MARKING SCHEME

2011

CLASS XII

SCIENCE SUBJECTS

CENTRAL BOARD OF SECONDARY EDUCATION
DELHI

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Manuscript as such highlights the main value points and does not represent a complete ideal answer.
Manuscript may vary from time to time and year to year.

PREFACE

CBSE as a pace setting national Board has constantly been striving to design its evaluation process in a manner that it is used as a powerful means of influencing the quality of teaching and learning in the classroom situation. Also, it has to be so designed that it provides constant feedback regarding the effectiveness of the course content, classroom processes and the growth of individual learners besides the appropriateness of evaluation procedures.

As a move in this direction, CBSE started the practice of publishing the Marking Schemes with twin objectives in mind-(i) making the system more transparent and at the same time, (ii) ensuring high degree of reliability in scoring procedure.

Who are the markers of answer scripts? How do they mark the answer scripts? How can it be ensured that marking is fair, objective and reliable? Questions of these types naturally arise in the minds of candidates appearing in the public examination. These questions are equally pertinent to the teachers who are not adequately exposed to the CBSE system of marking.

Answer Scripts marking is a specialised job. It is assigned to teachers-PGTs for Class XII and TGTs for Class X who are in direct touch with the subject and have a minimum of 3 years experience of teaching the subject at that level. Appointment of examiners is made in accordance with the well-defined norms. Markers examine scripts with the help of detailed guidelines called the 'Marking Schemes'.

It is this tool (Marking Scheme) alongwith the extensive supervisory checks and counter-checks through which CBSE tries to ensure objective and fair marking. The present publication is being brought out with a view to serving the following objectives :

(i) To give an opportunity to the teachers and students to look into the Marking Schemes that were developed by the Board and supplied to the evaluators in 2011 main examination in some selected main subjects.

(ii) To receive feedback and suggestions from institutions/subject teachers on the utility and further improvement of Marking Schemes.

(iii) To encourage institutions to undertake similar exercise of developing marking schemes for classes other than those covered by the Board's examination with a view to increasing teachers' responsiveness to them as the essential tools of evaluation.

HOW TO USE

Teachers and the students preparing for Class XII examination of the Board constitute the primary interest-group of this publication. Marking Schemes of Question Papers in the subjects of English Core, Functional English, Mathematics, Physics, Chemistry, Biology, Bio-Technology, Informatics Practices, Computer Science, Engineering Drawing and Multimedia & Web Technology administered in Delhi and Outside Delhi during the 2011 main examination have been included in this document. Some tips on their usage are given below :

(a) To Teachers :

— Go through the syllabus and the weightage distribution for the subject carefully.

— Read the question paper to find out how far the question paper set subscribes to the prescribed design. Grade every question by difficulty level for students who have taken the main Board examination.

— Consult the 'Marking Scheme' for each question, with reference to steps into which answers and awards have been divided.

— Work out concrete suggestions for the Board.

(b) To Students :

— Study each question carefully, comprehend them and write down the main points of the answer and note down their difficulties for clarification.

— Examine a question in conjunction with the Marking Scheme and find out the proximity of the answer to that suggested in the Marking Scheme.

— We will feel motivated if this publication is commented upon by practitioners in the context of its impact on their teaching learning strategies. Contribution of the experts and the officials of the Board in bringing out this document is gratefully acknowledged.

We urge the teachers to encourage their students to make use of this publication and at the same time to enrich us with their free and frank reactions.

M.C. SHARMA
CONTROLLER OF EXAMINATIONS

भारत का संविधान
उद्देशिका

हम, भारत के लोग, भारत को एक '[सम्पूर्ण प्रभूत्व-संपन्न समाजवादी पंथनिरपेक्ष लोकतंत्रात्मक गणराज्य] बनाने के लिए, तथा उसके समस्त नागरिकों को:

सामाजिक, आर्थिक और राजनैतिक न्याय,

विचार, अभिव्यक्ति, विश्वास, धर्म

और उपासना की स्वतंत्रता,

प्रतिष्ठा और अवसर की समता

प्राप्त कराने के लिए,

तथा उन सब में,

व्यक्ति की गरिमा और ² [राष्ट्र की एकता

और अखण्डता] सुनिश्चित करने वाली बंधुता

बढ़ाने के लिए

दृढ़संकल्प होकर अपनी इस संविधान सभा में आज तारीख 26 नवम्बर, 1949. ई॰ को एतद्द्वारा इस संविधान को अंगीकृत, अधिनियमित और आत्मार्पित करते हैं।

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1. संविधान (बयालीसवां संशोधन) अधिनियम, 1976 की धारा 2 द्वारा (3.1.1977) से "प्रभुत्व-संपन्न लोकतंत्रात्मक गणराज्य" के स्थान पर प्रतिस्थापित।

2. संविधान (बयालीसवां संशोधन) अधिनियम, 1976 की धारा 2 द्वारा (3.1.1977 से), "राष्ट्र की एकता" के स्थान पर प्रतिस्थापित।

भाग 4 क
मूल कर्त्तव्य

51 क. मूल कर्त्तव्य - भारत के प्रत्येक नागरिक का यह कर्त्तव्य होगा कि वह –

(क) संविधान का पालन करें और उसके आदर्शों, संस्थाओं, राष्ट्र ध्वज और राष्ट्र गान का आदर करें;

(ख) स्वतंत्रता के लिए हमारे राष्ट्रीय आंदोलन को प्रेरित करने वाले उच्च आदर्शों को हृदय में संजोए रखें और उनका पालन करें;

(ग) भारत की प्रभुता, एकता और अखंडता की रक्षा करें और उसे अक्षुण्ण रखें;

(घ) देश की रक्षा करें और आह्वान किए जाने पर राष्ट्र की सेवा करें;

(ङ) भारत के सभी लोगों मे समरसता और समान भ्रातृत्व की भावना का निर्माण करें जो धर्म, भाषा और प्रदेश या वर्ग पर आधारित सभी भेदभाव से परे हों, ऐसी प्रथाओं का त्याग करें जो स्त्रियों के सम्मान के विरूद्ध हैं;

(च) हमारी सामासिक संस्कृति की गौरवशाली परंपरा का महत्व समझें और उसका परिरक्षण करें;

(छ) प्राकृतिक पर्यावरण की जिसके अंतर्गत वन, झील, नदी, और वन्य जीव हैं, रक्षा करें और उसका संवर्धन करें तथा प्राणि मात्र के प्रति दयाभाव रखें;

(ज) वैज्ञानिक दृष्टिकोण, मानववाद और ज्ञानार्जन तथा सुधार की भावना का विकास करें;

(झ) सार्वजनिक संपत्ति को सुरक्षित रखें और हिंसा से दूर रहें;

(ञ) व्यक्तिगत और सामूहिक गतिविधियों के सभी क्षेत्रों में उत्कर्ष की ओर बढ़ने का सतत प्रयास करें जिससे राष्ट्र निरंतर बढ़ते हुए प्रयत्न और उपलब्धि की नई ऊंचाईयों को छू लें।

THE CONSTITUTION OF INDIA

PREAMBLE

WE, THE PEOPLE OF INDIA, having solemnly resolved to constitute India into a [1] **[SOVEREIGN SOCIALIST SECULAR DEMOCRATIC REPUBLIC]** and to secure to all its citizens :

JUSTICE, social, economic and political;

LIBERTY of thought, expression, belief, faith and worship;

EQUALITY of status and of opportunity; and to promote among them all

FRATERNITY assuring the dignity of the individual and the [2] [unity and integrity of the Nation];

IN OUR CONSTITUENT ASSEMBLY this twenty-sixth day of November, 1949, do **HEREBY ADOPT, ENACT AND GIVE TO OURSELVES THIS CONSTITUTION.**

1. Subs, by the Constitution (Forty-Second Amendment) Act. 1976, sec. 2, for "Sovereign Democratic Republic (w.e.f. 3.1.1977)

2. Subs, by the Constitution (Forty-Second Amendment) Act. 1976, sec. 2, for "unity of the Nation (w.e.f. 3.1.1977)

THE CONSTITUTION OF INDIA

Chapter IV A

Fundamental Duties

ARTICLE 51A

Fundamental Duties - It shall be the duty of every citizen of India-

(a) to abide the Constitution and respect its ideals and institutions, the National Flag and the National Anthem;

(b) to cherish and follow the noble ideals which inspired our national struggle for freedom;

(c) to uphold and protect the sovereignty, unity and integrity of India;

(d) to defend the country and render national service when called upon to do so;

(e) To promote harmony and the spirit of common brotherhood amongst all the people of India transcending religious, linguistic and regional or sectional diversities; to renounce practices derogatory to the dignity of women;

(f) to value and preserve the rich heritage of our composite culture;

(g) to protect and improve the natural environment including forests, lakes, rivers, wild life and to have compassion for living creatures;

(h) to develop the scientific temper, humanism and the spirit of inquiry and reform;

(i) to safeguard public property and to abjure violence;

(j) to strive towards excellence in all spheres of individual and collective activity so that the nation constantly rises to higher levels of endeavour and achievement.

CONTENTS

Senior School Certificate Examination (XII)

Marking Scheme

LIST OF COORDINATORS/SUBJECT EXPERTS/REPRESENTATIVES OF THE REGIONS FOR UPDATION/FINALISATION OF THE MARKING SCHEME FOR THE SENIOR SCHOOL CERTIFICATE EXAMINATION, 2011

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ENGLISH (Core)

Time allowed : 3 hours   *Maximum Marks : 100*

General Instructions:

(i)   This paper is divided into three Sections: A, B and C. All the sections are compulsory.

(ii) Separate instructions are given with each section and question, wherever necessary. Read these instructions very carefully and follow them faithfully.

(iii) Do not exceed the prescribed word limit while answering the questions.

QUESTION PAPER CODE 1/1/1
SECTION A : READING   **20 Marks**

1.   Read the passage given below and answer the questions that follow: **12 marks**

1.   For many years now the Governments have been promising the eradication of child labour in hazardous industries in India. But the truth is that despite all the rhetoric no Government so far has succeeded in eradicating this evil, nor has any been able to ensure compulsory primary education for every Indian child. Between 60 and 100 million children are still at work instead of going to school, and around 10 million are working in hazardous industries. India has the biggest child population of 380 million in the world; plus the largest number of children who are forced to earn a living.

2.   We have many laws that ban child labour in hazardous industries. According to the Child Labour (Prohibition and Regulation) Act 1986, the employment of children below the age of 14 in hazardous occupations has been strictly banned. But each state has different rules regarding the minimum age of employment. This makes implementation of these laws difficult.

3.   Also, there is no ban on child labour in non-hazardous occupations. The act applies to the organised or factory sector and not the unorganized or informal sector where most children find employment as cleaners, servants, porters, waiters among other forms of unskilled work. Thus, child labour continues because the implementation of the existing laws is lax.

4.   There are industries, which have a special demand for child labour because of their nimble fingers, high level of concentration and capacity to work hard at abysmally

1

low wages. The carpet industry in U.P. and Kashmir employs children to make hand-knotted carpets. There are 80,000 child workers in Jammu & Kashmir alone. In Kashmir because of the political unrest, children are forced to work while many schools are shut. Industries like gem cutting and polishing pottery and glass want to remain competitive by employing children.

5. The truth is that it is poverty which is pushing children into the brutish labour market. We have 260 million people below the poverty line in India, a large number of them are women. Poor and especially woman-headed families, have no option but to push their little ones in this hard life in hostile conditions, with no human or labour rights.

6. There is a lobby which argues that there is nothing wrong with children working as long as the environment for work is conducive to learning new skills but studies have shown that the children are made to do boring, repetitive and tedious jobs and are not taught new skills as they grow older. In these hell-holes like the sweet shops of the old, there is no hope.

7. Children working in hazardous industries are prone to debilitating diseases which can cripple them for life. By sitting in cramped, damp and unhygienic spaces, their limbs become deformed for life. Inside matchstick, fire works and glass industries they are victims of bronchial diseases and T.B. Their mental and physical development is permanently impaired by long hours of work. Once trapped, they can't get out of this vicious circle of poverty. They remain uneducated and powerless. Finally, in later years, they too are compelled to send their own children to work. Child labour perpetuates its own nightmare.

8. If at all the Government was serious about granting children their rights, an intensive effort ought to have been made to implement the Supreme Court's Directive of 1997 which laid down punitive action against employers of child labour. Only compulsory primary education can eliminate child labour.

9. Surely, if 380 million children are given a better life and elementary education, India's human capital would be greatly enhanced. But that needs, as former President Abdul Kalam says, "a Second Vision".

(a) (i)   On which two counts has the Government not succeeded so far in res-
            pect of children?   2

     (ii)   What makes the implementation of child labour law difficult ?   2

     (iii) Why do the industries prefer child labour?   2

(iv) What are the adverse effects of hazardous industries on children? Give any two. 2

(v) What does the Supreme Court's Directive of 1997 provide? 1

(b) Find words from the passage which mean the same as the following : 1 x 3 = 3

(i) risky/dangerous (para 1)

(ii) very unfriendly (para 5)

(iii) intended as punishment (para 3)

2. Read the passage given below and answer the questions that follow: **8 marks**

There is nothing more frustrating than when you sit down at your table to study with the most sincere of intentions and instead of being able to finish the task at hand, you find your thoughts wandering. However, there are certain techniques that you can use to enhance your concentration. "Your concentration level depends on a number of factors," says Samuel Ghosh, a social counsellor. "In order to develop your concentration span, it is necessary to examine various facets of your physical and internal environment," she adds.

To begin with one should attempt to create the physical environment that is conducive to focussed thought. Whether it is the radio, TV or your noisy neighbours, identify the factors that make it difficult for you to focus. For instance, if you live in a very noisy neighbourhood, you could try to plan your study hours in a nearby library.

She disagrees with the notion that people can concentrate or study in an environment with distractions like a loud television, blaring music etc. "If you are distracted when you are attempting to focus, your attention and retention powers do not work at optimum levels," cautions Ghosh. "Not more than two of your senses should be activated at the same time," she adds. What that means is that music that sets your feet tapping is not the ideal accompaniment to your books.

Also do not place your study table or desk in front of a window. "While there is no cure for a mind that wants to wander, one should try and provide as little stimulus as possible. Looking out of a window when you are trying to concentrate will invariably send your mind on a tangent," says Ghosh.

The second important thing, she says, is to establish goals for oneself instead of setting a general target and then trying to accomplish what you can in a haphazard fashioh. It is very important to decide what you have to finish in a given span of time.

The human mind recognizes fixed goals and targets and appreciates schedules more than random thoughts. Once your thoughts and goals are in line, a focussed system will follow.

She recommends that you divide your schedule into study and recreation hours. When you study, choose a mix of subjects that you enjoy and dislike and save the former for the last so that you have something to look forward to. For instance, if you enjoy verbal skill tests more than mathematical problems, then finish Maths first. Not only will you find yourself working harder, you will have a sense of achievement when you wind up.

Try not to sit for more than 40 minutes at a stretch. Take a very short break to make a cup of tea or listen to a song and sit down again. Under no circumstances, should one sit for more than one and a half hours. Short breaks build your concentration and refresh your mind. However, be careful not to overdo the relaxation. It may have undesired effects.

More than anything else, do not get disheartened. Concentration is merely a matter of disciplining the mind. It comes with practice and patience and does not take very long to become a habit for life.

(a) On the basis of your reading of the above passage make notes on it in points only, using abbreviations wherever necessary. Supply a suitable title.   5

(b) Write a summary of the above in 80 words.   3

SECTION - B (Advanced Writing Skills)   35 Marks

3. You are Srinivas/Srinidhi of D.P. Public School, Nagpur. As Student Editor of your school magazine, draft a notice in not more than 50 words for your school notice board inviting articles/sketches from students of all classes.   **5 marks**

OR

You want to rent out your newly constructed flat in the heart of the city. Draft an advertisement in not more than 50 words to be published in 'The Deccan Herald', Bangalore under classified columns. Give all the necessary details. You are Mohan/Mahima of Jayanagar, Bangalore.

4. You are Cultural Secretary of PND Xavier School, Jamshedpur. Your school organised, a debate on the topic, 'The impact of reality shows on the younger generation'. Write a report in 100-125 words to be published in 'The Times of India', Jamshedpur.   **10 marks**

A major bus mishap which left several people seriously injured took place at Nicholas Road, Nungambakkam, Chennai. Luckily no life was lost. Collect the information from the eyewitnesses and send a report in 100-125 words to 'The Nungambakkam Times'. You are Vinod/Vinodhini, a reporter.

5. Write a letter to the Dean, D.P.!. School of Management, Mumbai, requesting him to apprise you of the details such as eligibility criteria, fees, hostel facility, prospects of placement etc. for admission to P.G. Diploma in HRM. You are Ram/Romola of 21 Civil Lines, Bareily. **10 marks**

OR

Write a letter to the Editor, 'Deccan Times', Bangalore about the inadequate parking facilities in the Commercial Street, M.G. Road, which is causing a lot of inconvenience to the people. Offer your suggestions. You are Anoop/Ritu, 24 Hennus Road, Bangalore.

6. Increase in the number of vehicles causes pollution and traffic jams. Write an article in 150-200 words for 'The New Indian Express', Delhi, highlighting the urgent need to solve these man-made problems, giving suitable suggestions. You are Madhav / Madhuri. **10 marks**

OR

In almost all big cities in the country there is a mushroom growth of slums where people are living in inhuman conditions. Write an article in 150-200 words about this problem suggesting steps to deal with it. You are Komal /Kartik.

SECTION - C (Text Books)　　　　　　　　**45 Marks**

7. Read the extract given below and answer the questions that follow: **4 marks**

.... but soon

put that thought away and

looked out at young

trees sprinting, the merry children spilling

out of their homes, ...

(a) Which thought did the poet put away? 1

(b) What do the sprinting trees' signify? 1

(c) What are 'the merry children spilling out of their homes', symbolic of? 2

OR

Surely, Shakespeare is wicked, the map a bad example,

With ships and sun and love tempting them to steal –

For lives that slyly turn in their cramped holes

From fog to endless night? On their slag heap, these children

Wear skins peeped through by bones and spectacles of steel

With mended glass, like bottle bits on stones.

(a) Why is Shakespeare described as wicked? 2

(b) Explain: 'from fog to endless night'. 1

(c) What does the reference to 'slag heap' mean ? 1

8. Answer any three of the following in 30-40 words each: **2x3 = 6 marks**

(a) Do you think the poet, Pablo Neruda advocates total inactivity and death? Why / Why not?

(b) Why and how is grandeur associated with the mighty dead? (A Thing of Beauty)

(c) What was the plea of the folk who had put up the roadside stand?

(d) How do 'denizens' and 'chivalric' add to our understanding of the tigers' attitude?

9. Answer the following in 30-40 words each: **2x5 = 10 marks**

(a) What was Franz expected to be prepared with for the school that day?

(b) Why was Douglas determined to get over his fear of water?

(c) Why was the crofter so talkative and friendly with the peddler?

(d) Why did the author appear to be doing nothing at Gemini studios?

(e) Why didn't Sophie want Jansie to know about her story with Danny?

10. Answer the following in 125-150 words: **10 marks**

Give a brief account of the life and activities of the people like Saheb-e-Alam settled in Seemapuri.

11. Answer the following in 125-150 words: **7 marks**

The lesson, 'On The Face of It', is an apt depiction of the loneliness and sense of alienation experienced by people on account of a disability. Explain.

OR

What precautions were taken by the prison authorities to ensure that the German exam was conducted smoothly and also under strict security?

12. Answer the following in 30-40 words each: **2 x 4 = 8 marks**

(a)   What were the writer's feelings on reaching Antarctica?

(b)   How did Dr. Sadao ensure that the American sailor left his house but he himself remained safe and secure?

(c)   What part of the story did Jack himself enjoy the most and why?

(d)   What did Zitkala-Sa feel when her long hair was cut?

QUESTION PAPER CODE 1/1
SECTION A : READING   **20 Marks**

1.   Read the passage given below and answer the questions that follow: 12

1   For many years now the governments have been promising the eradication of child-labour in hazardous industries in India. But the truth is that despite all the rhetoric no government so far has succeeded in eradicating this evil, nor has any been able to ensure compulsory primary education for every Indian child. Between 60 and 100 million children are still at work instead of going to school, and around 10 million are working in hazardous industries. India has the biggest child population of 380 million in the world, plus the largest number of children who are forced to earn a living.

2   We have many laws that ban child-labour in hazardous industries. According to the Child Labour (Prohibition and Regulation) Act 1986, the employment of children below the age of 14 in hazardous occupations has been strictly banned. But each state has different rules regarding the minimum age of employment. This makes implementation of these laws difficult.

3   Also, there is no ban on child-labour in non-hazardous occupations. The Act applies to the organised or factory sector and not the unorganised or informal sector where most children find employment as cleaners, servants, porters, waiters etc. among other forms of unskilled work. Thus, child-labour continues because the implementation of the existing laws is lax.

4   There are industries, which have a special demand for child labour because of their nimble fingers, high level of concentration and capacity to work hard at abysmally low wages. The carpet industry in U.P. and Kashmir employs children to make hand-knotted carpets. There are 80,000 child workers in Jammu & Kashmir alone. In Kashmir because of the political unrest, children are forced, to work while many schools are shut. Industries like gem cutting and polishing pottery and glass want to remain competitive by employing children.

5   The truth is that it is poverty which is pushing children into the brutish labour market. We have 260 million people below the poverty line in India, a large number of them are women. Poor and especially Woman-headed families, have no option but to push their little ones in this hard life in hostile conditions, with no human or labour rights.

6   There is a lobby which argues that there is nothing wrong with children working as long as the environment for work is conducive to learning new skills, but studies have shown that the children are made to do boring, repetitive and tedious jobs and are not taught new skills as they grow older. In these hell-holes like the sweet shops of the old there is no hope.

7   Children working in hazardous industries are prone to debilitating diseases which can cripple them for life. By sitting in cramped, damp and unhygienic spaces, their limbs become deformed for life. Inside matchstick, fire-works and glass industries they are victims of bronchial diseases and T.B. Their mental and physical development is permanently impaired by long hours of work. Once trapped, they. can't get out of this vicious circle of poverty. They remain uneducated and powerless. Finally, in later years, they too are compelled to send their own children to work. Child-labour perpetuates its own nightmare.

8   If at all the government was serious about granting children their rights, an intensive effort ought to have been made to implement the Supreme Court's Directive of 1997 which laid down punitive action against employers of child-labour. Only compulsory pnmary education can eliminate child-labour.

9   Surely, if 380 million children are given a better life and elementary education, India's human capital would be greatly enhanced. But that needs, as former President Abdul Kalam says, "a second vision".

(a)   (i)   On which two counts has the government not succeeded so far in respect of children?   2

         (ii)   What makes the implementation of child-labour law difficult?   2

         (iii)   Why do the industries prefer child-labour?   2

         (iv)   What are the adverse effects of hazardous industries on children? Give any two.   2

         (v)   What does the Supreme Court's Directive of 1997 provide?   1

(b)   Find words from the passage which mean the same as the following: 3

         (i)   risky/dangerous (para 1)

         (ii)   very unfriendly (para 5)

         (iii)   intended as punishment (para 8)

2.   Read the passage given below and answer the questions that follow: 8

There is nothing more frustrating than when you sit down at your table to study with the most sincere of intentions and instead of being able to finish the task at hand you find your thoughts wandering. However, there are certain techniques that you can use to enhance your concentration. "Your concentration level depends on a number of factors," says Samuel Ghosh, a social counsellor. "In order to develop your concentration span, it is necessary to examine vanous facets of your physical and internal environment," she adds.

To begin with one should attempt to create the physical environment that is conducive to focussed thought. Whether it is the radio, TV or your noisy neighbours, identify the factors that make it difficult for you to focus. For instance, if you live in a very noisy neighbourhood, you could try to plan your study hours in a nearby library.

She disagrees with the notion that people can concentrate or study in an environment with distractions like a loud television, blaring music etc. "If you are distracted when you are attempting to focus, your attention and retention powers do not work at optimum levels," cautions Ghosh. "Not more than two of your senses should be activated at the same time," she adds. What that means is that music that sets your feet tapping is not the ideal accompaniment to your books.

Also do not place your study table or desk in front of a window. "While there is no cure for a mind that wants to wander, one should try and provide as little stimulus as possible. Looking out of a window when you are trying to concentrate will invariably send your mind on a tangent," says Ghosh.

The second important thing, she says, is to establish goals for oneself instead of setting a general target and then trying to accomplish what you can in a haphazard fashion. It is very important to decide what you have to finish in a given span of time. The human mind recognises fixed goals and targets and appreciates schedules more than random thoughts. Once your thoughts and goals are in line, a focussed system will follow.

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Try not to sit for more than 40 minutes at a stretch. Take a very short break to make a cup of tea or listen to a song and sit down again. Under no circumstances, should one sit for more than one and a half hours. Short breaks build your concentration and refresh your mind. However, be careful not to overdo the relaxation. It may have undesired effects.

More than anything else, do not get disheartened. Concentration is merely a matter of disciplining the mind. It comes with practice and patience and does not take very long to become a habit for life.

(a) On the basis of your reading of the above passage, make notes on it in points only, using abbreviations wherever necessary. Supply a suitable title.　　5

(b) Write a summary of the above in 80 words.　　3

SECTION B : ADVANCED WRITING SKILLS　　35

3. You are Secretary of Gymkhana Club, Madurai. Write a notice in not more than 50 words informing the members to attend an extraordinary meeting of the governing body. Include details like date, time, venue etc. Sign as Prabhu/Pratibha.　　5

OR

Due to a sudden landslide and inclement weather, St. Francis School, Vasco has to be closed for a week. As Principal of that school, draft a notice in not more than 50 words to be displayed at the school main gate notice board.

4. You are Poorva/Partha, Cultural Secretary of your school, D.B. Senior Secondary School, Ambur. A week-long Music and Dance festival was organised by your school. Write a report in 100 - 125 words for your school magazine. Invent the details.   10

OR

The Debating Society of your school has recently held a workshop on 'Continuous and Comprehensive Evaluation' (CCE) introduced for the students of Class X in all schools. The students discussed the assessment made by the school on the basis of their participation in various activities and the system of grading. Write a report in 100 - 125 words for your school magazine. You are Parveen/Payal, Secretary of the Society.

5. You are Raman / Rama, a member of Parent-Teacher Association of Little Valley Senior Secondary School, Hyderabad. Write a letter to the Principal of the school asking him to introduce vocational stream in the school providing facility of teaching such subjects as computers, insurance etc. so that the students may not needlessly continue academic studies. You are residing at 15, Anand Colon)', Hyderabad.   10

OR

Write a letter to the Manager (Publications) of Little Flower Company, Hyderabad, placing an order for 4 books on Management and Administration recently published by them. You are Ronit / Rohini, Librarian, H.P. Engineering College, Tirupathi.

6. The invention of mobile phone has brought about a revolution in the lives of the people in the country. If used properly it can be a blessing but if misused it can prove to be a curse. Write an article in 150 - 200 words on 'Mobile phone - a boon or bane'. You are Kartik/Krishna.   10

OR

With the rising number of people in almost all the big cities of the country, the rate of crime has also increased proportionately. The police needs to be trained in new methodology of combating the crime besides changing its mindset. Write an article in 150 - 200 words on 'The role of police in maintaining law and order in the metropolitan cities'. You are Ravi/Ravina.

7.   Read the extract given below and answer the questions that follow: 4

      Sometimes I feel myself I can hardly bear

      The thought of so much childish longing in vain,

      The sadness that lurks near the open window there,

      That waits all day in almost open prayer

      For the squeal of brakes, the sound of a stopping car,

      Of all the thousand selfish cars that pass,

      (a)   What is the 'childish longing' that the poet refers to ?   1

      (b)   Why does the poet say that it is in vain?   1

      (c)   Why do the people driving in the cars stop sometimes?   2

                                    OR

            Break O break open till they break the town

            And show the children to green fields, and make their world

            Run azure on gold sands, and let their tongues

            Run naked into books the white and green leaves open

            History theirs whose language is the sun.

      (a)   To whom does 'they' refer?   1

      (b)   What would they break?   1

      (c)   What other freedom should they enjoy?   2

8.   Answer any three of the following in 30 - 40 words each: 2x3=6

      (a)   What is the sadness that the poet, Pablo Neruda refers to in the poem, 'Keeping Quiet' ?

      (b)   What is the message of the poem, 'A Thing of Beauty' ?

      (c)   What were Kamala Das' fears as a child? Why do they surface when she is going to the airport?

(d) Why do you think Aunt Jennifer created animals that are so different from her own character?

9. Answer the following in 30 - 40 words each: 2x5=10

(a) Franz thinks, "Will they make them sing in German, even the pigeons ?" What does this tell us about the attitude of the Frenchmen?

(b) Which factors led Douglas to decide in favour of Y.M.C.A. pool?

(c) Why was the peddler surprised when he knocked on the door of the cottage?

(d) Why was the Moral Re-Armament Army welcomed at the studios?

(e) What thoughts came to Sophie's mind as she sat by the canal?

10. Answer the following in 125 - 150 words: 10

Why do you think Gandhiji considered the Champaran episode to be a turning-point in his life?

OR

'Lost Spring' explains the grinding poverty and traditions that condemn thousands of people to a life of abject poverty. Do you agree? Why / Why not?

11. Answer the following in 125 - 150 words: 7

Why is Antarctica the place to go to, to understand the Earth's present, past and future?

OR

Dr. Sadao was compelled by his duty as a doctor to help the enemy soldier. What made Hana, his wife sympathise with him in the face of open defiance from the domestic staff?

12. Answer the following in 30 - 40 words each: 2x4=8

(a) Why does Mr. Lamb leave his gate always open?

(b) How did the Governor react to the two phone calls he received in quick succession?

(c) What advice did Annan offer Bama?

(d) Why did Charley suspect that Sam had gone to Galesburg ?

Marking Scheme – English Core

General Instructions :

1. Evaluation is to be done as per instructions provided in the Marking Scheme Only.

2. The Marking Scheme provides suggested value points and not the complete answers.

3. If a question has parts, marks must be awarded on the right hand side for each part. Marks awarded to different parts of a question should then be totalled up, written and circled on the left hand margin of the answers concerned.

4. If a question does not have any parts, marks for that question must be awarded on the left-hand margin of the answer.

5. Where marks are allotted separately for content and expression as per the Marking Scheme, they have to be reflected separately and then totalled up. This is mandatory.

6. A slash (/) in the Marking Scheme indicates alternative answers(s) to a question. If a student writes an answer which is not given in the Marking Scheme but which seems to be equally acceptable, marks must be awarded in consultation with the Head-Examiner.

7. If a child has attempted an extra-question, answer deserving more marks should be retained and the other answer be scored out.

8. Q1 under Section A (reading) and Q7 under Section C (text books) have been designed to test students' ability to comprehend the given passage. As such the examinees need not to be unnecessarily penalised for their language errors.

9. Where questions have been designed to test the writing skills of students, the expression (grammatical accuracy, appropriate use of words, style, spelling, organization and presentation of relevant matter in a coherent and logical way) assumes as much importance as the content.

10. Identify major mistakes and shortcomings before awarding marks.

11. Wherever the word limit is given, no marks be deducted for exceeding it. However, due credit should be given for precise answers.

12. If a student, in response to a short-answer-type question, writes a single word / phrase answer which constitutes the core of the answer, it must be accepted and awarded marks.

13. If a student literally lifts a portion of the given passage / extract from the question paper as an answer to a question, no mark(s) to be deducted on this count as long as it is relevant and indicative of the desired understanding on the part of the student [reference questions under Q1 and Q7].

14. A full scale of marks - 0 to 100 - is to be used while awarding marks. In case of an answer book deserving 90 marks and above, marks be awarded only in consultation with the Head Examiner.

QUESTION PAPER CODE 1/1/1

EXPECTED ANSWERS/VALUE POINTS

SECTION A: (READING) 20 Marks

1 **COMPREHENSION PASSAGE**

(a) NOTE: No mark(s) should be deducted for mistakes in usage and grammar, spelling, or word limit. Full marks may be awarded if a student has been able to identify the core ideas. If a student literally lifts a portion of the given passage as an answer to a question, no mark(s) to be deducted for this as long as it is relevant.

    (i)   –   eradication of child labour in hazardous industries

           –   ensuring compulsory primary education   1+1 mark

    (ii)   –   each state has different rules regarding the minimum age of employment   2 marks

           –   no ban on child labour in non-hazardous occupations

           –   the act applies only to organised or factory sector and not the unorganised sector

           –   implementation of existing laws is lax

                    (any two)

    (iii)   –   because of nimble fingers of children   2 marks

           –   high level of concentration

		–	capacity to work hard	
		–	low wages	
			(any two)	
	(iv)	–	prone to debilitating diseases which can cripple them for life	3 marks
		–	limbs become deformed because of working in cramped, damp and unhygienic spaces	
		–	victims of bronchial diseases and TB	
		–	mental and physical development is permanently impaired	
		–	remain uneducated and powerless	
		–	no escape from the vicious circle	
			(any two)	
	(v)	–	punitive action against employers of child labour	1 mark
(b)	(i)		hazardous	1 mark
	(ii)		hostile / brutish	1 mark
	(iii)		(due to printing error credit of 1 mark to be given to all the students, whether they have attempted it or not)	1 mark

2   Note

- If a student has attempted only summary or only notes, due credit should be given.

- 1 mark allotted for the title be given if a student has written the title either in Q2(a) or Q2(b) part

- Content must be divided into heading and sub headings

The notes provided below are only guidelines. Any other title, main points and sub-points may be accepted if they are indicative of the candidate's understanding of the given passage, and the notes include the main points, with suitable and recognizable abbreviations. Complete sentences not to be accepted as notes. (In such cases ½ –1 mark may be deducted from marks awarded to content)

Numbering of points may be indicated in different ways, as long as a consistent pattern is followed.

(a) **NOTE MAKING**

Distribution of Marks

Abbreviations / Symbols (with /without key) – any four   1 mark

Title   1 mark

Content (minimum 3 headings and sub-headings, with proper indentation and   3 mark
notes)

Suggested Notes

Title: Concentration / Techniques to Enhance Concentration / Developing
           Concentration / Improving Concentration / any other suitable title

1   Hurdles / Barriers to Conc.

    1.1   wandering thoughts

    1.2   radio , TV

    1.3   noisy environment

    1.4   distracting env.

2   Technique of Enhancement

    2.1   examine environmental facets – phy. & internal

    2.2   identify distracting factors

    2.3   activate one sense at a time

    2.4   study table / desk away from window

3   Managing Conc.

    3.1   establish specific goals rather than gen. targets

    3.2   setting of thoughts & goals in line

    3.3   time management

4   Recommendations

    4.1   establish goals & schedules

    4.2   plan study & recreat'n'l hrs.

    4.3   make conc. a habit for life

5   Ultimate Help / Aid

    5.1   don't get disheartened

    5.2   discipline the mind

    5.3   practise & develop patience

(b) **Summary**

The summary should include all the important points given in the notes.

Content	2 mark
Expression	1 mark

SECTION B: ADVANCED WRITING SKILLS

NOTE: The objective of the section on Advanced Writing Skills is to test a candidate's writing ability. Hence, expression assumes as much importance as the content of the answer.

3   **NOTICE**

Format   1 mark

The format should include: NOTICE / TITLE, DATE, and WRITER'S NAME WITH DESIGNATION. The candidate should not be penalized if he has used capital letters for writing a notice within or without a box.

Content   2 marks

Expression   2 marks

Suggested value points

(SCHOOL MAGAZINE)

–   what (inviting articles / sketches / compositions from students)

–   why (for publication in school magazine)

–   how (neatly and legibly written)

–   last date for submission

–   to be given to whom/ contact person

–   any other relevant details

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OR

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ADVERTISEMENT

Content   3 marks

Expression   2 marks

Suggested value points

(TO LET / ACCOMMODATION AVAILABLE)

–   type of accommodation

–   location

–   facilities

–   expected rent

–   contact

–   any other relevant details

     (due credit should be given for economy of words used)

4   **REPORT WRITING**

Format

1.   title, reporter's name

2.   place, date – (optional)   1 mark

Content   4 marks

Expression

grammatical accuracy, appropriate words and spelling   [2½]

coherence and relevance of ideas and style   [2½]   5 marks

Suggested value points:

(THE IMPACT OF REALITY SHOWS/ any other suitable heading)

–   what – debate on the impact of reality shows on the younger generation

–   when – date and time

–   where – venue

–   participation level

–   panel of judges

–   students' response

–   result / prizes

–   any other relevant details

<div align="center">**OR**</div>

Suggested value points

(BUS MISHAP)

–   what – a bus mishap resulting in serious injuries to passengers

–   when (day, date, time)

<div align="center">**19**</div>

- where (Nicholas Road, Nungambakkam, Chennai)

- how the accident took place

- injuries suffered

- account of eye witnesses

- action taken by authorities

- any other relevant details

5 **LETTER WRITING**

[Note: - No marks are to be awarded if only the format is given. Credit should be given for the candidate's creativity in presentation of ideas. Use of both the traditional and the new format is permitted.]

Format   2 marks

1. sender's address, 2. date, 3. receiver's address, 4. subject / heading, 5. salutation, 6. complimentary close.

Content   4 marks

Expression

grammatical accuracy, appropriate words and spelling   [2]

coherence and relevance of ideas and style   [2]   4 marks

(P G DIPLOMA IN HRM)

Suggested Value Points

- purpose (details for admission)

- eligibility criteria

- fees

- hostel facility

- prospects of placement

- scholarships available (if any)

- request for prospectus

- any other relevant details

OR

(INADEQUATE PARKING FACILITIES)

Suggested Value Points

– introducing the problem (inadequate parking facilities)

– inconvenience caused (traffic congestion, accidents, etc.)

– suggestions for improvement

– any other relevant details

6 **ARTICLE WRITING**

Format: (Title and writer's name)   1 mark

Content   4 marks

Expression

grammatical accuracy, appropriate words and spelling   [2½]

coherence and relevance of ideas and style   [2½]   5 marks

Suggested Value Points

(POLLUTION AND TRAFFIC JAMS / any other suitable title)

Problems caused by pollution and traffic jams

– health problems

– harm to the environment

– wastage of time, fuel, man hours etc

Suggestions for improvement (urgent need to solve problems)

– decongesting market places

– compulsory pollution checks

– regulating traffic

– penalty for non-observance of rules

– improving public transport system

– any other relevant details

<div align="center">OR</div>

Suggested Value Points

(MUSHROOM GROWTH OF SLUMS/ any other suitable title)

the problem (mushroom growth of slums)

– crowding of cities

– inhuman conditions (temporary hutments, problems of water, electricity, toilets, roads, schools, clinics etc.)

– burden on city's infrastructure, facilities and conveniences

– eyesore / filth / garbage / unhygienic conditions

– under-employment and unemployment

– increase in crime rate

– any other related problem

suggestions to deal with the problems

– discouraging migration from rural areas

– decongesting cities

– equitable development of rural and urban areas

– creating better job opportunities in rural areas / better educational and medical facilities

– any other relevant details

SECTION C: LITERATURE (TEXT BOOKS)

NOTE: The objective of the section on Literature is to test a candidate's ability to understand and interpret the prescribed text through short and long answer type questions. Hence both content and expression in answers to the given questions deserve equal importance while awarding marks.

7 [This question has been designed to test the students' understanding of the text and their ability to interpret, evaluate and respond to the questions based on the given extract. In other words, it attempts to test their reading comprehension ONLY.]

Value points:

(a) – painful thought of mother's ageing and declining health/ losing her mother / being separated from her mother / she might not see her mother after returning / thought that mother was getting old / nearing her end   1 mark

(b) – the trees appear to be racing past as the car moves towards the airport / energy / youth / activity and enthusiasm / passage of time / old mother contrasted with young trees   1 mark

(c) – energy, playfulness / symbolic of happiness / stark contrast to old, dozing mother / sad thoughts of the poet contrasted with merry children

<div align="center">(any two)   2 marks</div>

<div align="center">**OR**</div>

(a) – no correlation between Shakespeare's works and the life of the slum children   2 marks

    – classic literature of Shakespeare beyond the understanding of slum children

    – beautiful world depicted by Shakespeare is denied to the slum children

<div align="center">(any two)</div>

(b) – miserable, bleak, cheerless and hopeless life of the slum children / gloomy future   1 mark

(c) – miserable condition of the slum children / unhygienic conditions / extreme poverty / waste / rejected / neglected / considered useless   1 mark

8   **Short answer type questions (Poetry)**

Distribution of marks:

Content: 1 mark

Expression

(deduct ½ mark for two or more grammatical/spelling mistakes)   1 mark

Value points:

(a) – No, not doing anything, not speaking in any tongue would give mankind an opportunity to introspect and know how it has been harming itself and the others / wants to have no truck with death / life sprouting out of seemingly dead surroundings / lesson to learn from the earth   2 marks

(b) – because of their grand deeds and achievements / their lives, deeds and achievements look extraordinary / we have imagined their greatness, heard of it / grandeur of the mighty dead is a thing of beauty / source of inspiration for others   2 marks

(c) – plea to the city dwellers to stop and buy their wares so that they could earn money for a decent life / the city money   2 marks

(d) – denizens (tigers of a world of green / live in forests), chivalric (brave, fearless, basic nature of the tigers) / brave and fearless animals living in the forest   2 marks

<div align="center">**23**</div>

9   **Short answer type questions (Prose)**

Questions are to be answered in 30-40 words each.

Distribution of marks:

Content: 1 mark

Expression

(deduct ½ mark   for   two   or   more grammatical/spelling mistakes)   1 mark

Value points:

(a)   –   rules of participles / grammar   2 marks

(b)   –   couldn't enjoy water sports (canoeing, boating, swimming etc) / the
            fear ruined his fishing trips   2 marks

(c)   –   lived alone / without wife, child or companion / suffered from loneliness   2 marks

(d)   –   job involved sitting at desk and tearing up newspapers day in and day
            out / cutting newspaper clippings on a wide variety of subjects and
            storing them in files / job not directly related to film making at the studio   2 marks

(e)   –   Jansie would spread it around / wouldn't keep it a secret / knew that
            Jansie wouldn't believe her so easily   2 marks

Q 10 & 11 [These questions have been set to test the students' understanding of the
text and their ability to interpret, evaluate and respond to the issues raised therein.
Hence no particular answer can be accepted as the only correct answer. All
presentations may be accepted as equally correct provided they have been duly
supported by the facts drawn from the text. The important thing is that the student
should be able to justify his or her viewpoint.]

10   Distribution of marks:

Content   5 marks

Expression

grammatical accuracy, appropriate words and spelling   [2½]

coherence and relevance of ideas and style   [2½]   5 marks

Value points:

–   poor rag pickers / unschooled / barefoot / sometimes taking up odd jobs like
     working at tea stalls

–   garbage to them is gold, it is their daily bread

- migrants (squatters) from Bangladesh, came to Delhi in 1973

- their fields and homes swept away in storms

- live in structures of mud with roofs of tin and tarpaulin, devoid of sewage, drainage or running water

- have lived for more than 30 years without identity, without permits but with ration cards

- no intention of going back to their own country

- wherever they find food, they pitch their tents

(any five)

OR

- Umberto Eco's style is narrative written in the manner of a story (in contrast to a regular academic style which is invariably depersonalised, dry and boring)

- his scholarly work has a certain playful and personal quality about it

- philosophical interests pursued through academic work and novels

- books for children on non-violence and peace

- any other relevant point

11 Distribution of marks:

Content: 4 marks

Expression

grammatical accuracy, appropriate words and spelling   [1½]

coherence and relevance of ideas and style   [1½]   3 marks

Value Points:

- loneliness and sense of alienation experienced by Derry and Mr Lamb

Derry

- loner / pessimistic / suffered from severe negative complexes / anger and frustration / withdrawn and introverted / low confidence / indulged in self pity / suspicious of the intent of others

(any two)

Mr Lamb

- inwardly - lonely, craved for company and acceptance

25

- outwardly - jovial, optimistic, lover of nature, social, outgoing, tolerant (didn't mind children calling him Lamey Lamb or picking the Crab apples)

- helpful, sensitive, independent

(any two)

OR

- Evans' razor, nail scissors were removed from the cell

- Reverend Stuart McLeery was the invigilator / he was frisked on arrival

- police officer Stephens deputed on duty inside the cell

- all the prison officials were put on high alert

- two locked doors between Evan's cell and the yard

- microphone installed in the cell as a precaution. The warden could listen to their talk by switching on the receiver

- any other relevant point from the text

(any four)

12   Distribution of marks:

Content: 1 mark

Expression

(deduct ½ mark for two or more grammatical/spelling mistakes)   1 mark

Value points:

(a)   –   relief followed by immediate and profound wonder at Antarctica's immensity and isolation   2 marks

(b)   –   offered his personal boat with food and extra clothing / advised him to go to a nearby island and escape from there by boarding a Korean fishing boat   2 marks

(c)   What   2 marks

- enjoyed narrating the part of the story where Roger goes to the wizard's house / imitating the wizard's voice (he did it by scrunching up his face and somehow whining through his eyes) / felt being an old man suited him / the part where he mixed his own childhood humiliations and experiences with narration of the story / the parts that made Jo apprehensive and tense

Why

– liked seeing his daughter holding on to his words / liked seeing her apprehensive and expecting something unexpected / enjoyed the expression of joy, wonder and suspense on his daughter's face / Jo enjoyed the stories narrated by him

(d) – felt indignant / anguished / lost her spirit / looked for comforting / felt like an animal driven by a herder / felt helpless like a puppet   2 marks

QUESTION PAPER CODE 1/1

EXPECTED ANSWERS/VALUE POINTS

SECTION A: (READING) 20 Marks

1   **COMPREHENSION PASSAGE**

(a)   NOTE: No mark(s) should be deducted for mistakes in usage and grammar, spelling, or word limit. Full marks may be awarded if a student has been able to identify the core ideas. If a student literally lifts a portion of the given passage as an answer to a question, no mark(s) to be deducted for this as long as it is relevant.

(i)   – eradication of child labour in hazardous industries

       – ensuring compulsory primary education   1 +1 mark

(ii)   – each state has different rules regarding the minimum age of emp-loyment   2 marks

       – no ban on child labour in non-hazardous occupations

       – the act applies only to organised or factory sector and not the unorganised sector

       – implementation of existing laws is lax

                  (any two)

(iii) – because of nimble fingers of children   2 marks

       – high level of concentration

       – capacity to work hard

       – low wages

                  (any two)

(iv)   – prone to debilitating diseases which can cripple them for life   2 marks

     –   limbs become deformed because of working in cramped, damp and unhygienic spaces

     –   victims of bronchial diseases and TB

     –   mental and physical development is permanently impaired

     –   remain uneducated and powerless

     –   no escape from vicious circle

<div align="center">(any two)</div>

(v)	–	punitive action against employers of child labour		1 mark
(b)	(i)	hazardous		1 mark
	(ii)	hostile / brutish		1 mark
	(iii)	punitive		1 mark

2   **Note**

- If a student has attempted only summary or only notes, due credit should be given.

- 1 mark allotted for the title be given if a student has written the title either in Q2(a) or Q2(b) part

- Content must be divided into heading and sub headings

The notes provided below are only guidelines. Any other title, main points and sub-points may be accepted if they are indicative of the candidate's understanding of the given passage, and the notes include the main points, with suitable and recognizable abbreviations. Complete sentences not to be accepted as notes. (In such cases ½ –1 mark may be deducted from marks awarded to content)

Numbering of points may be indicated in different ways, as long as a consistent pattern is followed.

(a)   **NOTE MAKING**

Distribution of Marks

Abbreviations / Symbols (with /without key) – any four   1 mark

Title   1 mark

Content (minimum 3 headings and sub-headings, with proper indentation and notes)   3 marks

Suggested Notes

Title: Concentration / Techniques to Enhance Concentration / Developing Concentration / Improving Concentration / any other suitable title

1   Hurdles / Barriers to Conc.

    1.1   wandering thoughts

    1.2   radio , TV

    1.3   noisy environment

    1.4   distracting env.

2   Techiques of Enhancement

    2.1   examine environmental facets – phy. & internal

    2.2   identify distracting factors

    2.3   activate one sense at a time

    2.4   study table / desk away from window

3   Managing Conc.

    3.1   establish specific goals rather than gen. targets

    3.2   setting of thoughts & goals in line

    3.3   time management

4   Recommendations

    4.1   establish goals & schedules

    4.2   plan study & recreat'n'l hrs.

    4.3   make conc. a habit for life

5   Ultimate Help / Aid

    5.1   don't get disheartened

    5.2   discipline the mind

    5.3   practise & develop patience

(b)   **Summary**

The summary should include all the important points given in the notes.

Content   2 marks

Expression   1 mark

SECTION B: ADVANCED WRITING SKILLS

NOTE: The objective of the section on Advanced Writing Skills is to test a candidate's writing ability. Hence, expression assumes as much importance as the content of the answer.

3   **NOTICE**

Format   1 mark

The format should include: NOTICE / TITLE, DATE, and WRITER'S NAME WITH DESIGNATION. The candidate should not be penalized if he has used capital letters for writing a notice within or without a box.

Content   2 marks

Expression   2 marks

Suggested value points

(EXTRAORDINARY MEETING OF GOVERNING BODY)

–   name of club – Gymkhana Club, Madurai

–   what – extraordinary meeting

–   when – date, time

–   where – venue

–   agenda (optional)

–   issuing authority

–   any other relevant details

<div align="center">OR</div>

Suggested value points

(SCHOOL CLOSED)

–   name of school – St Francis School, Vasco

–   what – closure of school

–   when – one week from _____ to _____

–   why – sudden landslide / inclement weather

–   issuing authority

–   any other relevant details

4   **REPORT WRITING**

Format

1. title, reporter's name   1 mark

Content   4 marks

Expression

grammatical accuracy, appropriate words and spelling   [2½]

coherence and relevance of ideas and style   [2½]   5 marks

Suggested value points:

(MUSIC AND DANCE FESTIVAL / any other suitable heading)

–   what (music and dance festival)

–   when (date and time)

–   where (venue)

–   duration (a week long)

HIGHLIGHTS

–   inauguration

–   participants

–   details of the programme

–   public response

–   success of the programme

–   any other relevant details

<div align="center">OR</div>

Suggested value points

(WORKSHOP ON CCE)

–   what (workshop on CCE)

–   when (date and time)

–   where (venue)

–   by whom (Debating Society)

–   HIGHLIGHTS / introduction of resource persons / guest speakers / panel experts

- interactive sessions

- issues discussed

- response of participants

- feedback

- vote of thanks

- any other relevant details

5   **LETTER WRITING**

[Note: - No marks are to be awarded if only the format is given. Credit should be given for the candidate's creativity in presentation of ideas. Use of both the traditional and the new format is permitted.]

Format   2 marks

1. sender's address, 2. date, 3. receiver's address, 4. subject / heading, 5. salutation, 6. complimentary close.

Content   4 marks

Expression

grammatical accuracy, appropriate words and spelling   [2]

coherence and relevance of ideas and style   [2]   4 marks

(TO INTRODUCE VOCATIONAL STREAM IN THE SCHOOL)

Suggested Value Points

- request to introduce vocational stream

- subjects

- utility / future prospect

- any other relevant details

OR

(PLACING AN ORDER FOR BOOKS)

Suggested Value Points

- request to send

- details of books ordered

- discount

- target time

- mode of payment
- any other relevant details

6 **ARTICLE WRITING**

Format: (Title and writer's name)   1 mark

Content   4 marks

Expression

grammatical accuracy, appropriate words and spelling   [2½]

coherence and relevance of ideas and style   [2½]   5 marks

Suggested Value Points

(MOBILE PHONE – A BOON OR BANE / any other suitable title)

Boon

- source of information, entertainment, knowledge
- tool of immediate communication
- safety
- providing jobs, business
- indication of technology development
- multiple application – calculator, internet, camera
- saves paper / cost of transportation
- educational value
- any other relevant details

(any 4)

Bane

- addiction
- misuse
- distraction
- health hazard
- accidents, black mailing
- promoting immorality
- ruining the language

– nuisance value

– intrusion on one's privacy

– any other relevant details

(any 4)

(Note: as the question is open ended if a student writes about boon or bane or a mix of the two the answer may be accepted)

OR

Suggested Value Points

(THE ROLE OF POLICE IN MAINTAINING LAW AND ORDER / any other suitable title)

– expansion and growth of cities, excess population, pressure of law and order

– rate of the unemployed, unemployment

– crime rate more in youngsters

– easy money

– new methodology / technology

– changed mindset – regular counselling

– better working conditions

– merit based recruitment

– well equipped mobile vans

– quick response team

– patrolling on two wheelers

– incentives should be given

– high salary package

– continuous motivation / workshops

– any other relevant details

(any 4)

SECTION C: LITERATURE (TEXT BOOKS)

NOTE: The objective of the section on Literature is to test a candidate's ability to understand and interpret the prescribed text through short and long answer type questions. Hence both content and expression in answers to the given questions deserve equal importance while awarding marks.

7   [This question has been designed to test the students' understanding of the text and their ability to interpret, evaluate and respond to the questions based on the given extract. In other words, it attempts to test their reading comprehension ONLY.]

Value points:

(a) – longing for people to halt and buy things from their stand / to feel some city money in hand   1 mark

(any one)

(b) – hardly any one stops / their dreams are never to be fulfilled   1 mark

(any one)

(c) – to reverse / to turn back   2 marks

     – to ask for the direction

     – to enquire for gas / fuel

(any two)

OR

(a) – refers to governor, inspector, visitors   1 mark

(b) – break the mental and physical barriers / break boundaries of discrimination   1 mark

(c) – free and happy life away from slum   2 marks

     – freedom to education

     – freedom to explore the world / gold sand / green fields

     – opportunity to prosper

(any two)

8   **Short answer type questions (Poetry)**

Distribution of marks:

Content: 1 mark

Expression   1 mark

(deduct ½ mark for two or more grammatical/spelling mistakes)

Value points:

(a) – never understanding oneself   2 marks

     – being oblivious of consequences

35

			in a frenzy of activities – no time for introspection	
		–	fail to understand fellow human beings	
		–	threat of death / own disaster	
		–	sadness of isolation	

(any two)

(b) – a thing of beauty – eternal joy 2 marks

    – never loses its charm

    – make long lasting impression

    – relieves us of worldly worries

(any two)

(c) – as a child, fear of losing her mother 2 marks

    – approaching old age

    – fear surfaces as mother has grown older

    – close to death

(any two)

(d) – to express hidden agony of her suppressed married life 2 marks

    – to highlight qualities of freedom, boldness, fearlessness

    – to create alternate reality

    – as a creative outlet

(any two)

9 **Short answer type questions (Prose)**

Questions are to be answered in 30-40 words each.

Distribution of marks:

Content: 1 mark

Expression

(deduct ½ mark for two or more grammatical/spelling mistakes) 1 mark

Value points:

(a) – it echoes the sentiments of French people 2 marks

    – defiance against the imposition of German language

– sense of patriotism

– regret / repentance

– helplessness

(any two)

(b) – the YMCA pool was safe   2 marks

– only 2 or 3 feet deep at the shallow end and 9 feet at the other end

– the drop was gradual

– ideal for learning swimming

(any two)

(c) – not refused entry   2 marks

– accorded a warm welcome

(d) – MRA was a welcome break from ordinary performances / two impressive plays   2 marks

(e) – thought Danny Casey would come to meet her   2 marks

– saddened to realise that such a thing is impossible

– perfect place to meet

(any two)

Q 10 & 11 [These questions have been set to test the students' understanding of the text and their ability to interpret, evaluate and respond to the issues raised therein. Hence no particular answer can be accepted as the only correct answer. All presentations may be accepted as equally correct provided they have been duly supported by the facts drawn from the text. The important thing is that the student should be able to justify his or her viewpoint.]

10 Distribution of marks:

Content   5 marks

Expression

grammatical accuracy, appropriate words and spelling   [2½]

coherence and relevance of ideas and style   [2½]   5 marks

Value points:

– because he declared that the British could not order him in his own country

- did not begin as an act of defiance
- grew out of an attempt to alleviate the distress of large number of poor peasants and farmers
- a typical Gandhi pattern
- policies intertwined with the practical day to day problem of millions
- first civil disobedience movement
- poor farmers could be convinced that they also had rights
- got local support
- taught self reliance to farmers
- realised the effect of a simple, illiterate farmer's role in bringing about a mass movement
- not only helped peasants but educated them about cleanliness etc.
- any other relevant point

(any four)

OR

Yes – duly supported by examples from text

- both caught in the vicious cycle of poverty, apathy, affected by the greed of others, injustice
- lost childhood – spring of life

Mukesh's story – bangle making industry

- caught in the web of middlemen, politicians, policemen, the keepers of law, bureaucrats
- lose all spirit and ability to dream

Saheb-a-Alam's story

- rag picker, scrounging for gold, walking bare foot, got job, not happy because no freedom, lost childhood
- any other relevant point

11   Distribution of marks:

Content: 4 marks

Expression   3 marks

grammatical accuracy, appropriate words and spelling　　　　　[1½]

coherence and relevance of ideas and style　　　　　　　　　[1½]

Value Points:

−　　to visit Antarctica now is to be a part of history

−　　get a grasp where we have been from and where we possibly could be heading

−　　gives insight into the process of formation of earth

−　　significance of Cordilleran folds and pre-Cambrian granite shield, carbon and ozone; evolution and extinction

−　　never sustained human population therefore remains relatively pristine in this respect

−　　holds in its ice cores half a million year old carbon records

−　　lack of bio-diversity, hence is a place to study about changes in the environment and its repercussions (global warming)

(any four)

OR

−　　understood Sadao's feelings

−　　professional ethics

−　　kind, humane, has a tender heart

−　　felt US soldier could not be left to die

−　　did not want to give into servant's defiance

−　　maintained dignity and self-respect

−　　proud of her husband's expertise and supported him

(any four)

12　　Distribution of marks:

Content:　　　　　　　　　　　　　　　　　　　　　　　　　1 mark

Expression　　　　　　　　　　　　　　　　　　　　　　　　1 mark

(deduct ½ mark for two or more grammatical/spelling mistakes)

Value points:

(a)　−　　happy to have visitors / children to come there for apples, pears and toffees / to overcome his feeling of loneliness　　　　　　　2 marks

(b) – suspected that calls might be fake, some signal / some secret message / to check, dialled, exam board but heard bleeps of line engaged   2 marks

(c) – advised her to work hard / study with care and make progress to throw away indignities / if you are ahead in your lesson, people will come to you   2 marks

(d) – Sam had disappeared with 800 dollars worth of old style currency exchanged / first day cover from Sam with a letter / he always said he liked the sound of the place   2 marks

FUNCTIONAL ENGLISH

Time allowed : 3 hours   *Maximum Marks : 100*

General Instructions:

(i)   This paper is divided into four Sections: A, B, C and D. All the sections are compulsory.

(ii) Separate instructions are given with each section and question, wherever necessary. Read these instructions very carefully and follow them faithfully.

(iii) Do not exceed the prescribed word limit while answering the questions.

QUESTION PAPER CODE 212/1

SECTION A : READING   **(20 Marks)**

1.   Read the passage given below and answer the questions that follow: **12 marks**

(1)   I want to share with you, the life lessons these events have taught me. I will begin with the importance of learning from experience. It is less important, I believe, where you start. It is more important how and what you learn. If the quality of the learning is high, the development gradient is steep, and, given time, you can find yourself in a previously unattainable place.

(2)   Learning from experience, however, can be complicated. It can be much more difficult to learn from success than from failure. If we fail, we think carefully about the precise cause. Success can indiscriminately reinforce all our prior actions.

(3)   A second theme concerns the power of chance events. As I think across a wide variety of settings in my life, I am struck by the incredible role played by the interplay of chance events with intentional choices. While the turning points themselves are indeed often fortuitous, how we respond to them is anything but so. It is this very quality of how we respond systematically to chance events that is crucial.

(4)   Of course, the mindset one works with is also quite critical. It matters greatly whether one believes that ability is inherent or that it can be developed. The former view, a fixed mindset, creates a tendency to avoid challenges, to ignore useful negative feedback and leads people to plateau early and not achieve

their full, potential. The latter view; a growth mindset, leads to a tendency to embrace challenges, to learn from criticism and enables people to reach higher levels of achievement.

(5) The fourth theme is cornerstone of the Indian spiritual tradition: self-knowledge. Indeed, the highest form of knowledge, it is said, is self-knowledge. I believe this greater awareness and knowledge of oneself is what ultimately helps develop a more grounded belief in oneself, courage, determination, and, above all, humility - all qualities which enables one to wear one's success with dignity and grace.

(6) I would like to end with some words of advice. Do you believe that your future is pre-ordained, and is already set? Or, do you believe that your future is yet to be written and that it will depend upon sometimes fortuitous events? Do you believe that these events can provide turning points to which you will respond with energy and enthusiasm? Do you believe that you will learn from these events and that you will reflect on your setbacks? Do you believe that you will examine your successes with even greater care? I hope you believe that the future will be shaped by several turning points with great learning opportunities. In fact, this is the path I have walked to much advantage.

(7) A final word: when, one day, you have made your mark on the world, remember that, in the ultimate analysis, we are all mere temporary custodians of the wealth we generate, whether it be financial, intellectual, or emotional. The best use of all your wealth is to share it with those less fortunate.

(8) Go forth and embrace your future with open arms, and enthusiastically pursue your own life journey of discovery!

(a) On the basis of your understanding of the passage, answer the following in your own words:

(i) Why does the writer feel it is easier to learn from failure than from success? 1

(ii) How can experience help a person or an enterprise to grow? 1

(iii) According to the writer how does one benefit from chance events? 2

(iv) How do people with a positive mindset benefit from experience? 1

(v) According to the writer what are the qualities that are essential for a person to succeed gracefully? 1

(vi) Explain the phrase: "We are all merely temporary custodians of the wealth we generate." 2

(b) Pick out words/phrases from the passage which are similar in meaning to the following: 4

(i) unexpected (para 3)

(ii) hard to believe (para 3)

(iii) foundation (para 5)

(iv) caretakers (para 7)

2. Read the passage given below and answer the questions that follow: **8 marks**

Cycling is a good aerobic fitness exercise. But should one cycle on congested city roads ? Yes, suggests a team of Dutch scientists even though there are risk of traffic accidents and exposure to vehicle exhaust. Health benefits of cycling are greater than the hazards associated with it, they say.

Scientists analyzed data from international studies on the benefits of exercise and threats from vehicle exhaust and traffic accidents. They then compared the health impact of cycling over car driving, assuming that 500,000 adults switched from cars to cycles in the Netherlands every day. The assessment was done for short trips because half of all car trips in the country are less than 7.5 kms.

The researchers found that cycling even for a short period of time in traffic can lead to significant exposure to vehicle exhaust because cyclists tend to breathe about twice as deeply as car drivers. This contributes to respiratory and heart problems. They also calculated the risk of dying in a traffic accident. In the Netherlands, which has dedicated cycle lanes the risk is four times greater per kilometer travelled for cyclists than for car drivers.

Despite the risks the scientists determined while watching from driving to cycling people would on an average live 3-14 months longer because of increased physical fitness.

The risks we would face would be potentially losing 0.8-40 days of life because of increased exposure to air pollution and 5-9 days due to fatal traffic accidents. The elderly benefitted the most by this switch. The ratio of life years gained to life years lost was 84 : 10 for people less than 40 years and 86 : 10 for those between 40-64 & 108 : 10 for those over 65.

Switching to cycling would also benefit public health, because eliminating 500,000 car trips a day would significantly reduce pollution. Policies promoting cycling have so far been focused on congestion and pollution. Such policies can now elaborate net beneficial effects on public health, especially if accompanied by suitable transport planning and safety measures.

(a) Make notes on the passage given above in any format using recognizable abbreviations. Give a suitable title to the passage.   5

(b) Write a summary based on the notes you have made in about 80 words.   3

SECTION - B (Writing)   **25 Marks**

3. You are Sanjay/Ameeta. As the President of the Science Club, you have organized an excursion to Indian Institute of Science at Bangalore for students of Class XII during the autumn break. Write a notice informing the students about this excursion (50 - 80 words).   **5 marks**

OR

You are Yudhvir. Yesterday one of your teachers was absent and there was no teacher in your class for about twenty minutes. The headmaster walked in and asked the class to write a factual description of how your classmates behaved in the teacher's absence. Write a factual description of your class and classmates without a teacher in 50 - 80 words.

4. You have recently seen an advertisement published by a Centre for Life Skills Development for school children. This centre is run by children. Write an application offering to work as a peer educator giving all relevant details.   **10 marks**

OR

You are Sahir/Anubhuti. Write a letter to the editor of a local daily giving suggestions on how school children can help in making 'Education for All' a reality as education is the only way for the development and progress of the country. (125 -150 words)

5. Shahid/Aisha of class XII has just read a book called Four Ways to Decide What Career is Right which talks about some tips you can follow while choosing a career. He/she has jotted down some points in his/her diary. Later, when asked to give a speech on choosing a career, he/she decides to use the following notes to write the speech. Write the speech in about 200 words.

Notes:

> – Know yourself - what do you enjoy the most?
>
> – Explore career options based on your interests.
>
> – Look for options to turn hobbies into careers.
>
> – Look for options/degrees to enhance skills.
>
> – Follow your dreams, not your friend's.

10 marks

OR

You are Suman/Suresh. You recently attended a seminar on "Youth and the Internet." The seminar focused on the impact and influence of the internet on the youth; how the internet can change the attitude and personality of the youth. There was also a discussion on the growing need to educate the youth about the positive power of the net. Using the input given below, write an article for the school magazine in about 200 words.

> – internet created world of good, bad, and several worlds in between
>
> – excessive computer use, an addiction - interferes with daily life
>
> – Facebook and Twitter govern lives - youth meet unpleasant characters
>
> – positive side - created generation of people who could be easily educated
>
> – kids online - reading, thinking, analyzing, criticizing and authenticating-composing their thoughts

SECTION - C (Grammar)   **20 Marks**

6. Rearrange the following sentences sequentially to make complete sense.   **1x5 = 5 marks**

   (a) The easiest way to do this is through the body mass index (BMI).

   (b) For a person to be classified as obese the excess body weight needs to measure above certain levels.

   (c) However a person with a BMI of more than 28 is obese and faces several health risks.

(d) According to the table, a person with a BMI of 27, while overweight is not obese.

(e) Obesity is an ailment characterized by excessive accumulation of body fat.

7. You are Raveena/Ravi. Your cousin, Anisha who lives abroad has come to India after 10 years. You spent an evening with her discussing about the new face of Indian cities. Write out a set of five exchanges that might have taken place between you and Anisha using the following clues. **5 marks**

> landscape, infrastructure, population, traffic, pollution

The first set of dialogue has been done as an example:

Raveena/Ravi : Hi Anisha. You must be feeling happy to be visiting India after such a long time.

Anisha : Hi. Yes. Indian cities have really changed.

8. The following passage has ten errors. Identify the error in each line and write them along with their corrections. **x10=5 marks**

We were late and it is getting dark	(a) _____	_____
when someone suddenly grab my shoulder	(b) _____	_____
thus prevent me from walking into a pit.	(c) _____	_____
I leapt back but ran. My	(d) _____	_____
friend think I was playing	(e) _____	_____
the game She followed me.	(f) _____	_____
Now we both was running. Then I	(g) _____	_____
stop to see who had grabbed my	(h) _____	_____
shoulder. I get terrified to see	(i) _____	_____
that their was no one behind us.	(j) _____	_____

9. Sheena/Sarthak has been selected to interview the American President, Barack Obama, during his visit to India. You are Sheena/Sarthak. Frame a set of 10 questions that you would like to ask him during the interview. The following clues have been given to help you frame the questions. **5 marks**

–	Early childhood
–	Memorable experience of school days
–	First job
–	Secret of fitness
–	Entry into politics
–	Highlights of political career
–	Greatest influence / role model
–	Family life
–	Impressions of India
–	Future plans

SECTION - D (Literature)   **35 Marks**

10.   Choose the following extract and answer the questions that follow: **7 marks**

But her hands are a wet eagle's

two black pink-crinkled feet,

one talon crippled in a garden-

trap set for a mouse.

(a)   Who is the 'her' referred to in the first line?   1

(b)   Pick out the poetic device used in the first line and explain it.   2

(c)   What does 'talon' refer to? How has it been crippled?   2

(d)   What are the changes evident in the person being described in these lines?   2

<div align="center">

OR

</div>

And the vivid image lost even in waking,

There is no taste now for the shrunken sense to keep,

And these, the dreamer's eyes, are not alive to weep,

And this, the clinic heart, the dreamer's, is not breaking.

(a)   Identify the poem and the poet.   1

(b)   What is the narrator describing in the first line?   2

(c)   What is the poetic device used in the second line? Explain.   2

(d)   What is the mood of the narrator in these lines? Why does he/she feel like this?   2

11.   Answer any two of the following in about 50 words each: **4x2 = 8 marks**

(a)   What are the contrasting images of autumn created by the narrator in the first
        and second stanzas of the poem, 'Ode to Autumn' ?

(b)   Discuss any two symbols used in the poem, 'Ars Poetica ? \What do these
        symbols convey?

(c)   What image of the non-combatants does the narrator of the poem, 'Survivors'
        wish to convey?

12.   Answer anyone of the following in 80 - 100 words: **5 marks**

What does Alexander describe as his 'greatest victory' ? What light does this throw
on his character? Was it in keeping with his general attitude? Give reasons for your
answer.

OR

Herbert describes the monkey's paw as 'stuff and nonsense'. How does he pay for
his comment? How is his father's reaction different from his?

13.   Answer any two of the following in about 50 words each: **4x2 = 8 marks**

(a)   What were the factors that had contributed towards the poverty of the beggar
        in the story, 'Whit's Your Dream' ?

(b)   When and why does Mrs. Malik have a 'strange sinking sensation' in the
        story, 'A Room 10x8' ?

(c)   How does the view of a child differ from an adult as discussed in the essay,
        'Hum of Insects' ?

14.   Answer anyone of the following in 100 - 125 words: **7 marks**

Write a short essay on the qualities of good education as described by Einstein.

OR

After unburdening himself to his horse, lona writes a diary entry in which he records
his feeling at the loss of his son and his overwhelming sense of loneliness. Write the
diary entry.

1.   Read the passage given below and answer the questions that follow: 12

    1   My own recollection is that I did not have high regard for my ability. I used to
        be astonished whenever I won prizes and scholarships. But I very jealously
        guarded my character. When I merited, or seemed to the teacher to merit, a
        rebuke, it was unbearable for me. I remember having once received corporal
        punishment. I did not so much mind the punishment, as the fact that it was
        considered my desert. I wept piteously. That was when I was in the first or
        second standard. There was another such incident during the time when I was
        in the seventh standard. Dorabji Edulji Gimi was the headmaster then. He
        was popular among the boys, as he was a disciplinarian, a man of method,
        and a good teacher. He had made gymnastics and cricket compulsory for
        boys of the upper standards. I disliked both. I never took part in any exercise,
        cricket or football, before they were made compulsory. My shyness was one
        of the reasons for this aloofness, which I now see was wrong. I then had the
        false notion that gymnastics had nothing to do with education.

    2. Today I know that physical training should have as much place in the curriculum
        as mental training. I may mention, however, that I was none the worse for
        abstaining from exercise. That was because I had read in books about the
        benefits of long walks in the open air, and having liked the advice, I had
        formed a habit of taking walks, which has still remained with me. These walks
        gave me a fairly hardy constitution. The reason for my dislike for gymnastics
        was my keen desire to serve as nurse to my father. As soon as the school
        closed, I would hurry home and begin serving him. Compulsory exercise came
        directly in the way of this service. I requested Mr. Gimi to exempt me from
        gymnastics so that I might be free to serve my father. But he would not listen
        to me.

    3. Now it happened that one Saturday, when we had school in the morning, I
        had to go from home to the school for gymnastics at 4 o'clock in the afternoon.
        I had no watch, and the clouds deceived me. Before I reached the school the
        boys had all left. The next day Mr. Gimi, examining the roll, found me marked
        absent. Being asked the reason for absence, 1 told him what had happened.
        He refused to believe me and ordered me to pay a fine - one or two annas (I
        cannot now recall how much). 1 was convicted of lying! That deeply pained
        me. How was 1 to prove my innocence? There was no way. 1 cried in deep

anguish. 1 saw that a man of truth must also be a man of care. This was the first and last instance of my carelessness in school.

4.   But though 1 was none the worse for having neglected exercise, 1 am still paying the penalty of another neglect. 1 do not know whence 1 got the notion that good handwriting was not a necessary part of education, but 1 retained it until I went to England. When later, especially in South Africa, I saw the beautiful handwriting of lawyers and young men born and educated in South Africa, 1 was ashamed of myself and repented of my neglect. 1 saw that bad handwriting should be regarded as a sign of an imperfect education. 1 tried later to improve mine, but it was too late. 1 could never repair the neglect of my youth. Let every young man and woman be warned by my example, and understand that good handwriting is a necessary part of education. 1 am now of opinion that children should first be taught the art of drawing before learning how to write. Let the child learn his letters by observation as he does different objects, such as flowers, birds, etc., and let him learn handwriting only after he has learnt to draw objects. He will then write a beautifully formed hand.

(a)   On the basis of the reading of the passage, answer the following questions:

   (i)   What kind of a person was Dorabji ?   2

   (ii)   Why did Gandhiji dislike gymnastics and cricket?   1

   (iii) Why did Gandhiji want exemption from gymnastics?   1

   (iv)   What did Gandhiji think about handwriting initially? What made him
          change his opinion?   2

   (v)   What, according to Gandhiji, is the right method of teaching good hand-
          writing to children?   2

(b)   Pick out words from the passage which mean the same as :   4

   (i)   reprimand (para 1)

   (ii)   cheated (para 3)

   (iii) pain (para 3)

   (iv)   preserved (para 4)

2.   Read the passage given below and answer the questions that follow: 8

      I believe we can change the world if we start listening to one another again. I believe that if we turn to one another, if we begin talking with each other - especially

with those we call stranger or enemy - then this world can reverse its darkening direction and change for the good. And I know with all my heart that the only way the world will change is if many more of us step forward, let go of our judgments, become curious about each other, and take the risk to begin a conversation.

Our twenty-first-century world is descending into aggression, fear, and separation. War, genocide, violence, slavery, pandemics, poverty, natural disasters - all these are commonplace in this new century, despite most people's deep longing to live together in peace.

What are we going to do about this? What role do we choose to play? Do we withdraw and hope at least to live a satisfying private life? Or do we turn to one another and do what we can to bring forth a healthy future?

To support you who aspire to restore hope to the future, we need to think about two new conversations. "What is my role in creating change ?" It is about how the world always only changes when a few individuals step forward. It doesn't change from leaders or top-level programmes or big ambitious plans. It changes when we, everyday people gathering in small groups, notice what we care about and take those first steps to change the situation.

The second new conversation is : "Can I be fearless ?" Fear is everywhere these days, and it's only increasing. Fear destroys human capacity; therefore, we are called to be fearless. Fearless doesn't mean that we are free of fear. It means we learn how to face our fear so that it stops controlling us. If we don't learn how to move past our fears, we will not be able to host conversations or become active on behalf of this troubled, still beautiful world.

Singer Harry Belafonte said, "The last source of truth and hope is the people themselves." Do you know this to be true? If not, I encourage you to begin one of these conversations. In conversation, you'll discover that other people are just as concerned, caring, and eager for change as are you.

We can change the world if we just start listening to one another again.

<div align="right">Margaret J. Wheatley</div>

(a) Make notes on the passage given above in any format using recognizable abbreviations. Give a suitable title to the passage.   5

(b) Write a summary based on the notes you have made in about 80 words.   3

3. You are Kamal/Kavya, the Sports Secretary of the school. Write a notice in 50 - 80 words for your school notice board, informing the students about a camp for training students in yoga.   5

OR

The Indian Army issued an appeal to the youth of the country to join it for a challenging and adventurous career. As Secretary of Social Science Club, draft a poster in 50 - 80 words prompting the youth to join the Indian Army.

4. You are Sonam/Sohil, living at 36, Vasant Vihar, New Delhi, You want to use your summer vacation to gain firsthand experience as an office assistant in a shopping mall. Write an application for the post of an office assistant giving your complete bio-data to the Manager, Crown Plaza, B.C., Part I, New Delhi.   10

OR

You are Aarti/Atul. You came across an advertisement, 'based on laser technology to help ladies look best'. You feel strongly about the dangers inherent in the use of synthetic chemicals and over-exposure of skin to laser beams. Write a letter in 125 - 150 words to the Editor of The Hindustan Times, highlighting the possible dangers to the users and suggesting action against the exploiters.

5. You are Rahul/Rekha who reads. the following headlines commenting on the measures taken by the metropolitan cities of our country to give them a 'clean' look by removing the poor without eradicating poverty. You are upset at the manner in which these steps have been taken. You also mention the steps that could have been taken to safeguard their homes and livelihood and comment on our responsibilities towards keeping the cities clean. Write an article in about 200 words.

POOR BANISHED FROM PUBLIC PLACES

COPS ASK HAWKERS, VENDORS TO PACK UP

NO BUSINESS ON ROADS

     10

OR

Shahid/Aisha of Class XII has just read a book called, <u>Four Ways to Decide What</u>

<u>Career is Right</u> which talks about some tips you can follow while choosing a career. He/She has jotted down some points in his/her diary. Later, when asked to give a speech on choosing a career, he/she decides to use the following notes to write the speech. Write the speech in about 200 words.

Notes:

–   Know yourself - What do you enjoy the most?

–   Explore career options based on your interests

–   Look for options to turn hobbies into careers

–   Look for options/degrees to enhance skills

–   Follow your dreams, not your friend's

SECTION C - GRAMMAR   20

6.   Rearrange the following sentences sequentially to make complete sense.   1x5 = 5

(a)   Set a daily goal of writing two hundred, five hundred and even one thousand words.

(b)   Then set aside a regular time, like early morning and be disciplined.

(c)   To start off on a writing career you need to follow a pattern.

(d)   Don't worry about making what you write perfect.

(e)   Just focus on getting the story out.

7.   Jatin is worried at the depleting tiger population in India. He meets Valmiki Thapar, the 'tiger man' of India and discusses some of the issues involved with tiger conservation. Construct five sets of dialogues based on the cues given below. The first one has been done as an example for you.   5

* poachers - removing selling vital organs / skin / teeth / bones / paw

* some corrupt forest officers in connivance with poachers

* villagers using poison to kill them - to protect livestock

* steps to be taken to protect the tiger

* stricter laws and heavy fines to be levied

Jatin : Good morning sir, thank you for your time. I would be grateful if you could tell me why the tiger population is depleting at such a rapid rate

Valmiki Thapar : Well, there are many reasons for this.

8. The following passage has ten errors. Identify the error in each line and write them along with their corrections. The first has been done as an example.   ½x10=5

	Incorrect	**Correct**
Asthma can made exercising a struggle and	made	make
everyday activity the challenge. But it is often	(a) ____	____
overlooked, especially in adult. In one recent	(b) ____	____
study it were found that more than four thousand	(c) ____	____
men and women has undiagnosed asthma. According	(d) ____	____
with experts undiagnosed asthma could make life more	(e) ____	____
difficult and could even being deadly. Your doctor may	(f) ____	____
prescribe an inhaled asthma medication to seeing if it	(g) ____	____
help or he may perform what's known as a spirometry test.	(h) ____	____
Both these test will help him to gauge your lung function	(i) ____	____
and see who medicine would be effective in treating you.	(j) ____	____

9. Shalini/Subodh is working for the Department of Tourism and has been asked to conduct a survey on the preferences and facilities provided for the foreign tourists visiting India. Prepare a questionnaire on this topic taking help from the cues given below: 5

> reasons for visiting India
>
> choice of places
>
> cities
>
> monuments
>
> impression of cities visited
>
> impression of hotels
>
> people
>
> facilities
>
> any suggestions
>
> weather

10. Choose either of the extracts given below and answer the questions that follow:

> They'll soon forget their haunted nights; their cowed
>
> Subjection to the ghosts of friends who died,
>
> Their dreams that drip with murder; And they'll be proud
>
> Of glorious war that shatter'd all their pride ...

(a) Who does 'they' refer to in the first line? Who is the speaker?　　½+½

(b) Why have the nights been described as 'haunted' ? Who or what will haunt
them?　　1+1

(c) What does 'cowed subjection' mean?　　2

(d) Explain the paradox in the last line.　　2

<div align="center">**OR**</div>

> Seasons of mists and mellow fruitfulness,
>
> Close bosom-friend of the maturing sun:
>
> Conspiring with him how to load and bless
>
> With fruit the vines that round the thatch-eves run;

(a) Which is the season being described in the first line?　　1

(b) Mention any four qualities of the season mentioned here.　　2

(c) Pick out the literary device in these lines and explain.　　2

(d) What are the other activities that take place during this season?
(atleast four)　　2

11. Answer any two of the following in about 50 words each:　　4x2=8

(a) How does the narrator feel on seeing his old mother? What are the changes
that he observes in her?

(b) What is the relation between Hamlet and the theme of the poem, 'Curtain' ?

(c) Mention any two symbols used in the poem, 'Ars Poetica'. What do these
symbols convey?

12. Answer the following in 80 - 100 words.   5

Why is Alexander called an 'adventurer' ? What are the qualities of an adventurer that Alexander exhibits?

OR

What is the contradiction between the second and third wish made by Mr. White in the play, 'Monkey's Paw' ? Why does he make the two wishes?

13. Answer any two of the following in about 50 words each.   4x2=8

(a) Why does Iona feel happy in the company of the young men even though they were insensitive to his feelings?

(b) Compare and contrast the characters of Robichon and Quinquart as depicted in the story, 'The Judgement of Paris'.

(c) Why did Lisa's friend consider her to be cold and aloof?

14. Answer the following in 100 - 125 words.   7

How is the statement, 'Man proposes and God disposes' related to the theme of the story, 'A Room 10' x 8" ?

OR

The Censors of Piety have to submit a report to King Asoka about the work that they have done to spread Dharma amongst the people. Write the report.

Marking Scheme – Functional English

11. If a student literally lifts a portion of the given passage as an answer to a question, no marks should be deducted for this so long as it is relevant and indicative of the desired understanding on the part of the student especially in Q.1 (Section A) and Q.11 (Section D).

12. Some of the questions may relate to Higher Order Thinking Skills. These questions are to be evaluated carefully and student's understanding/analytical ability may be judged.

13. Wherever the word limit is given, no marks to be deducted for exceeding the word limit.

14. A full scale of marks - 0 to 100 is to be used. In case of an answerbook deserving 95 marks and above, marks be awarded in consultation with the Head Examiner only.

QUESTION PAPER CODE 212/1

EXPECTED ANSWERS/VALUE POINTS

SECTION A: (READING) **20 Marks**

Q1 READING **LEARNING FROM FAILURE** **TOTAL MARKS: 12**

Under Section A, Reading (Q1), questions have been designed to test a student's understanding of the passage and his/her ability to interpret, evaluate and respond to the given passage. As such, content assumes more importance than expression in the answers to these questions. Please do not hesitate to award full marks if the answer deserves it.

Objective : To identify and understand main parts of the text.

Marking : No penalty for spelling and grammar.

Accept any other word equivalent in meaning to the answers given below.

Answers : a)

i. If we fail, we think carefully about the precise cause and strive to improve upon our faults / Success can indiscriminately reinforce all our prior actions.

1 mark

ii.

- It depends on the quality of the learning from the experience. ½ mark

- If the learning is high the growth will be substantial ½ mark

iii.

- Quality of how we respond systematically to chance events is crucial.

2 marks

iv.

- The person with a positive mindset tends to embrace challenges   ½ mark

- Learn from criticism and reach higher levels of achievement.   ½ mark

v.

- Greater awareness and knowledge of oneself, courage, determination, and, above all, humility – are all qualities which enable one to wear one's success with dignity and grace.   1 mark

  (any two qualities)

vi.

- It means that one has to die someday leaving behind all our possessions (financial, intellectual or emotional)   1 mark

- All accumulated wealth to be shared with humanity at large (not for personal use)   1 mark

b.   VOCABULARY   4 marks

Objective : To deduce the meanings of unfamiliar lexical items.

Marking : 1 mark each (4 marks)

Answers :   (i) fortuitous\chance

                    (ii) incredible

                    (iii) cornerstone

                    (iv) custodians

Q 2.   Note Making and Summarizing   Total Marks: 8

Objective :   To develop the skill of taking down notes

                    To develop the extracted ideas into a sustained piece of writing.

Marking :   Note making   5 marks

                    Heading   1 mark

Abbreviations / symbols		1 mark
(with or without key)		
(minimum four)		
Content		3 marks
(minimum three sub headings)		

Important instructions:

The notes provided below are only guidelines. Any other title, main points and sub-points should be accepted if they are indicative of students understanding of the given passage and the notes include the main points with suitable and recognizable abbreviations.

Complete sentences should not be accepted as notes. Half a mark should be deducted from the total if the student writes complete sentences.

Numbering of points can be indicated in different ways and these should be accepted as long as it follows a consistent pattern.

Q 2.a) Note Making

Note: If a student has attempted only the summary or only the notes, due credit should be given.

Suggested Notes

Title : Cycling / benefits of cycling (any other suitable title)

1. Health benefits of Cycling

    a. good aerobic / physical fitness exercise

    b. incr. life span 3-14 mnths longer

    c. benefits public health

2. Risks / Hazards of cycling

    a. threat of accidents

        i. risk 4 times greater for cyclists than car drivers

    b. exposure to vehicle exhaust

        i. tend to breathe twice as deeply as car drivers

        ii. causes respiratory & heart problems

3. Research findings

    a. switch to cycling

    b. less congestion

    c. reduces plltn

    d. elderly benefit more

    e. suitable transpt planning promotes cycling

Key:

1. incr.   –   increase

2. mnths.   –   months

3. &   –   and

4. plltn.   –   pollution

5. transpt   -   transport

Note: 1. Any abbreviations made by the students should be accepted.

    2. No student to be penalized if they have not given a key to abbreviations separately.

Q2b) Summary

Objective: 1) To expand notes (headings and sub-headings) into a summary

    2) To test ability of extraction

Marking: Content   2 marks

                Expression   1 mark

Note: Considering the numerous facts mentioned in the notes about cycling, due consideration should be given to the students if they do not cover all the points in the summary which is expected to be concise. The summary should cover the essential details only.

SECTION B   **WRITING**   **TOTAL - 25 MARKS**

In Section B, where questions have been designed to test the writing skills of the students, expression (grammatical accuracy, appropriate vocabulary and style, spellings, organization and presentation of relevant matter in a coherent and logical way) is important.

Q.3. OPTION-1   **NOTICE - EXCURSION**   **TOTAL ñ 5 MARKS**

Objective: To write in an appropriate style of a notice

Marking :   Format   1 mark

Notice/name of the institution, title, date and writer's name with the designation

(The candidate should not be penalized if he has written the notice in block letters or not enclosed it within a box.)

Content   2 marks

Suggested Value Points

1.   what, when, where and how

2.   last date for registration

3.   fee and other details

4.   any other

Expression   2 marks

- Coherence and relevance of ideas, accuracy and style

Option-2   **FACTUAL DESCRIPTION - CLASSROOM**   **TOTAL ñ 5 MARKS**

Objective :   To use a style appropriate of a factual description

Marking :   5 marks

     Format (title)   ½ mark

     Content   2½ marks

Suggested value points:

- various activities taking place in the class both positive and negative

- discipline and noise level of the class

- arrival of the headmaster and the changes observed.

Expression   2 marks

Coherence and relevance of ideas and style

Q.4. Option -1   LETTER OF APPLICATION ñ PEER EDUCATOR   TOTAL -10 MARKS

NOTE: Any formal letter of application offering to work as a peer educator. Relevant details like personal/academic, experience/training, other interests, references should be included either in the letter format or in the resume (marks should not be deducted if bio-data is not separately written).

Objectives: To use an appropriate style to write a formal letter.

　　　　　　To plan, organize and present ideas coherently

Marking: Format   2 marks

　　　　　(1. sender's address, 2. date

　　　　　　3. address of the addressee

　　　　　　4. salutation, 5. subject

　　　　6. complimentary close

　　　　　7. sender's signature/name)

　　　　Content   4 marks

　　　　Suggested value points

　- reference to advertisement

　- relevant details

　　　　　a.　　personal details

　　　　　b.　　qualification / training

　　　　　c.　　experience if any

　　　　　d.　　other achievements

　　　　　e.　　any other

　　　　　f.　　references

　　　　Expression   4marks

　●　　grammatical accuracy, appropriate words and spellings　　(2)

　●　　coherence and relevance of ideas and style　　　　(2)

Or

Option -2 LETTER TO THE EDITOR ñ EDUCATION FOR ALL   TOTAL -10 MARKS

Objectives: To use an appropriate style to write a formal letter.

To plan, organize and present ideas coherently

Marking: Format   2 marks

(1. sender's address 2. date

3. address of the addressee

4. salutation 5. subject

6. complimentary close

7. sender's signature/name)

Content   4 marks

Suggested value points

- education for development and progress

- literacy workshops \ seminars\ peer education \ each one teach one

- literacy activities in the neighbourhood

- any other

Expression   4 marks

- grammatical accuracy, appropriate words and spellings   (2)

- coherence and relevance of ideas and style   (2)

Q.5. Option -1   SPEECH ñ CHOOSING A CAREER   TOTAL ñ 10 MARKS

Objective: To write in a style appropriate to the given situation

To plan, organize and present ideas coherently

Marking: Format   1 mark

(to include greeting and thanking the gathering)

Content   4 marks

Suggested Value Points

(Atleast few points from the question paper to be included)

- know yourself – what do you enjoy the most?

- explore career options based on your interests

- look for options to turn hobbies into careers

- look for options/degrees to enhance skills

- follow your dreams not your friend's

Any other relevant points

Expression   5 marks

- grammatical accuracy, appropriate words and spellings   (2½)

- coherence and relevance of ideas and style   (2½)

Option ñ 2

ARTICLE ñ YOUTH AND THE INTERNET

Objective: To write in a style appropriate to the given situation

To plan, organize and present ideas coherently

To analyze given input and arrive at conclusions

Marking: Format   1 mark

(heading and writer's name)

Content   4 marks

Suggested value points

(Atleast few points from the question paper to be included)

Advantages of the Internet

- kids online able to read, think and compose thoughts

- creates a world of good

- created generation of people who could be educated

Disadvantages

- addiction

- interference with daily life

- meet unpleasant characters

Need to educate youngsters

- the dangers of using the internet

- positive power of the net

Any other relevant point

Expression   5 marks

- grammatical accuracy, appropriate words and spellings   (2½)

- coherence and relevance of ideas and style   (2½)

SECTION C   (GRAMMAR)   20 MARKS

In Section C, care should be taken not to award marks to any inaccurate answer carrying errors in grammar and punctuation.

Q6. REARRANGING   TOTAL: 5 MARKS

Objectives: To be able to present ideas in grammatically logical sequence

5 marks

Marking: 1 mark for every correct answer

Answer   (E, B, A, D, C)

1. Obesity is an ailment characterized by excessive accumulation of body fat.

2. For a person to be classified as obese the excess body weight needs to measure above certain levels.

3. The easiest way to do this is through the body mass index (BMI)

4. According to the table, a person with a BMI of 27, while overweight is not obese.

5. However a person with a BMI of more than 28 is obese and faces several health risks.

Q7. DIALOGUE WRITING **TOTAL-5 MARKS**

NOTE: **Full marks to be awarded irrespective of the fact that a student attempts four sets of exchanges or five sets. In case the student has written five sets and one of them is incorrect, then full marks to be awarded.**

Objectives: To read and arrange sentences in a sequential order

Marking: 1 mark each for every correct exchange provided it is accurately and appropriately expressed. No marks should be awarded if there is any inaccuracy. This includes inaccuracies in grammar, spelling or punctuation. 5 marks

Sample Answers

Ravi: Do you find any change in the landscape?
Anisha: Yes, the landscape has been marred by large number of concrete structures

Ravi: I agree, but we now have world class malls and business centres.
Anisha: Yes I can see that. I am pleasantly surprised.

Ravi: Do you find the city very congested?
Anisha: Yes. It's so crowded – must be because of the rapid increase in population

Ravi: What do you feel about the traffic?
Anisha: It's so chaotic.

Ravi: It is because of the increase in traffic that we have so much of pollution.
Anisha: You are right. I do feel the effect of the pollution when I step out.

Q.8. EDITING **TOTAL: 5 MARKS**

Objectives: To use grammatical items appropriately

Marking: ½ mark each

If the candidate copies the sentence and replaces the incorrect word with the correct answer, marks should be awarded. However, no marks are to be deducted if the candidate has given only the correct words.

	Incorrect		**Correct**
a.	is	-	was
b.	grab	-	grabbed
c.	prevent	-	preventing/prevented
d.	but	-	and
e.	think	-	thought
f.	the	-	a
g.	was	-	were
h.	stop	-	stopped
i.	get	-	got
j.	their	-	there

Note: Line 3(c) has 2 options as indicated above

Q9. FRAMING QUESTIONS   TOTAL-5 MARKS

Objectives: To understand the context and frame relevant and appropriate questions.

Marking: ½ mark each for every accurate question framed

Note: No marks are to be awarded if there is any inaccuracy. The ten questions should cover at least two of the areas specified for the interview in the given input. Any other suitable questions may be acceptable

1. Where did you spend your childhood?

2. Can you share some of the memorable experiences of your school days?

3. What was your first job?

4. What is the secret of your fitness?

5. Which year did you enter into politics?

6. Can you share some of the highlights of your political career?

7. Who is your role model? \ Who has had the greatest influence on you? (in your life)

8. Are you able to spend adequate time with your family?

9. What are your impressions of India?

10. Where do you see yourself after 5 years? \ What are your future plans?

SECTION D: **LITERATURE** **TOTAL -35 MARKS**

Q10. REFERENCE TO CONTEXT **TOTAL- 7 MARKS**

Under Section D (Q10), questions have been designed to test a student's understanding of the passage and his/her ability to interpret, evaluate and respond to the given passage. As such, content assumes more importance than expression in the answers to these questions. Please do not hesitate to award full marks if the answer deserves it especially in the long answers.

Objective: To test students' comprehension of poetry- local, global, interpretative, inferential and evaluative

Marking: 7 marks

Answers:

OPTION (1) OF MOTHERíS AMONG OTHER THINGS

a) mother of the narrator - 1 mark

b) metaphor – mother's hands compared to an eagle's talon - 1 + 1 mark

c) fingers – caught in a mouse trap - 1 + 1 mark

d) aged – crippled – unable to use both the fingers / has slowed down.\ lost her importance in the family (Any two)
- 1 + 1 mark

OPTION (2) CURTAIN

a) curtain – Helen Spalding - ½ + ½ mark

b) two people who have been very close have separated by natural consent and are coming to terms with their separation - 1+1 mark

c) unusual collocation – shrunken sense is unusual combination of words.

irony \ oxymoron\ paradox – the contradiction lies in the fact that the senses which are meant to sense \ feel have become numb.

metaphor - taste being compared to shrunken sense (any one of the above)

- 1 mark

The emotions have become numb with grief. - 1 mark

d) in shock, disbelief and sorrowful - 1 mark

agony of separation - 1 mark

Q11. POETRY **TOTAL 4X2=8 MARKS**

Objectives: To test the students' comprehension of poetry – local and global

Marking: Content: 3 marks

Expression: 1 mark

a) first stanza – hectic activity – abundance

second stanza – slower pace – time of harvesting, storing, peaceful and contented

b) Any two symbols from the poem with an expression

- globed fruit
- medallion
- worn out casement ledge
- flight of birds
- open doorway
- leaning grasses
- climbing of the moon
- twigs released by the moon
- Any other

c) the non-combatants are unrealistic, insensitive, selfish, the ones to start a war.

Q12. PLAY **TOTAL-5 MARKS**

Objectives: To test the students' ability to comprehend plays, understand character etc.

Marking: Content: 3 marks

Expression: 2 marks

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OPTION (1) AN ADVENTURE STORY

a)   getting Queen Mother to talk \ breaking her vow of silence is his greatest victory

b)   shows his sensitive, emotional, insecure, human side.

c)   not in keeping with his otherwise image as ambitious, arrogant, merciless, and cruel conqueror.

<p style="text-align:center">OR</p>

OPTION (2) MONKEYíS PAW

Suggested answer

- He loses his life when he is accidently caught in the machinery.

- Father at first inquisitive, but after wishing feels paw moving, sees faces in the fire – apprehensive and fearful (later) of the power of the paw.

Q13. FICTION   **TOTAL 4X2=8 MARKS**

Objective: To test student's ability to comprehend, interpret and evaluate prose texts

Marking: Content   -   3 marks

Expression -   1 mark

a)   becoming greedy, careless \ stealing someone else's dreams takes everything for granted

b)   life has turned a full circle – she had the sinking feeling when she was ushered into the room '10× 8' – guilt and remorse for her past actions, fear of the future \ regret for past action

c)   world is the chief toy and a perfectly happy place, music of insects enchanting, believe adults laugh because they are happy; smile because they are kind \ innocence of childhood.

for an adult, world a problem; run down machine; stuffy full of stabbing creatures making irritating noises.

Q14. LONG ANSWERS - FICTION   **Total 7 marks**

Objectives: To test students' ability to comprehend prose texts globally, interpret and evaluate them.

Marking: Content -   4 marks

Expression -   3 marks

Option -1   **ON EDUCATION**   **DIARY ENTRY**

Note: Marks should be awarded for student's creativity

Suggested Value Points:

- school - centre for preserving and passing on culture and heritage

- knowledge not static, has to be renewed

- education should aim at creating individuals who can think critically and give back to society more than taking back from it

- should aim at inspiring students by using methods to arouse interest in the subjects being taught without creating an unhealthy competitive environment.

- teachers should be given freedom to create their own curriculum and methodology.

- more stress on practice

- creation of holistic individuals not specialists.

- competition versus cooperation

Option- 2   GRIEF

Suggested Value Points:

- his feeling at the loss of his son and his overwhelming sense of loneliness

- son had died of fever a week ago

- lonely-no wife, daughter in the village, no friends

- callous, insensitive people

- making desperate attempt to unburden his grief

- unburdens to his horse

- slight relief

EXPECTED ANSWERS/VALUE POINTS

SECTION A   **READING**   **20 MARKS**

Q1. READING   **TOTAL MARKS: 12**

Under Section A, Reading (Q1), questions have been designed to test a student's understanding of the passage and his/her ability to interpret, evaluate and respond to the given passage. As such, content assumes more importance than expression in the answers to these questions. Please do not hesitate to award full marks if the answer deserves it.

Objective : To identify and understand the main parts of the text.

Marking : No penalty for spelling and grammar.

Accept any other answer equivalent in meaning to the answers given below.

Answers : (a)

i.   Popular among the boys, disciplinarian, a man of method and a good
        teacher (any two)   2 marks

ii.   Shyness / false notion that gymnastics had nothing to do with education
        (any one)   1 mark

iii.   To serve his father   1 mark

iv   -   initial view – good handwriting not necessary

        -       embarrassed when he saw the beautiful handwriting of lawyers
                in South Africa   1+1 mark

v.   -   drawing objects before writing

        -       learning letters through observations of flowers and birds
                                                                    1+1 mark

b.   VOCABULARY

Objective : To deduce the meanings of unfamiliar lexical items.

Marking : 1 mark each (4 marks)

Answers :   i. rebuked

               ii. deceived

               ii. anguish

               iv. retained

Q 2. Note making and Summarizing   **Total Marks: 8**

Objective : To develop the skill of taking down notes

             To develop the extracted ideas into a sustained piece of writing.

Marking :	Note making	5 marks
	Heading	1 mark
	Abbreviations / Symbols (with or without key) (minimum four)	1 mark
	Content (minimum three sub headings)	3 marks

Important instructions:

The notes provided below are only guidelines. Any other title, main points and sub points should be accepted if they are indicative of the students understanding of the given passage and the notes include the main points with suitable and recognizable abbreviations.

Complete sentences should not be accepted as notes. Half a mark should be deducted from the total if the student writes complete sentences.

Numbering of points can be indicated in different ways and these should be accepted as long as it follows a consistent pattern.

Q 2.a Note making

Note: If the student has attempted only the summary or only the notes, due credit should be given.

Suggested Notes

Title : HOW TO CHANGE THE WORLD

              or

Any other suitable title

1.   Ways to change world

      a.   start listening to one another

      b.   let go of judgemental behavior

      c.   b'come curious about each other

      d.   risk beginning a conv.

2.   Problems of 21st century

      a)   has descended into

            i.   aggr.

            ii.   fear

            iii.   separation

            iv.   war

            v.   genocide

            vi.   slavery

            vii.   poverty

            viii.   natural disasters

3   Important questions

      a   What to be done to solve prob?

      b   Our roles in solving prob.

      c.   We withdraw or get involved

      d.   changes do not happen from top level leaders \ programmes

      e.   change brought about at individual level

4   Meaning of fearlessness

      a   not freedom from fear

      b.   How to face fear?

      c.   not allowing it to control us

      d.   learning to move ahead inspite of it.

5. Imp. of holding conversation

    a. Discovering ppl. to be

        i. concerned

        ii. caring

        iii eager for change

Key:

1.	b'come	–	become
2.	conv.	–	conversation
3.	aggr.	–	aggression
4.	prob.	–	problem
5.	ppl.	-	people

Note: 1. Any other suitable abbreviations made by the students may be accepted.

    2. No student to be penalized if they have not given a key to abbreviations separately.

Q2. b. SUMMARY

Objective: 1) To expand notes (headings and sub-headings) into a summary

    2) To test the ability of extraction

Marking: Content   2 marks

           Expression   1 mark

Note: Considering the numerous facts mentioned in the notes, due consideration should be given to the students if they do not cover all the points in the summary which is expected to be concise. The summary should cover the essential details only.

SECTION B   **(WRITING)**   **TOTAL - 25 MARKS**

In Section B, where questions have been designed to test the writing skills of the students, expression (grammatical accuracy, appropriate vocabulary and style, spellings, organization and presentation of relevant matter in a coherent and logical way) is important.

Q.3. OPTION 1   **NOTICE ñ YOGA CAMP**   **TOTAL ñ 5 MARKS**

Objective: To write in an appropriate style of a notice

Marking :   Format   1 mark

Notice/name of the institution, title, date and writer's name with the designation

The candidate should not be penalized if he has used block letters with or without a box.

Content   2 marks

Suggested Value Points

- mention the event

- time, date, venue

- purpose of the camp

- duration

- any other relevant information

Expression   2 marks

● Coherence and relevance of ideas, accuracy and style)

OPTION 2   **POSTER ñ JOIN THE INDIAN ARMY**   **TOTAL ñ 5 MARKS**

Objective : To write in an appropriate style of a poster (blurbs, bullets, different font size etc. may be considered)

Marking : Content   3 marks

(to include heading and issuing authority)

Suggested Value points

- theme/topic

- purpose

- message/appeal

- catchy slogans

- caption

- name of the issuing authority

- any other relevant points

Expression   2 marks

- coherence and relevance of ideas and style

- Due credit should be given for creativity and economy of words

Q.4. Option -1   LETTER OF JOB APPLICATION   TOTAL -10 MARKS

NOTE: Any formal letter of application offering to work as an office assistant. Relevant details like personal/academic, experience/training, other interests, references should be included either in the letter format or in the resume (marks should not be deducted if bio-data is not separately written).

Objectives: To use an appropriate style to write a formal letter.

            To plan, organize and present ideas coherently

Marking: Format   2 marks

1.   sender's address

2.   date

3.   address of the addressee

4.   salutation

5.   subject

6.   complimentary close

7.   sender's signature/name

Content   4 marks
(includes the covering letter and bio data)

Suggested value points

- Personal details (name, father's name, DOB/age, Address, Contact No./ Telephone no).

- Academic details

- Achievements

- References

- any other relevant points

Expression: 4 marks

(Grammatical accuracy, appropriate words and spellings   2 marks

Coherence and relevance of ideas and style)   2 marks

Option -2

LETTER TO THE EDITOR ñ DANGER - USE OF SYNTHETIC

CHEMICALS   **TOTAL -10 MARKS**

Objectives: To use an appropriate style to write a formal letter.

       To plan, organize and present ideas coherently

Marking: Format   2 marks

1. sender's address

2. date

3. address of the addressee

4. salutation

5. subject

6. complimentary close

7. sender's signature/name

Content   4 marks

Suggested value points

-       disturbed by the manner in which customers are fooled

-       apathy of the society \ community \ authorities

-       recording feelings about dangers involved

-       suggesting measures – creating awareness; stringent

        actions

-       any other relevant points

Expression   4 marks

•   grammatical accuracy, appropriate words and spellings   (2)

•   coherence and relevance of ideas and style   (2)

Q.5. Option -1

ARTICLE – REMOVING THE POOR WITHOUT ERADICATING POVERTY

Objective: To write in a style appropriate to the given situation.

To plan, organize and present ideas coherently.

Marking: Format   1 mark

(heading and writer's name)

Content   4 mark

Suggested value points

- measures taken by the metropolitan cities to give the city a 'clean' look

- removing the poor without eradicating poverty

- mention steps that could have been taken to safeguard their homes and livelihood

- people's responsibility to keep the city clean

- any other relevant points

Expression   5 marks

• grammatical accuracy, appropriate words and spellings

(2½)

• Coherence and relevance of ideas and style   (2½)

Option ñ 2

SPEECH ñ CHOOSING A CAREER   **TOTAL ñ 10 MARKS**

Objectives: To write in a style appropriate to the given situation.

To plan, organize and present ideas coherently.

Marking: Format   1 mark

(to include greeting and thanking)

Content   4 mark

Suggested Value Points

Any view point based on given input

- know yourself – what do you enjoy the most?

- explore career options based on your interests

- look for options to turn hobbies into careers

- look for options/degrees to enhance skills

- follow your dreams not your friend's

- any other relevant points

Expression 5 marks

● grammatical accuracy, appropriate words and spellings (2½)

● coherence and relevance of ideas and style (2½)

SECTION C **(GRAMMAR)** **20 MARKS**

In Section C, care should be taken not to award marks to any inaccurate answer carrying errors in grammar and punctuation.

Q6. REARRANGING **TOTAL: 5 MARKS**

Objective: To read and arrange sentences in a sequential order 5 marks

Marking: 1 mark for every correct answer

Answer

(C, A, B, D, E) \ (C, B, A, E, D)

a. To start off on a writing career you need to follow a pattern.

b. Set a daily goal of writing two hundred, five hundred and even one thousand words.

c. Then set aside a regular time, like, early morning and be disciplined.

d. Don't worry about making what you write perfect.

e. Just focus on getting the story out.

Or

a. To start off on a writing career you need to follow a pattern.

b. Then set aside a regular time, like, early morning and be disciplined.

c. Set a daily goal of writing two hundred, five hundred and even one thousand words.

d. Just focus on getting the story out.

e. Don't worry about making what you write perfect.

Q7. DIALOGUE WRITING   TOTAL-5 MARKS

NOTE: Full marks to be awarded irrespective of the fact that a student attempts four sets of exchanges or five sets. In case the student has written five sets and one of them is incorrect, then full marks to be awarded.

Objective: To extend the given input into a meaningful dialogue.

Marking: ½ mark each for every correct dialogue provided it is accurately and appropriately expressed. No marks should be awarded if there is any inaccuracy. This includes inaccuracies in grammar, spelling or punctuation.   5 marks

Sample Answers:

a. Jatin: Do you think the poachers are the main reason for the depletion of the tiger population?

   Valmik Thapar: Yes, they are responsible. They sell the vital organs of the tigers like skin, teeth, bones etc.

b. Jatin: Do you think the forest officers are also involved?

   VT: Yes, some corrupt forest officers are involved with the poachers.

c. Jatin: How are the villagers responsible for the depletion of the tiger population?

   VT: Villagers use poison to kill them in order to protect their livestock.

d. Jatin: What do you think should be done in such a situation?

   VT: Effective steps should be taken to protect the tiger.

e. Jatin: What kind of steps can be taken?

VT: Strict laws should be enforced and heavy fines should be imposed on those responsible for depletion of the tiger population.

(Any other suitable exchange may be accepted)

Q.8. EDITING   TOTAL: 5 MARKS

Objective: To use grammatical items appropriately

Marking: ½ mark each

If the candidate copies the sentence and replaces the incorrect word with the correct answer marks should be awarded. If only the correct words are given marks should be awarded.

	Incorrect		Correct
a.	the	-	a
b.	adult	-	adults
c.	were	-	was
d.	has	-	have
e.	with	-	to
f.	being	-	be \ become
g.	seeing	-	see
h.	help	-	helps
i.	test	-	tests
j.	who	-	which

Note: Line 6(f) has 2 options as indicated above

Q9. FRAMING QUESTIONS   TOTAL-5 MARKS

Objectives: To understand the context and frame relevant and appropriate questions.

Marking: ½ mark each for every accurate question framed

Note: No marks to be awarded if there is any inaccuracy. The ten questions should cover at least any of the two areas specified for the interview in the given question.

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Suggested Answers:

1. Why did you choose to visit India?

2. Which all places did you visit?

3. Which is your favourite city?

4. What do you think about the monuments in India?

5. What are your impressions about the cities that you have visited?

6. What do you feel about the hotels that you have stayed at?

7. Do you find the people of India warm and friendly?

8. Are you impressed by the facilities provided by the Department of Tourism?

9. How do you find the weather here?

10. Do you have any suggestions to make for the improvement of the facilities offered by the Department?

SECTION D: **LITERATURE**   **TOTAL -35 MARKS**

In Section D, (Q10) questions have been designed to test a students understanding of the passage and his/her ability to interpret, evaluate and respond to the given passage. As such, content assumes more importance than expression in the answers to these questions. Please do not hesitate to award full marks if the answer deserves it especially in the long answers.

Q10. REFERENCE TO CONTEXT   **TOTAL- 7 MARKS**

Objective: To test students' comprehension of poetry- local, global, interpretative, inferential and evaluative

Marking: 7 marks

Answers:

OPTION (1)   **SURVIVORS**

a)   survivors   - ½ mark

        non-combatants   - ½ mark

b)   – their disturbed sleep at night \ nightmares

        - visions of their dead friends \of battles fought\ death and destruction \ bloody wars   - 1 + 1 mark

c) combatants cower or hide in fear from the visions that terrify them and give them nightmares \ helplessness - 2 marks

d) the war that was supposed to bring them glory has caused them suffering and disillusionment \ has shattered the pride of the soldiers. - 2 marks

OPTION (2)   **ODE TO AUTUMN**

a) Autumn - 1 mark

b) mellowness; mists; abundance; flowering; ripening of fruits; collecting the nectar (Any four) - ½ + ½ +½ + ½ = 2 marks

c) personification - sun and autumn personified as bosom friends conspiring together to ripen the fruits and vegetables

Imagery - vivid description of the autumn season / maturing sun.

Transferred epithet – the sun has been described as having matured, which is a human quality.

(any one literary device with explanation) - 1+1=2 marks

d) reaping; harvesting; winnowing; gleaning, watching the cider being extracted - ½ + ½ +½ + ½ = 2 marks

Q11. POETRY   **TOTAL 4X2=8 MARKS**

Objectives: To test the students' comprehension of poetry – local and global

Marking: Content: 3 marks

      Expression: 1 mark

SUGGESTED ANSWERS

a) choking sensation /feeling of guilt / regretful /utter helplessness/ remorseful, realization that she will not be there for a long time / feather of one time wing.

has become emaciated, frail, lost weight, shrivelled, bent, shrunken in size, slow in her movements. (any three)

b) To emphasize the feeling of loneliness and confusion that Hamlet experiences. the similarity with the feelings of the two lovers.

c) Any two symbols from the poem with an explanation

- globed fruit – delectable / wholesome

- medallion – priceless

- worn out casement ledge – classic element/timelessness

- flight of birds – imagination

- open doorway – grief, sadness and void

- leaning grasses- love / surrender of the self

Q12. DRAMA   TOTAL-5 MARKS

Objective: To test the students' ability to comprehend plays, understand characters etc.

Marking: Content: 3 marks

Expression: 2 marks

OPTION (1)   AN ADVENTURE STORY

Alexander is to become the world conqueror

loved facing challenges

ready to face the unknown

fearless /reckless/ambitious/impulsive/ruthless

believed in action

OPTION (2)   THE MONKEYíS PAW

second wish – wishing for the dead son to come alive

third wish – wishing him dead again

reason – wife devastated after son's death –forces him to wish on the paw – after

hearing knocking – frightened at the thought of seeing disfigured son and effect

on his wife – does not want to play with nature – wants son to rest in peace

Q13. PROSE   TOTAL 4X2=8 MARKS

Objective: To test the students' ability to comprehend, interpret and evaluate prose texts

Marking: Content: 3 marks

Expression: 1 mark

a) lost his son

engulfed in grief

their chatter helped him to forget his grief for a short while / diversion of his mind for a brief time.

b) both talented comedians in love with the same girl

both equally appreciated by the public and the critic

(any other suitable comparison)

Robichon – robust – open – loves to show off

Quinquart – skinny – quiet – secretive about his plans

(any other suitable contrast)

c) Lisa – quiet, reclusive, found the girls and their conversation frivolous

appeared very intense and was extremely sensitive to the pain and suffering around her.

Q14. PROSE (LONG ANSWERS)   **Total 7 marks**

Objective: To test the students' ability to comprehend prose texts globally, interpret and evaluate them.

Marking: Content   -   4 marks

                Expression -   3 marks

OPTION (1)   A ROOM 10' 8'

Note: Marks should be awarded for the student's creativity

Suggested Value Points:

Theme

A lady's desire to own her home and be its mistress and to stay on in Delhi – decides to allot the store room to her mother-in-law as long as she lives – very keen to move in – takes keen interest in its construction – but destiny thwarts her plans – the government acquires the property – has to leave Delhi – daughter-in-law becomes

mistress after the death of her husband when they finally move into the house – relegated to the same room 10' × 8' which she had designed for her mother-in-law

OPTION (2)   **KING ASOKA**

Suggested Value Points:

- engaged in the spread of Law of Piety among the people.

- working towards the progress , welfare and happiness of the people.

- ensuring justice for all especially the old, the homeless and those with large families / effected by calamities

- practising high moral standards personally

MATHEMATICS

Time allowed : 3 hours   *Maximum Marks : 100*

General Instructions:

1. **All** *questions are compulsory.*

2. *The question paper consists of **29** questions divided into three sections, A, B and C. Section A comprises of **10** questions of one mark each, Section B comprises of **12** questions of **four** marks each and Section C comprises of **7** questions of **six** marks each.*

3. **All** *questions in Section A are to be answered in one word, **one** sentence or as per the exact requirement of the question.*

4. *There is no overall choice. However, internal choice has been provided in **4** questions of **four** marks each and **2** questions of **six** marks each. You have to attempt only **one** of the alternatives in all such questions.*

5. *Use of calculators is **not** permitted.*

QUESTION PAPER CODE 65/1/1
SECTION A

Question numbers 1 to 10 carry 1 mark each.

1. State the reason for the relation R in the set $\{1, 2, 3\}$ given by $R = \{(1, 2), (2, 1)\}$ not to be transitive.

2. Write the value of $\sin\left[\dfrac{\pi}{3} - \sin^{-1}\left(-\dfrac{1}{2}\right)\right]$

3. For a 2×2 matrix, $A = [a_{ij}]$, whose elements are given by $a_{ij} = \dfrac{i}{j}$, write the value of a_{12}.

4. For what value of x, the matrix $\begin{bmatrix} 5-x & x+1 \\ 2 & 4 \end{bmatrix}$ is singular ?

5. Write A^{-1} for $A = \begin{bmatrix} 2 & 5 \\ 1 & 3 \end{bmatrix}$.

6. Write the value of $\int \sec x \, (\sec x + \tan x) \, dx$.

7. Write the value of $\int \dfrac{dx}{x^2 + 16}$

8. For what value of 'a' the vectors $2\hat{i} - 3\hat{j} + 4\hat{k}$ and $a\hat{i} + 6\hat{j} - 8\hat{k}$ are collinear?

9. Write the direction cosines of the vector $-2\hat{i} + \hat{j} - 5\hat{k}$.

10. Write the intercept cut off by the plane $2x + y - z = 5$ on x-axis.

SECTION - B

Question numbers 11 to 22 carry 4 marks each.

11. Consider the binary operation * on the set $\{1, 2, 3, 4, 5\}$ defined by $a * b = \min. \{a, b\}$. Write the operation table of the operation *.

12. Prove the following:

$$\cot^{-1}\left[\frac{\sqrt{1 + \sin x} + \sqrt{1 - \sin x}}{\sqrt{1 + \sin x} - \sqrt{1 - \sin x}}\right] = \frac{x}{2}, \ x \in \left(0, \frac{\pi}{4}\right)$$

OR

Find the value of $\tan^{-1}\left(\dfrac{x}{y}\right) - \tan^{-1}\left(\dfrac{x - y}{x + y}\right)$

13. Using properties of determinants, prove that

$$\begin{vmatrix} -a^2 & ab & ac \\ ba & -b^2 & bc \\ ca & cb & -c^2 \end{vmatrix} = 4a^2b^2c^2$$

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14. Find the value of 'a' for which the function f defined as

$$f(x) = \begin{cases} a \sin \dfrac{\pi}{2}(x+1), & x \le 0 \\ \dfrac{\tan x - \sin x}{x^3}, & x > 0 \end{cases}$$

is continuous at $x = 0$.

15. Differentiate $x^{x \cos x} + \dfrac{x^2+1}{x^2-1}$ w.r.t. x

OR

If $x = a(\theta - \sin \theta)$, $y = a(1 + \cos \theta)$, find $\dfrac{d^2 y}{dx^2}$

16. Sand is pouring from a pipe at the rate of 12 cm³/s. The falling sand forms a cone on the grou;nd in such a way that the height of the cone is always one-sixth of the radius of the base. How fast is the height of the sand cone increasing when the height is 4cm?

OR

Find the points on the curve $x^2 + y^2 - 2x - 3 = 0$ at which the tangents are parallel to x-axis.

17. Evaluate: $\displaystyle \int \dfrac{5x+3}{\sqrt{x^2+4x+10}}\,dx$

OR

Evaluate: $\displaystyle \int \dfrac{2x}{(x^2+1)(x^2+3)}\,dx$

18. Solve the following differential equation:

$e^x \tan y \, dx + (1 - e^x) \sec^2 y \, dy = 0$

19. Solve the following differential equation:

$\cos^2 x \dfrac{dy}{dx} + y = \tan x.$

20. Find a unit vector perpendicular to each of the vectors $\vec{a} + \vec{b}$ and $\vec{a} - \vec{b}$, where $\vec{a} = 3\hat{i} + 2\hat{j} + 2\hat{k}$ and $\vec{b} = \hat{i} + 2\hat{j} - 2\hat{k}$.

21. Find the angle between the following pair of lines:

$$\frac{-x+2}{-2} = \frac{y-1}{7} = \frac{z+3}{-3} \text{ and } \frac{x+2}{-1} = \frac{2y-8}{4} = \frac{z-5}{4}$$

and check whether the lines are parallel or perpendicular.

22. Probabilities of solving a specific problem independently by A and B are $\frac{1}{2}$ and $\frac{1}{3}$ respectively. If both try to solve the problem independently, find the probability that (i) the problem is solved (ii) exactly one of them solves the problem.

SECTION - C

Question numbers 23 to 29 carry 6 marks each.

23. Using matrix method, solve the following system of equations:

$$\frac{2}{x} + \frac{3}{y} + \frac{10}{z} = 4, \quad \frac{4}{x} - \frac{6}{y} + \frac{5}{z} = 1, \quad \frac{6}{x} + \frac{9}{y} - \frac{20}{z} = 2; \quad x, y, z \neq 0$$

OR

Using elementary transformations, find the inverse of the matrix

$$\begin{pmatrix} 1 & 3 & -2 \\ -3 & 0 & -1 \\ 2 & 1 & 0 \end{pmatrix}$$

24. Show that of all the rectangles inscribed in a given fixed circle, the square has the maximum area.

25. Using integration find the area of the triangular region whose sides have equations $y = 2x + 1$, $y = 3x + 1$ and $x = 4$.

26. Evaluate: $\displaystyle\int_{0}^{\pi/2} 2 \sin x \cos x \tan^{-1}(\sin x)\, dx$

OR

Evaluate: $\displaystyle\int_{0}^{\pi/2} \frac{x \sin x \cos x}{\sin^4 x + \cos^4 x}\, dx$

27. Find the equation of the plane which contains the line of intersection of the planes $\vec{r} \cdot \left(\hat{i} + 2\hat{j} + 3\hat{k}\right) - 4 = 0$, $\vec{r} \cdot \left(2\hat{i} + \hat{j} - \hat{k}\right) + 5 = 0$ and which is perpendicular to the plane $\vec{r} \cdot \left(5\hat{i} + 3\hat{j} - 6\hat{k}\right) + 8 = 0$.

28. A factory makes tennis rackets and cricket bats. A tennis racket takes 1.5 hours of machine time and 3 hours of craftman's time in its making while a cricket bat takes 3 hours of machine time and 1 hour of craftman's time. In a day, the factory has the availability of not more than 42 hours of machine time and 24 hours of craftsman's time. If the profit on a racket and on a bat is Rs. 20 and Rs. 10 respectively, find the number of tennis rackets and crickets bats that the factory must manufacture to earn the maximum profit. Make it as an L.P.P. and solve graphically.

29. Suppose 5% of men and 0.25% of women have grey hair. A grey haired person is selected at random. What is the probability of this person being male? Assume that there are equal number of males and females.

QUESTION PAPER CODE 65/1
SECTION A

Question numbers 1 to 10 carry 1 mark each.

1. Let A = {1, 2, 3}, B = {4, 5, 6, 7} and let f = {(1, 4), (2, 5), (3, 6)} be a function from A to B. State whether f is one-one or not.

2. What is the principal value of $\cot^{-1}\left(\cos\dfrac{2\pi}{3}\right) + \sin^{-1}\left(\sin\dfrac{2\pi}{3}\right)$?

3. Evaluate :

$$\begin{vmatrix} \cos 15^{\circ} & \sin 15^{\circ} \\ \sin 75^{\circ} & \cos 75^{\circ} \end{vmatrix}$$

4. If $A = \begin{bmatrix} 2 & 3 \\ 5 & -2 \end{bmatrix}$, write A^{-1} in terms of A.

5. If a matrix has 5 elements, write all possible orders it can have.

6. Evaluate:

$$\int (ax + b)^3 \, dx$$

7. Evaluate:

$$\int \frac{dx}{\sqrt{1 - x^2}}$$

8. Write the direction-cosines of the line joining the points $(1, 0, 0)$ and $(0, 1, 1)$.

9. Write the projection of the vector $\hat{i} - \hat{j}$ on the vector $\hat{i} + \hat{j}$.

10. Write the vector equation of a line given by $\dfrac{x - 5}{3} = \dfrac{y + 4}{7} = \dfrac{z - 6}{2}$.

SECTION B

Question numbers 11 to 22 carry 4 marks each.

11. Let $f : R \rightarrow R$ be defined as $f(x) = 10x + 7$. Find the function $g : R \rightarrow R$ such that $gof = fog = I_R$.

OR

A binary operation * on the set $\{0, 1, 2, 3, 4, 5\}$ is defined as :

$$a * b = \begin{cases} a + b, & \text{if} \quad a + b < 6 \\ a + b - 6, & \text{if} \quad a + b \geq 6 \end{cases}$$

Show that zero is the identity for this operation and each element 'a' of the set is, invertible with 6 – a, being the inverse of 'a'.

12. Prove that:

$$\tan^{-1}\left|\frac{\sqrt{1+x}-\sqrt{1-x}}{\sqrt{1+x}+\sqrt{1-x}}\right| = \frac{\pi}{4} - \frac{1}{2}\cos^{-1}x, \ -\frac{1}{\sqrt{2}} \le x \le 1$$

13. Using properties of determinants, solve the following for x :

$$\begin{vmatrix} x-2 & 2x-3 & 3x-4 \\ x-4 & 2x-9 & 2x-16 \\ x-8 & 2x-27 & 3x-64 \end{vmatrix} = 0$$

14. Find the relationship between 'a' and 'b' so that the function 'f' defined by:

$$f(x) = \begin{cases} ax+1, & \text{if } x \le 3 \\ bx+3, & \text{if } x > 3 \end{cases} \text{ is continuous at } x = 3.$$

OR

If $\quad x^y = e^{x-y}$, show that $\dfrac{dy}{dx} = \dfrac{\log x}{\{\log (x\,e)\}^2}$.

15. Prove that $y = \dfrac{4\sin\theta}{2+\cos\theta} - \theta$ is an increasing function in $\left[0, \dfrac{\pi}{2}\right]$.

OR

If the radius of a sphere is measured as 9 cm with an error of 0.03 cm, then find the approximate error in calculating its surface area.

16. If $x = \tan\left(\dfrac{1}{a}\log y\right)$, show that

$$(1+x^2)\frac{d^2y}{dx^2} + (2x-a)\frac{dy}{dx} = 0$$

17. Evaluate:

$$\int_0^{\pi/2} \frac{x + \sin x}{1 + \cos x} \, dx$$

18. Solve the following differential equation:

$$x \, dy - y \, dx = \sqrt{x^2 + y^2} \, dx$$

19. Solve the following differential equation:

$$(y + 3x^2) \frac{dx}{dy} = x$$

20. Using vectors, find the area of the triangle with vertices A(1, 1, 2), B(2, 3, 5) and C(1, 5, 5).

21. Find the shortest distance between the following lines whose vector equations are:

$$\vec{r} = (1 - t) \, \hat{i} + (t - 2) \, \hat{j} + (3 - 2t) \, \hat{k} \quad \text{and}$$

$$\vec{r} = (s + 1) \, \hat{i} + (2s - 1) \, \hat{j} - (2s + 1) \, \hat{k}$$

22. A random variable X has the following probability distribution:

X	0	1	2	3	4	5	6	7
P(X)	0	K	2K	2K	3K	K^2	$2K^2$	$7K^2 + K$

Determine:

(i)   K

(ii)   P(X < 3)

(iii)   P(X > 6)

(iv)   P(0 < X < 3)

OR

Find the probability of throwing at most 2 sixes in 6 throws of a single die.

SECTION C

Question numbers 23 to 29 carry 6 marks each.

23. Using matrices, solve the following system of equations:

$$4x + 3y + 2z = 60$$

$$x + 2y + 3z = 45$$

$$6x + 2y + 3z = 70$$

24. Show that the right-circular cone of least curved surface and given volume has an altitude equal to $\sqrt{2}$ times the radius of the base.

OR

A window has the shape of a rectangle surmounted by an equilateral triangle. If the perimeter of the window is 12 m, find the dimensions of the rectangle that will produce the largest area of the window.

25. Evaluate:

$$\int_{\pi/6}^{\pi/3} \frac{dx}{1 + \sqrt{\tan x}}$$

OR

Evaluate:

$$\int \frac{6x + 7}{\sqrt{(x - 5)(x - 4)}}\, dx$$

26. Sketch the graph of $y = |x + 3|$ and evaluate the area under the curve $y = |x + 3|$ above x-axis and between $x = -6$ to $x = 0$.

27. Find the distance of the point (- 1, - 5, - 10), from the point of intersection of the line $\vec{r} = \left(2\hat{i} - \hat{j} + 2\hat{k}\right) + \lambda \left(3\hat{i} + 4\hat{j} + 2\hat{k}\right)$ and the plane $\vec{r} \cdot \left(\hat{i} - \hat{j} + \hat{k}\right) = 5$.

28. Given three identical boxes I, II and III each containing two coins. In box I, both coins are gold coins, in box II, both are silver coins and in box III, there is one gold

and one silver coin. A person chooses a box at random and takes out a coin. If the coin is of gold, what is the probability that the other coin in the box is also of gold?

29. A merchant plans to sell two types of personal computers - a desktop model and a portable, model that will cost Rs. 25,000 and Rs. 40,000 respectively. He estimates that the total monthly demand of computers will not exceed 250 units. Determine the number of units of each type of computers which the merchant should stock to get maximum profit if he does not want to invest more than Rs. 70 lakhs and his profit on the desktop model is Rs. 4,500 and on the portable model is Rs. 5,000. Make an L.P.P. and solve it graphically.

Marking Scheme –– Mathematics

General Instructions :

1. The Marking Scheme provides general guidelines to reduce subjectivity in the marking. The answers given in the Marking Scheme are suggested answers. The content is thus indicative. If a student has given any other answer which is different from the one given in the Marking Scheme, but conveys the meaning, such answers should be given full weightage.

2. Evaluation is to be done as per instructions provided in the marking scheme. It should not be done according to one's own interpretation or any other consideration –– Marking Scheme should be strictly adhered to and religiously followed.

3. Alternative methods are accepted. Proportional marks are to be awarded.

4. In question(s) on differential equations, constant of integration has to be written.

5. If a candidate has attempted an extra question, marks obtained in the question attempted first should be retained and the other answer should be scored out.

6. A full scale of marks - 0 to 100 has to be used. Please do not hesitate to award full marks if the answer deserves it.

EXPECTED ANSWERS/VALUE POINTS

SECTION - A

Q. No.   Marks

1-10. 1. $(1, 2) \in R$, $(2,1) \in R$ but $(1,1) \notin R$ 2. 1   3. $a_{12} = \dfrac{1}{2}$

4. $x = 3$ 5. $A^{-1} = \begin{pmatrix} 3 & -5 \\ -1 & 2 \end{pmatrix}$ 6. $\tan x + \sec x + c$ 7. $\dfrac{1}{4} \tan^{-1} \dfrac{x}{4} + c$

8. $a = -4$ 9. $-\dfrac{2}{\sqrt{30}}, \dfrac{1}{\sqrt{30}}, \dfrac{-5}{\sqrt{30}}$ 10. $\dfrac{5}{2}$ $1 \times 10 = 10$ m

SECTION - B

11.

$a*b$	1	2	3	4	5
1	1	1	1	1	1
2	1	2	2	2	2
3	1	2	3	3	3
4	1	2	3	4	4
5	1	2	3	4	5

1½ marks, for correct structuring of table.

½ mark for each correct row / column

         4 m

12. $\text{LHS} = \cot^{-1} \left[\dfrac{\sqrt{1+\sin x} + \sqrt{1-\sin x}}{\sqrt{1+\sin x} - \sqrt{1-\sin x}} \right]$

$\therefore \text{LHS} = \tan^{-1} \left[\dfrac{\left(\cos \frac{x}{2} + \sin \frac{x}{2}\right) + \left(\cos \frac{x}{2} - \sin \frac{x}{2}\right)}{\left(\cos \frac{x}{2} + \sin \frac{x}{2}\right) - \left(\cos \frac{x}{2} - \sin \frac{x}{2}\right)} \right]$ 2 m

$= \cot^{-1} \left| \cot \frac{x}{2} \right|$ 1 m

$= \dfrac{x}{2}$ 1 m

OR

$$\tan^{-1}\left(\frac{x}{y}\right) - \tan^{-1}\left(\frac{x-y}{x+y}\right) = \tan^{-1}\left(\frac{x}{y}\right) - \tan^{-1}\left(\frac{\frac{x}{y}-1}{1+\frac{x}{y}}\right)$$ 1 m

$$= \tan^{-1}\left(\frac{x}{y}\right) - \left(\tan^{-1}\frac{x}{y} - \frac{\pi}{4}\right)$$ 2 m

$$= \tan^{-1}\left(\frac{x}{y}\right) - \tan^{-1}\left(\frac{x}{y}\right) + \frac{\pi}{4} = \frac{\pi}{4}$$ 1 m

13. Taking a, b, c respectivly common from R_1, R_2, R_3 toget

$$\text{LHS} = \text{Determinant} = abc\begin{vmatrix} -a & b & c \\ a & -b & c \\ a & b & -c \end{vmatrix}$$ 1 m

Taking a, b, c respectivly common from C_1, C_2, C_3 toget

$$\text{LHS} = a^2 b^2 c^2 \begin{vmatrix} -1 & 1 & 1 \\ 1 & -1 & 1 \\ 1 & 1 & -1 \end{vmatrix}$$ 1 m

Applying $R_2 \to R_2 + R_1$, $R_3 \to R_3 + R_1$, toget

$$\text{LHS} = a^2 b^2 c^2 \begin{vmatrix} -1 & 1 & 1 \\ 0 & 0 & 2 \\ 0 & 2 & 0 \end{vmatrix}$$ 1 m

$$= a^2 b^2 c^2 \cdot (-1)(-4) = 4 a^2 b^2 c^2 = \text{RHS}$$ 1 m

14. L.H.L. $= \lim\limits_{x \to 0^-} f(x) = a$ 1 m

$$f(0) = a \cdot \sin \frac{\pi}{2} = a$$ ½ m

$$\text{R.H.L.} = \lim\limits_{x \to 0^+} \frac{\tan x}{x} \cdot \frac{(1-\cos x)}{x^2}$$

$$= \lim_{x \to 0^+} \frac{\tan x}{x} \cdot 2 \left(\frac{\sin \frac{x}{2}}{2 \frac{x}{2}} \right)^2 = \frac{1}{2}$$ 2 m

$$\therefore \quad a = \frac{1}{2}$$ ½ m

15. $y = x^{x \cos x} + \dfrac{x^2 + 1}{x^2 - 1} = u + v$ ½ m

$u = x^{x \cos x} \Rightarrow \log u = x \cos x \cdot \log x$ ½ m

$$\therefore \quad \frac{1}{u} \cdot \frac{du}{dx} = \frac{x \cos x}{x} + \cos x \cdot \log x \; - x \sin x \log x$$

$$\Rightarrow \frac{du}{dx} = x^{x \cos x} (\cos x + \log x \cdot \cos x - x \sin x \log x)$$ 1 m

$$v = \frac{x^2 + 1}{x^2 - 1}, \quad \frac{dv}{dx} = \frac{(x^2 - 1)2x - (x^2 + 1)2x}{(x^2 - 1)^2} = - \frac{4x}{(x^2 - 1)^2}$$ 1 m

$$\therefore \quad \frac{dy}{dx} = x^{x \cos x} (\cos x + \log x \cdot \cos x - x \sin x \log x) - \frac{4x}{(x^2 - 1)^2}$$ 1 m

OR

$$\therefore \quad \frac{dx}{d\theta} = a(1 - \cos \theta) \text{ and } \frac{dy}{d\theta} = -a \sin \theta$$ 1 m

$$\Rightarrow \frac{dy}{dx} = - \frac{\sin \theta}{1 - \cos \theta}$$ 1 m

$$\frac{d^2 y}{dx^2} = \frac{(1 - \cos \theta)(-\cos \theta) + \sin \theta (\sin \theta)}{(1 - \cos \theta)^2} \cdot \frac{d\theta}{dx}$$ 1 m

$$= \frac{(1 - \cos \theta)}{(1 - \cos \theta)^2} \cdot \frac{1}{a(1 - \cos \theta)}$$

$$= \frac{1}{a(1 - \cos \theta)^2} \text{ or } \frac{1}{4a} \operatorname{cosec}^4 \frac{\theta}{2}$$ 1 m

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16. Here $\dfrac{dv}{dt} = 12 \text{ cm}^3/\text{s}$ and $h = \dfrac{1}{6} r$ 1 m

$$v = \frac{1}{3}\pi r^2 h$$ ½ m

$$= \frac{1}{3}\pi (6h)^2 \cdot h = 12\pi h^3$$ ½ m

$$\frac{dv}{dt} = 36\pi h^2 \cdot \frac{dh}{dt} \Rightarrow \frac{dh}{dt} = \frac{1}{36\pi h^2} \frac{dv}{dt}$$ 1 m

when $h = 4$ cm, $\dfrac{dh}{dt} = \dfrac{1}{36\pi (16)} 12 = \dfrac{1}{48\pi}$ cm/s   1 m.

<center>OR</center>

$x^2 + y^2 - 2x - 3 = 0 \Rightarrow 2x + 2y\dfrac{dy}{dx} - 2 = 0$ 1 m

$\therefore \dfrac{dy}{dx} = \dfrac{1-x}{y}$ ½ m

since tangents are parallel to x axis $\therefore \dfrac{1-x}{y} = 0 \Rightarrow x = 1$ 1 m

$\Rightarrow (1)^2 + y^2 - 2(1) - 3 = 0 \Rightarrow y^2 = 4 \therefore y = \pm 2$ 1 m

Hence the points are $(1, 2), (1, -2)$ ½ m

17. $I = \displaystyle\int \dfrac{5x+3}{\sqrt{x^2+4x+10}} dx = \int \dfrac{\frac{5}{2}(2x+4)-7}{\sqrt{x^2+4x+10}} dx$ 1 m

$= \dfrac{5}{2} \displaystyle\int \dfrac{2x+4}{\sqrt{x^2+4x+10}} dx - 7 \int \dfrac{1}{\sqrt{(x+2)^2 + \left(\sqrt{6}\right)^2}} dx$ 1 m

$= 5 \cdot \sqrt{x^2+4x+10} - 7 \log\left|(x+2) + \sqrt{x^2+4x+10}\right| + c$ 1+1 m

<center>103</center>

OR

$$I = \int \frac{2x}{(x^2+1)(x^2+3)} \, dx = \int \frac{dt}{(t+1)(t+3)} \text{ where } t = x^2$$ 1 m

$$= \frac{1}{2} \int \left[\frac{1}{(t+1)} - \frac{1}{(t+3)} \right] dt$$ 1 m

$$= \frac{1}{2} \left[\log|t+1| - \log|t+3| \right] + c$$ 1 m

$$= \frac{1}{2} \left[\log(x^2+1) - \log(x^2+3) \right] + c$$ 1 m

18. Given differential equation can be written as

$$\frac{e^x}{1-e^x} \, dx + \frac{\sec^2 y}{\tan y} \, dy = 0$$ 1 m

Integrating to get $-\log|1-e^x| + \log|\tan y| = \log|c|$ 2 m

$$\log|\tan y| = \log|c(1-e^x)|$$ ½ m

$$\therefore \quad \tan y = c(1-e^x)$$ ½ m

19. Given differential equation can be written as

$$\frac{dy}{dx} + \sec^2 x \cdot y = \tan x \cdot \sec^2 x$$ ½ m

$$I.F. = e^{\int \sec^2 x \, dx} = e^{\tan x}$$ 1 m

$\therefore$ The solution is $y \cdot e^{\tan x} = \int \tan x \cdot e^{\tan x} \sec^2 x \, dx$ 1 m

$$= \int t \, e^t \, dt, \text{ where } \tan x = t$$

$$\Rightarrow y \cdot e^{\tan x} = (t-1) \, e^t + c$$ 1 m

$$\Rightarrow y \cdot e^{\tan x} = (\tan x - 1) \, e^{\tan x} + c$$ ½ m

or $y = (\tan x - 1) + c \cdot e^{-\tan x}$

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20. $\vec{a} + \vec{b} = 4\hat{i} + 4\hat{j}, \quad \vec{a} - \vec{b} = 2\hat{i} + 4\hat{k}$ 1 m

A vector perpendicular to $\vec{a} + \vec{b}$ and $\vec{a} - \vec{b}$ is $\left(\vec{a} + \vec{b}\right) \times \left(\vec{a} - \vec{b}\right)$ ½ m

$$\left(\vec{a} + \vec{b}\right) \times \left(\vec{a} - \vec{b}\right) = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 4 & 4 & 0 \\ 2 & 0 & 4 \end{vmatrix} = 16\hat{i} - 16\hat{j} - 8\hat{k}$$ 1½ m

$\therefore$ Unit vector in the direction of $\left(\vec{a} + \vec{b}\right) \times \left(\vec{a} - \vec{b}\right)$ is

$$\frac{16}{24}\hat{i} - \frac{16}{24}\hat{j} - \frac{8}{24}\hat{k} = \frac{2}{3}\hat{i} - \frac{2}{3}\hat{j} - \frac{1}{3}\hat{k}$$ 1 m

21. The direction ratios of given lines are

$$2, 7, -3 \text{ and } -1, 2, 4$$ 1 m

Let θ be the angle between these lines, then

$$\cos\theta = \frac{2(-1) + 7(2) + (-3)4}{\sqrt{4+49+9} \cdot \sqrt{1+4+16}} = 0$$ 1 m

$$\Rightarrow \theta = \pi/2$$ 1 m

Hence the lines are perpendicular to each other.   1 m

22. Here $P(A) = \dfrac{1}{2}$ $\therefore$ $P(\text{Not } A) = \dfrac{1}{2}$

and $P(B) = \dfrac{1}{3}$ $\therefore$ $P(\text{Not } B) = \dfrac{2}{3}$ 1 m

(i) P (problem is solved) = 1 – P (problem is not solved)   ½ m

$$= 1 - P(\text{Not } A) \cdot P(\text{Not } B)$$ ½ m

$$= 1 - \frac{1}{2} \cdot \frac{2}{3} = \frac{2}{3}$$

½ m

(ii) P (exactly one of them solves) $= P(A) \cdot P(\bar{B}) + P(B) \cdot P(\bar{A})$

½ m

$$= \frac{1}{2} \cdot \frac{2}{3} + \frac{1}{3} \cdot \frac{1}{2}$$

½ m

$$= \frac{1}{2}$$

½ m

SECTION - C

23.   Writing the given system of equations as

$$\begin{pmatrix} 2 & 3 & 10 \\ 4 & -6 & 5 \\ 6 & 9 & -20 \end{pmatrix} \begin{pmatrix} \frac{1}{x} \\ \frac{1}{y} \\ \frac{1}{z} \end{pmatrix} = \begin{pmatrix} 4 \\ 1 \\ 2 \end{pmatrix} \quad \text{or} \quad A \cdot X = B$$

1 m

$|A| = 2(120 - 45) - 3(-80 - 30) + 10(36 + 36) = 1200, \quad \therefore \quad X = A^{-1} B$

1 m

$$C_{11} = 75, \quad C_{12} = 110, \quad C_{13} = 72$$
Cofactors are $C_{21} = 150, \quad C_{22} = -100, \quad C_{23} = 0$ 1 mark for any 4 correct cofactors   2 m
$$C_{31} = 75, \quad C_{32} = 30, \quad C_{33} = -24$$

$$A^{-1} = \frac{1}{1200} \begin{pmatrix} 75 & 150 & 75 \\ 110 & -100 & 30 \\ 72 & 0 & -24 \end{pmatrix}$$

½ m

$$\therefore \begin{pmatrix} \frac{1}{x} \\ \frac{1}{y} \\ \frac{1}{z} \end{pmatrix} = \frac{1}{1200} \begin{pmatrix} 75 & 150 & 75 \\ 110 & -100 & 30 \\ 72 & 0 & -24 \end{pmatrix} \begin{pmatrix} 4 \\ 1 \\ 2 \end{pmatrix} = \begin{pmatrix} \frac{1}{2} \\ \frac{1}{3} \\ \frac{1}{5} \end{pmatrix}$$

$$\therefore \quad x = 2,\ y = 3,\ z = 5 \qquad\qquad\qquad 1\tfrac{1}{2}\,m$$

<div align="center">OR</div>

Given matrix A can be written as

$$\begin{pmatrix} 1 & 3 & -2 \\ -3 & 0 & -1 \\ 2 & 1 & 0 \end{pmatrix} = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix} A \qquad\qquad 1\,m$$

Applying $R_2 \to R_2 + 3R_1\ \ R_3 \to R_3 - 2R_1$
$$\begin{pmatrix} 1 & 3 & -2 \\ 0 & 9 & -7 \\ 0 & -5 & 4 \end{pmatrix} = \begin{pmatrix} 1 & 0 & 0 \\ 3 & 1 & 0 \\ -2 & 0 & 1 \end{pmatrix} A \qquad 1\,m$$

$R_2 \to R_2 + 2R_3 \Rightarrow$
$$\begin{pmatrix} 1 & 3 & -2 \\ 0 & -1 & 1 \\ 0 & -5 & 4 \end{pmatrix} = \begin{pmatrix} 1 & 0 & 0 \\ -1 & 1 & 2 \\ -2 & 0 & 1 \end{pmatrix} A \qquad \tfrac{1}{2}\,m$$

$R_3 \to R_3 + 5R_2 \Rightarrow$
$$\begin{pmatrix} 1 & 3 & -2 \\ 0 & -1 & 1 \\ 0 & 0 & -1 \end{pmatrix} = \begin{pmatrix} 1 & 0 & 0 \\ -1 & 1 & 2 \\ 3 & -5 & -9 \end{pmatrix} A \qquad \tfrac{1}{2}\,m$$

$R_2 \to R_2 + R_3,\ R_3 \to -R_3$
$$\begin{pmatrix} 1 & 3 & -2 \\ 0 & -1 & 0 \\ 0 & 0 & 1 \end{pmatrix} = \begin{pmatrix} 1 & 0 & 0 \\ 2 & -4 & -7 \\ -3 & 5 & 9 \end{pmatrix} A \qquad 1\,m$$

$R_1 \to R_1 + 2R_3,\ R_2 \to -R_2$
$$\begin{pmatrix} 1 & 3 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix} = \begin{pmatrix} -5 & 10 & 18 \\ -2 & 4 & 7 \\ -3 & 5 & 9 \end{pmatrix} A \qquad 1\,m$$

$R_1 \to R_1 - 3R_2$
$$\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix} = \begin{pmatrix} 1 & -2 & -3 \\ -2 & 4 & 7 \\ -3 & 5 & 9 \end{pmatrix} A \qquad \tfrac{1}{2}\,m$$

$$\therefore \quad A^{-1} = \begin{pmatrix} 1 & -2 & -3 \\ -2 & 4 & 7 \\ -3 & 5 & 9 \end{pmatrix} \qquad\qquad \tfrac{1}{2}\,m$$

24.
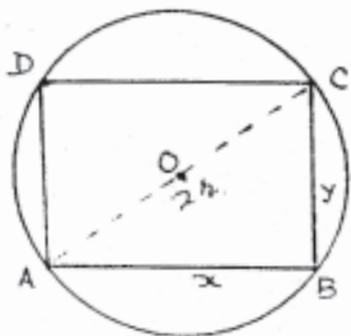
Let ABCD be the rectangle of maximum area inscribed in a circle of radius r. For Figure   1 m

If AB = x and BC = y, then

$$x^2 + y^2 = 4r^2 \quad \Rightarrow \quad y^2 = 4r^2 - x^2 \qquad 1\,m$$

and Area $(A) = xy$

let $S = x^2 y^2 = x^2 (4r^2 - x^2) = 4r^2 x^2 - x^4 \qquad 1\,m$

$$\frac{ds}{dx} = 0 \quad \Rightarrow \quad 8r^2 x - 4x^3 = 0$$

$$\Rightarrow \quad x^2 = 2r^2 \Rightarrow x = \sqrt{2}\, r \qquad 1\,m$$

$$\frac{d^2 s}{dx^2} = 16r^2 - 12x^2 = 16r^2 - 12\left(2r^2\right) = -8r^2 < 0 \qquad 1\,m$$

$\therefore$ For maximum area $x = \sqrt{2}\, r$ and $y = \sqrt{4r^2 - 2r^2} = \sqrt{2}\, r$

$\therefore$ square has the maximum area.   1 m

25.
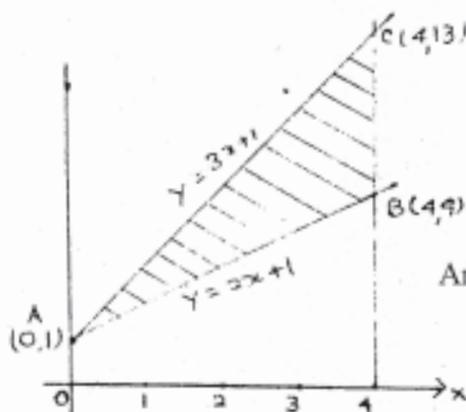
Figure   1 m

Getting the points of intersection as

A (0, 1), B (4, 9) and C (4, 13)   1½ m

$$\text{Area } \Delta\, ABC = \int_0^4 (3x+1)\, dx - \int_0^4 (2x+1)\, dx \qquad 2\,m$$

$$= \int_0^4 x\, dx = \left[\frac{x^2}{2}\right]_0^4 = 8 \text{ sq.units} \qquad 1\tfrac{1}{2}\,m$$

26. $I = \displaystyle\int_0^{\pi/2} 2 \sin x \cos x \tan^{-1}(\sin x)\, dx = \int_0^1 \tan^{-1} t \cdot (2t)\, dt \quad$ where $\sin x = t$ 1 m

$$= \left[\tan^{-1} t \times t^2\right]_0^1 - \int_0^1 \frac{t^2}{t^2+1}\, dt \qquad 1\,m$$

$$= \frac{\pi}{4} - \int_0^1 \left(1 - \frac{1}{t^2+1}\right) dt \qquad \text{½+1 m}$$

$$= \frac{\pi}{4} - \left[t - \tan^{-1} t\right]_0^1 \qquad \text{1 m}$$

$$= \frac{\pi}{4} - \left[1 - \frac{\pi}{4}\right] = \left(\frac{\pi}{2} - 1\right) \qquad \text{½+1 m}$$

<div align="center">OR</div>

$$I = \int_0^{\frac{\pi}{2}} \frac{x \sin x \cos x}{\sin^4 x + \cos^4 x} dx \quad\text{..}(i)$$

$$x \rightarrow \left(\frac{\pi}{2} - x\right)$$

$$= \int_0^{\frac{\pi}{2}} \frac{\left(\frac{\pi}{2} - x\right) \sin\left(\frac{\pi}{2} - x\right) \cos\left(\frac{\pi}{2} - x\right)}{\sin^4\left(\frac{\pi}{2} - x\right) + \cos^4\left(\frac{\pi}{2} - x\right)} dx = \int_0^{\frac{\pi}{2}} \frac{\left(\frac{\pi}{2} - x\right) \cos x \sin x \, dx}{\sin x^4 + \cos x^4} \quad\text{....(ii)} \qquad \text{1+1 m}$$

$$2I = \frac{\pi}{2} \int_0^{\frac{\pi}{2}} \frac{\sin x \cos x}{\sin^4 x + \cos^4 x} dx = \frac{\pi}{2} \int_0^{\frac{\pi}{2}} \frac{\tan x \cdot \sec^2 x \, dx}{1 + \tan^4 x} \qquad \text{1+1 m}$$

$$I = \frac{\pi}{4} \frac{1}{2} \int_0^\infty \frac{dt}{1 + t^2} \quad \text{where } t = \tan^2 x \qquad \text{1 m}$$

$$= \frac{\pi}{8} \cdot \left[\tan^{-1} t\right]_0^\infty = \frac{\pi}{8} \cdot \frac{\pi}{2} = \frac{\pi^2}{16} \qquad \text{1 m}$$

27.   Given equation of planes can be written as   1 m

$$x + 2y + 3z - 4 = 0, \quad\text{...}(i) \qquad \text{1 m}$$

$$\text{and} \quad 2x + y - z + 5 = 0, \quad\text{...}(ii) \qquad \text{1 m}$$

Equation of plane through the intersection of (i) and (ii) is

$$x + 2y + 3z - 4 + \lambda(2x + y - z + 5) = 0 \qquad \text{1 m}$$

$$\Rightarrow \quad (1 + 2\lambda)x + (2 + \lambda)y + (3 - \lambda)z - 4 + 5\lambda = 0 \quad ....\text{(iii)} \qquad 1\tfrac{1}{2}\text{ m}$$

Plane (iii) is perpendicular to the plane $5x + 3y - 6z + 8 = 0$

$$\therefore \quad 5(1 + 2\lambda) + 3(2 + \lambda) - 6(3 - \lambda) = 0 \quad \Rightarrow \quad \lambda = \frac{7}{19} \qquad 1\tfrac{1}{2}\text{ m}$$

$$\therefore \quad \text{Equation of plane is } 33x + 45y + 50z - 41 = 0 \qquad \text{1 m}$$

$$\text{or} \quad \vec{r} \cdot (33\hat{i} + 45\hat{j} + 50\hat{k}) - 41 = 0$$

28. Let number of tennis rackets be 'x' and cricket bats be 'y'

$$\therefore \text{ LPP is}$$

Maximise $z = 20x + 10y$ 1 m

s.t. $1.5x + 3y \leq 42$

$3x + y \leq 24$

$x \geq 0, \ y \geq 0$ 2 m

For correct graph   2 m

vertices of feasible region are

$A(0, 14), B(4, 12), C(8, 0)$

$P(A) = \text{Rs. } 140, \ P(B) = \text{Rs. } 200, P(C) = \text{Rs. } 160$

For Maximum profit

Number of Rackets $= 4$ 1 m

Number of bats $= 12$
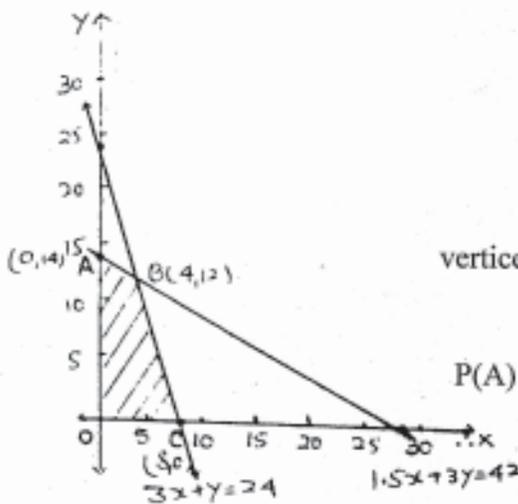
29. Let event E_1 : A male is selected

E_2 : A female is selected

A : selected person is grey haired   1 m

$$P(E_1) = \frac{1}{2}, \ \ P(E_2) = \frac{1}{2} \qquad \text{1 m}$$

$$P(A/E_1) = \frac{5}{100} = \frac{1}{20}, \ \ P(A/E_2) = \frac{25}{10000} = \frac{1}{400} \qquad \text{1 m}$$

$$P(E_1/A) = \frac{P(E_1) \cdot P(A/E_1)}{P(E_1) \cdot P(A/E_1) + P(E_2) \cdot P(A/E_2)}$$

<div align="right">1 m</div>

$$= \frac{\dfrac{1}{2} \cdot \dfrac{1}{20}}{\dfrac{1}{2} \cdot \dfrac{1}{20} + \dfrac{1}{2} \cdot \dfrac{1}{400}} = \frac{1}{1 + \dfrac{1}{20}} = \frac{20}{21}$$

<div align="right">2 m</div>

<div align="center">QUESTION PAPER CODE 65/1</div>

<div align="center">EXPECTED ANSWERS/VALUE POINTS</div>

<div align="center">SECTION - A</div>

<div align="right">Marks</div>

1-10. 1. f is a one-one function   2. π 3. Zero   4. $A^{-1} = \dfrac{1}{19} A$

5. $1 \times 5, 5 \times 1$ 6. $\dfrac{1}{4a}(ax + b)^4 + c$ 7. $\sin^{-1}x + c$ 8. $-\dfrac{1}{\sqrt{3}}, \dfrac{1}{\sqrt{3}}, \dfrac{1}{\sqrt{3}}$

9. zero   10. $\vec{r} = (5\hat{i} - 4\hat{j} + 6\hat{k}) + (3\hat{i} + 7\hat{j} + 2\hat{k})$

<div align="right">$1 \times 10 = 10$ m</div>

<div align="center">SECTION - B</div>

11.   Let $y = 10x + 7$ $\therefore$ $x = \dfrac{1}{10}(y - 7)$

let $g(y) = \dfrac{1}{10}(y - 7)$

<div align="right">1 m</div>

$\therefore$ $gof(x) = g(10x + 7) = \dfrac{1}{10}(10x + 7 - 7) = x \Rightarrow I_R = gof$

<div align="right">1½ m</div>

and $\therefore$ $fog(y) = f\left(\dfrac{1}{10}(y - 7)\right) = 10\left(\dfrac{1}{10}(y - 7)\right) + 7 = y \Rightarrow I_R = fog$

<div align="right">1½ m</div>

<div align="center">Hence $g(y) = \dfrac{1}{10}(y - 7)$</div>

<div align="center">OR</div>

since $a * 0 = a + 0 = a$

and $0 * a = 0 + a = a$ $\bigg\}$ $\forall a \in \{0, 1, 2, 3, 4, 5\}$

<div align="right">2 m</div>

<div align="center">111</div>

$\therefore$ 0 is the identity for *.

Also, $\forall\, a \in$ {0, 1, 2, 3, 4, 5}, a * (6 – a) = a + (6 – a) – 6

$\hspace{6cm}$ = 0 (which is identity) $\hspace{2cm}$ 2 m

$\therefore$ Each element 'a' of the set is invertible with (6 – a), being the inverse of 'a'.

12. $\quad$ Putting $x = \cos\theta$ to get LHS $= \tan^{-1}\left[\dfrac{\sqrt{1+\cos\theta} - \sqrt{1-\cos\theta}}{\sqrt{1+\cos\theta} + \sqrt{1-\cos\theta}}\right]$ $\hspace{2cm}$ 1 m

$\therefore$ LHS $= \tan^{-1}\left[\dfrac{\cos\frac{\theta}{2} - \sin\frac{\theta}{2}}{\cos\frac{\theta}{2} + \sin\frac{\theta}{2}}\right] = \tan^{-1}\left[\tan\left(\dfrac{\pi}{4} - \frac{\theta}{2}\right)\right]$ $\hspace{1.5cm}$ 1+1 m

$\hspace{1.5cm} = \dfrac{\pi}{4} - \dfrac{1}{2}\theta = \dfrac{\pi}{4} - \dfrac{1}{2}\cos^{-1}x$ $\hspace{4cm}$ 1 m

13. $\quad$ Applying $C_2 \to C_2 - 2C_1$ and $C_3 \to C_3 - 3C_1$, we get

$$\begin{vmatrix} x-2 & 1 & 2 \\ x-4 & -1 & -4 \\ x-8 & -11 & -40 \end{vmatrix} = 0$$ $\hspace{3cm}$ 2 m

Applying $R_1 \to R_1 + R_2$ and $R_3 \to R_3 - 11R_2$, We get

$$\begin{vmatrix} 2x-6 & 0 & -2 \\ x-4 & -1 & -4 \\ -10x+36 & 0 & 4 \end{vmatrix} = 0$$ $\hspace{3cm}$ 1 m

Expanding along C_2, we get $-1[8x - 24 - 20x + 72] = 0$

$\hspace{1.5cm}$ or $12x = 48$ i.e. $x = 4$ $\hspace{5cm}$ 1 m

14. $\quad$ L.H.L. $=$ 3a + 1

$\hspace{1cm}$ f (3) = 3a + 1 $\hspace{7cm}$ 2 m

$\hspace{0.5cm}$ RHL = 3b + 3

since f(x) is continuous at x = 3, $\therefore$ 3a + 1 = 3b + 3 $\hspace{2.5cm}$ 1 m

$\hspace{1.5cm}$ or 3a – 3b = 2, which is the required relation. $\hspace{1.5cm}$ 1 m

$\hspace{4cm}$ OR

$\hspace{1cm} x^y = e^{x-y} \Rightarrow y\,.\,\log x = (x - y)\log e = x - y$ $\hspace{2cm}$ 1 m

$\hspace{1.5cm} \Rightarrow\ y = \dfrac{x}{1+\log x}$ $\hspace{5cm}$ ½ m

112

$$\frac{dy}{dx} = \frac{(1+\log x) \cdot 1 - x \cdot \left(\frac{1}{x}\right)}{(1+\log x)^2} = \frac{\log x}{(1+\log x)^2}$$

1+1 m

$$= \frac{\log x}{(\log e + \log x)^2} = \frac{\log x}{\left[\log(xe)\right]^2}$$

½ m

15. $$\frac{dy}{d\theta} = \frac{(2+\cos\theta)4\cos\theta - 4\sin\theta\,(-\sin\theta)}{(2+\cos\theta)^2} - 1$$

1 m

$$= \frac{8\cos\theta + 4\left(\cos^2\theta + \sin^2\theta\right) - \left(4 + \cos^2\theta + 4\cos\theta\right)}{(2+\cos\theta)^2}$$

½ m

$$= \frac{4\cos\theta - \cos^2\theta}{(2+\cos\theta)^2} = \frac{4-\cos\theta}{(2+\cos\theta)^2} \cdot \cos\theta$$

1 m

since, $$\frac{4-\cos\theta}{(2+\cos\theta)^2} > 0 \text{ for } \forall\,\theta \text{ and } \cos\theta \geq 0 \text{ in } \left[0, \frac{\pi}{2}\right]$$

1 m

$$\therefore \frac{dy}{d\theta} \geq 0 \text{ in } \left[0, \frac{\pi}{2}\right], \text{ Hence the function is increasing in } \left[0, \frac{\pi}{2}\right]$$

½ m

OR

Here r = 9 cm and $\Delta r = 0.03$ cm.

½ m

Error in surface area $$\Delta A \approx \frac{dA}{dr} \cdot \Delta r \text{ where } A = 4\pi r^2$$

1 m

$$\approx 8\pi r \cdot \Delta r$$

1 m

$$\approx 8\pi\,(9)\,(0.03) = 2.16\pi \text{ cm}^2$$

1½ m

16. $$x = \tan\left(\frac{1}{a}\log y\right) \Rightarrow \log y = a\tan^{-1}x \therefore y = e^{a\cdot\tan^{-1}x}$$

1 m

$$\frac{dy}{dx} = e^{a\cdot\tan^{-1}x} \cdot \frac{a}{1+x^2}$$

1 m

$$\Rightarrow \left(1+x^2\right)\frac{dy}{dx} = a \cdot y \qquad \qquad \text{½ m}$$

differentiating again w.r.t., x we get

$$\left(1+x^2\right)\frac{d^2y}{dx^2} + 2x \cdot \frac{dy}{dx} = a \cdot \frac{dy}{dx} \qquad \qquad \text{1 m}$$

$$\left(1+x^2\right)\frac{d^2y}{dx^2} + \left(2x-a\right)\frac{dy}{dx} = 0 \qquad \qquad \text{½ m}$$

17. $$I = \int_0^{\pi/2}\frac{x}{1+\cos x}\,dx + \int_0^{\pi/2}\frac{\sin x}{1+\cos x}\,dx \qquad \qquad \text{½ m}$$

$$= \int_0^{\pi/2} \cdot x \cdot \frac{1}{2}\sec^2\frac{x}{2}\,dx + \int_0^{\pi/2}\tan\frac{x}{2}\,dx \qquad \qquad \text{1 m}$$

$$= \left[x\tan\frac{x}{2}\right]_0^{\pi/2} - \int_0^{\pi/2}\tan\frac{x}{2}\,dx + \int_0^{\pi/2}\tan\frac{x}{2}\,dx \qquad \qquad \text{1½ m}$$

$$= \frac{\pi}{2}\,1-0 = \frac{\pi}{2} \qquad \qquad \text{1 m}$$

18. Given equation can be written as $\dfrac{dy}{dx} = \dfrac{y}{x} + \sqrt{1+\left(\dfrac{y}{x}\right)^2}$ \qquad \qquad ½ m

$$\Rightarrow v + x\frac{dv}{dx} = v + \sqrt{1+v^2} \quad \text{where } \frac{y}{x} = v \qquad \qquad \text{1 m}$$

$$\Rightarrow \int\frac{dv}{\sqrt{1+v^2}} = \int\frac{dx}{x} \qquad \qquad \text{½ m}$$

$$\Rightarrow \log\left|v+\sqrt{1+v^2}\right| = \log cx \qquad \qquad \text{1 m}$$

$$\Rightarrow v+\sqrt{1+v^2} = cx \quad \therefore \quad y+\sqrt{x^2+y^2} = cx^2 \qquad \qquad \text{1 m}$$

19. Given equation can be written as

$$x \frac{dy}{dx} - y = 3x^2 \quad \text{or} \quad \frac{dy}{dx} - \frac{1}{x} \cdot y = 3x$$

1 m

$$\text{I.F.} = e^{-\int \frac{1}{x} dx} = e^{-\log x} = e^{\log \frac{1}{x}} = \frac{1}{x}$$

1 m

$$\therefore \text{ solution is, } y \cdot \frac{1}{x} = \int 3x \cdot \frac{1}{x} dx = 3x + c$$

1½ m

$$\Rightarrow y = 3x^2 + cx$$

½ m

20. Area $\triangle ABC = \frac{1}{2} \left| \overrightarrow{AB} \times \overrightarrow{BC} \right|$

1 m

Here, $\overrightarrow{AB} = \hat{i} + 2\hat{j} + 3\hat{k}$ and $\overrightarrow{BC} = -\hat{i} + 2\hat{j}$

1 m

$$\overrightarrow{AB} \times \overrightarrow{BC} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 1 & 2 & 3 \\ -1 & 2 & 0 \end{vmatrix} = -6\hat{i} - 3\hat{j} + 4\hat{k}$$

1 m

$$\Rightarrow \text{Area} = \frac{1}{2}\sqrt{36 + 9 + 16} = \frac{1}{2}\sqrt{61} \text{ sq. units}$$

1 m

21. Equations of the lines are,

$$\vec{r} = \left(\hat{i} - 2\hat{j} - 3\hat{k}\right) + t\left(-\hat{i} + \hat{j} - 2\hat{k}\right) \text{ and}$$

½ m

$$\vec{r} = \left(\hat{i} - \hat{j} - \hat{k}\right) + s\left(\hat{i} + 2\hat{j} - 2\hat{k}\right)$$

$$\text{shortest distance} = \frac{\left| \left(\overrightarrow{a_2} - \overrightarrow{a_1}\right) \cdot \left(\overrightarrow{b_1} \times \overrightarrow{b_2}\right) \right|}{\left| \overrightarrow{b_1} \times \overrightarrow{b_2} \right|} \quad \text{where}$$

½ m

$$\overrightarrow{a_1} = \hat{i} - 2\hat{j} + 3\hat{k}, \ \overrightarrow{a_2} = \hat{i} - \hat{j} - \hat{k}, \ \overrightarrow{b_1} = -\hat{i} + \hat{j} - 2\hat{k}, \ \overrightarrow{b_2} = \hat{i} + 2\hat{j} - 2\hat{k}$$

½ m

$$\vec{a_2} - \vec{a_1} = \hat{j} - 4\hat{k}, \quad \vec{b_1} \times \vec{b_2} = 2\hat{i} - 4\hat{j} - 3\hat{k}$$

½+1 m

$$\therefore \quad \text{S.D.} = \frac{0 - 4 + 12}{\sqrt{29}} = \frac{8}{\sqrt{29}}$$

1 m

22. Here $k + 2k + 2k + 3k + k^2 + 2k^2 + 7k^2 + k = 1 \implies 10k^2 + 9k - 1 = 0$

1 m

$$\implies (10k - 1)(k + 1) = 0 \implies k = \frac{1}{10}$$

$\therefore$ (i) $k = \dfrac{1}{10}$

½ m

(ii) $P(x < 3) = 0 + k + 2k = 3k = \dfrac{3}{10}$

1 m

(iii) $P(x > 6) = 7k^2 + k = \dfrac{7}{100} + \dfrac{1}{10} = \dfrac{17}{100}$

1 m

(iv) $P(0 < x < 3) = k + 2k = 3k = \dfrac{3}{10}$

½ m

<div align="center">OR</div>

Here $n = 6$, probability of success $(p) = \dfrac{1}{6}$

probability of failure $(q) = \dfrac{5}{6}$

½ m

P (at most 2 sixes) = P(0) + P(1) + P(2)

1 m

$$= 6_{C_0}\left(\frac{1}{6}\right)^0 \cdot \left(\frac{5}{6}\right)^6 + 6_{C_1}\left(\frac{1}{6}\right)^1 \cdot \left(\frac{5}{6}\right)^5 + 6_{C_2}\left(\frac{1}{6}\right)^2 \cdot \left(\frac{5}{6}\right)^4$$

1½ m

$$= \left(\frac{5}{6}\right)^6 + \left(\frac{5}{6}\right)^5 + \frac{1}{2}\left(\frac{5}{6}\right)^5 = \frac{7}{3}\left(\frac{5}{6}\right)^5$$

1 m

SECTION - C

23. Given system of equations can be written as

$$\begin{pmatrix} 4 & 3 & 2 \\ 1 & 2 & 3 \\ 6 & 2 & 3 \end{pmatrix} \begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} 60 \\ 45 \\ 70 \end{pmatrix} \text{ or } A \cdot X = B$$

1 m

$$|A| = 4(0) - 3(-15) + 2(-10) = 45 - 20 = 25 \neq 0 \therefore X = A^{-1} B$$

1 m

Cofactors are $\begin{pmatrix} C_{11} = 0 & C_{12} = +15 & C_{13} = -10 \\ C_{21} = -5 & C_{22} = 0 & C_{23} = 10 \\ C_{31} = 5 & C_{32} = -10 & C_{33} = 5 \end{pmatrix}$ 1 mark for any 4 correct cofactors   2 m

$$\therefore A^{-1} = \frac{1}{25} \begin{pmatrix} 0 & -5 & 5 \\ 15 & 0 & -10 \\ -10 & 10 & 5 \end{pmatrix}$$

½ m

$$\therefore \begin{pmatrix} x \\ y \\ z \end{pmatrix} = \frac{1}{25} \begin{pmatrix} 0 & -5 & 5 \\ 15 & 0 & -10 \\ -10 & 10 & 5 \end{pmatrix} \begin{pmatrix} 60 \\ 45 \\ 70 \end{pmatrix} = \begin{pmatrix} 5 \\ 8 \\ 8 \end{pmatrix}$$

$$\therefore \quad x = 5, y = 8, z = 8$$

1½ m

24. Let radius of cone be r and height h

$$\therefore \quad v = \frac{1}{3} \pi r^2 h \text{ (given)} \Rightarrow h = \frac{3v}{\pi r^2}$$

1 m

$$\text{C.S.A.} = A = \pi r l = \pi r \sqrt{r^2 + h^2} = \pi r \sqrt{r^2 + \frac{9v^2}{\pi^2 r^4}}$$

1 m

$$\text{Let } S = \pi^2 r^2 \left(r^2 + \frac{9v^2}{\pi^2 r^4} \right) = \pi^2 r^4 + \frac{9v^2}{r^2}$$

½ m

$$\frac{ds}{dr} = 0 \implies 4\pi^2 r^3 - \frac{18v^2}{r^3} = 0 \quad or \quad 18v^2 = 4\pi^2 r^6 \qquad 1\tfrac{1}{2}\,m$$

$$\implies 18\left(\frac{1}{9}\pi^2 r^4 h^2\right) = 4\pi^2 r^6 \implies h = \sqrt{2}\,r \qquad 1\,m$$

$$\frac{d^2s}{dr^2} = 12\pi^2 r^2 + \frac{54v^2}{r^4} > 0 \implies \text{curved surface area is least when } h = \sqrt{2}\,r \qquad 1\,m$$

OR

Correct fiqure   1 m

let sides of rectangle be x and y and the sides of equilateral triangle be x
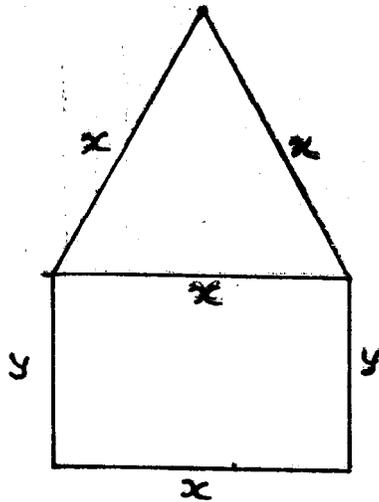
$$\therefore \quad 3x + 2y = 12 \implies y = \frac{12 - 3x}{2} \qquad 1\,m$$

$$\text{Area} = xy + \sqrt{3}\,\frac{x^2}{4} \qquad 1\,m$$

$$= x\,\frac{(12 - 3x)}{2} + \sqrt{3}\,\frac{x^2}{4} \qquad \tfrac{1}{2}\,m$$

$$A = \frac{1}{4}\,[24x - 6x^2 + \sqrt{3}\,x^2]$$

$$\frac{dA}{dx} = 0 \implies 24 - 12x + 2\sqrt{3}\,x = 0$$

$$\implies x = \frac{24}{12 - 2\sqrt{3}} \quad or \quad \frac{4\left(6 + \sqrt{3}\right)}{11}\,m \qquad 1\,m$$

$$\therefore \quad y = \frac{30 - 6\sqrt{3}}{11}\,m \qquad \tfrac{1}{2}\,m$$

$$\frac{d^2A}{dx^2} = (-12 + 2\sqrt{3}) < 0 \therefore \text{ Area is maximum for} \qquad 1\,m$$

$$x = \frac{4\left(6 + \sqrt{3}\right)}{11}\,m \text{ and } y = \frac{30 - 6\sqrt{3}}{11}\,m$$

25. $I = \displaystyle\int_{\pi/6}^{\pi/3} \dfrac{dx}{1 + \sqrt{\tan x}} = \int_{\pi/6}^{\pi/3} \dfrac{\sqrt{\cos x}}{\sqrt{\cos x} + \sqrt{\sin x}}\, dx$ .... (i)   1 m

$x \rightarrow \left(\dfrac{\pi}{3} + \dfrac{\pi}{6} - x\right)$ 1 m

$= \displaystyle\int_{\pi/6}^{\pi/3} \dfrac{\sqrt{\cos\left(\frac{\pi}{2} - x\right)}}{\sqrt{\cos\left(\frac{\pi}{2} - x\right)} + \sqrt{\sin\left(\frac{\pi}{2} - x\right)}}\, dx = \int_{\pi/6}^{\pi/3} \dfrac{\sqrt{\sin x}}{\sqrt{\sin x} + \sqrt{\cos x}}\, dx$ ....(ii)   1 m

Adding (i) and (ii) to get

$2I = \displaystyle\int_{\pi/6}^{\pi/3} 1 \cdot dx = \big[x\big]_{\pi/6}^{\pi/3} = \dfrac{\pi}{3} - \dfrac{\pi}{6} = \dfrac{\pi}{6}$ 1+1 m

$\Rightarrow I = \dfrac{\pi}{12}$ 1 m

<div align="center">OR</div>

$I = \displaystyle\int \dfrac{6x + 7}{\sqrt{(x-5)(x-4)}}\, dx = \int \dfrac{6x + 7}{\sqrt{x^2 - 9x + 20}}\, dx$ 1 m

$= \displaystyle\int \dfrac{3(2x - 9) + 34}{\sqrt{x^2 - 9x + 20}}\, dx$ 1 m

$= 3\displaystyle\int \dfrac{2x - 9}{\sqrt{x^2 - 9x + 20}}\, dx + 34\int \dfrac{dx}{\sqrt{\left(x - \dfrac{9}{2}\right)^2 - \left(\dfrac{1}{2}\right)^2}}\, dx$ 1½

$= 3.2\sqrt{x^2 - 9x + 20} + 34.\log\left|\left(x - \dfrac{9}{2}\right) + \sqrt{x^2 - 9x + 20}\right| + c$ 1+1

$= 6 \cdot \sqrt{x^2 - 9x + 20} + 34.\log\left|\left(\dfrac{2x - 9}{2}\right) + \sqrt{x^2 - 9x + 20}\right| + c$ ½

<div align="center">119</div>

26.
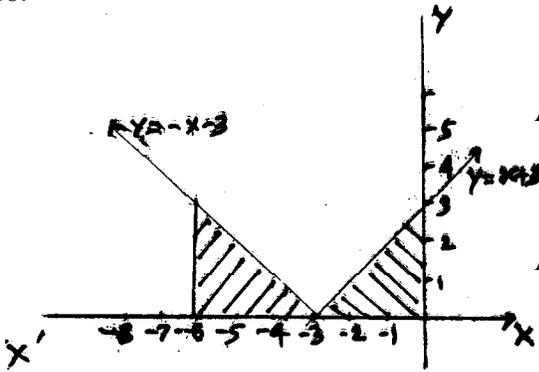
For correct graph   1 m

$$A = \int_{-6}^{-3} -(x+3)\,dx + \int_{-3}^{0} (x+3)\,dx$$ 2 m

$$A = \left[-\frac{(x+3)^2}{2}\right]_{-6}^{-3} + \left[\frac{(x+3)^2}{2}\right]_{-3}^{0}$$ 2 m

$$= -0 + \frac{9}{2} + \frac{9}{2} - 0 = 9 \text{ sq. U.}$$ 1 m

27.   Any point on the given line is $(2+3\lambda)\hat{i} + (-1+4\lambda)\hat{j} + (2+2\lambda)\hat{k}$ 1 m

If this point lies on plane, it must satisfy its equation

$\therefore\ \left[(2+3\lambda)\hat{i} + (-1+4\lambda)\hat{j} + (2+2\lambda)\hat{k}\right]\cdot\left(\hat{i} - \hat{j} + \hat{k}\right) = 5$ 1 m

$\Rightarrow\ 2 + 3\lambda + 1 - 4\lambda + 2 + 2\lambda - 5 = 0 \Rightarrow \lambda = 0$ 1 m

$\therefore$ Point of intersection is $(2, -1, 2)$ 1 m

$\text{Distance} = \sqrt{(2+1)^2 + (-1+5)^2 + (2+10)^2} = 13$ 2 m

28.   Let E_1 : selecting box I, E_2 : selecting box II and E_3 : selecting box III   ½ m

$\therefore\ \ P(E_1) = P(E_2) = P(E_3) = \dfrac{1}{3}$ 1 m

let event A : Getting a gold coin

$\therefore\ \ P(A/E_1) = 1 \quad P(A/E_2) = 0 \quad P(A/E_3) = \dfrac{1}{2}$ 1½ m

$P(E_1/A) = \dfrac{P(E_1)\cdot P(A/E_1)}{P(E_1)\,P(A/E_1) + P(E_2)\,P(A/E_2) + P(E_3)\,P(A/E_3)}$ 1 m

$= \dfrac{\frac{1}{3}\cdot 1}{\frac{1}{3}\cdot 1 + 0 + \frac{1}{3}\cdot\frac{1}{2}} = \dfrac{2}{3}$ 1+1 m

29. Let the number of desktop models, he stock be x and the number of portable model be y
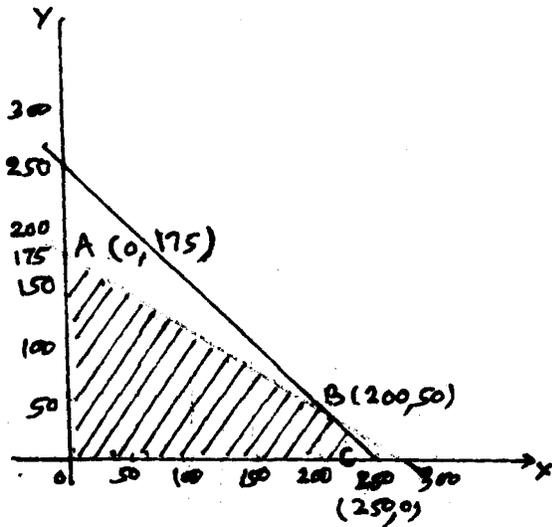
L.P.P. is, Maximise $P = 4500 x + 5000y$ 1 m

subject to $x + y \leq 250$

$25000 x + 40000 y \leq 7000000$

(or $5x + 8y \leq 1400$)   2 m

$x \geq 0, \ y \geq 0$

For correct graph   2 m

Vertices of feasible region are

A (0, 175), B (200, 50), C (250, 0)

$P(A) = $ Rs. 875000

$P(B) = $ Rs. $900000 + 250000 = $ Rs. 1150000

$P(C) = $ Rs. 1125000

$\therefore$ For max. Profit destop model $= 200$

portable model $= 50$ 1 m

PHYSICS (Theory)

Time allowed : 3 hours   *Maximum Marks : 70*

General Instructions:

(i)   All questions are compulsory.

(ii) There are 30 questions in total. Questions 1 to 8 are very short answer type questions
      and carry one marks each.

(iii) Questions 9 to 18 carry two marks each, questions 19 to 27 carry three marks each
      and questions 28 to 30 carry five marks each.

(iv) There is no overall choice. However, an internal choice has been provided in one
      question of two marks, one question of three marks and all three questions of five
      marks each. You have to attempt only one of the given choices in such questions.

(v)   Use of calculators is **not** permitted. However, you may use log tables if necessary.

(vi) You may use the following physical constants wherever necessary:

$c = 3 \times 10^8$ m/s

$h = 6.63 \times 10^{-34}$ Js

$e = 1.6 \times 10^{-19}$ C

$\mu_0 = 4\pi \times 10^{-7}$ T mA^{-1}

$\dfrac{1}{4\pi\varepsilon_0} = 9 \times 10^9 \ \dfrac{\text{Nm}^2}{\text{C}^2}$

$m_e = 9.1 \times 10^{-31}$ kg

1. A point charge Q is placed at point O as shown in the figure. Is the potential difference $V_A - V_B$ positive, negative or zero, if Q is (i) positive (ii) negative ?   1

2. A plane electromagnetic wave travels in vacuum along z-direction. What can you say about the direction of electric and magnetic field vectors?   1

3. A resistance R is connected across a cell of emf ε and internal resistance r. A potentiometer now measures the potential difference between the terminals of the cell as V. Write the expression for 'r' in terms of ε, V and R.   1

4. The permeability of a magnetic material is 0.9983. Name the type of magnetic materials it represents.   1

5. Show graphically, the variation of the de-Broglie wavelength (λ) with the potential (V) through which an electron is accelerated from rest.   1

6. In a transistor, doping level in base is increased slightly. How will it affect (i) collector current and (ii) base current ?   1

7. Define the term 'wattless current'.   1

8. When monochromatic light travels from one medium to another its wavelength changes but frequency remains the same, Explain.   1

9. Two uniformly large parallel thin plates having charge densities $+\sigma$ and $-\sigma$ are kept in the X-Z plane at a distance 'd' apart. Sketch an equipotential surface due to electric field between the plates. If a particle of mass m and charge '-q' remains stationary between the plates, what is the magnitude and direction of this field ?   2

OR

Two small identical electrical dipoles AB and CD, each of dipole moment 'p' are kept at an angle of 120° as shown in the figure. What is the resultant dipole moment

of this combination ? If this system is subjected to electric field ($\vec{E}$) directed along +X direction, what will be the magnitude and direction of the torque acting on this ?
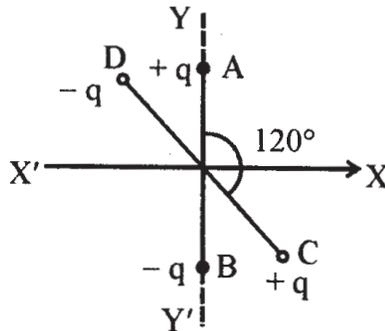
10. A magnetic needle free to rotate in a vertical plane parallel to the magnetic meridian has its north tip down at 60° with the horizontal. The horizontal component of the earth's magnetic field at the place is known to be 0.4 G. Determine the magnitude of the earth's magnetic field at the place. **2**

11. Figure shows two identical capacitors, C_1 and C_2, each of 1 μF capacitance connected to a battery of 6 V. Initially switch 'S' is closed. After sometime 'S' is left open and dielectric slabs of dielectric constant K = 3 are inserted to fill completely the space between the plates of the two capacitors. How will the (i) charge and (ii) potential difference between the plates of the capacitors be affected after the slabs are inserted ? **2**
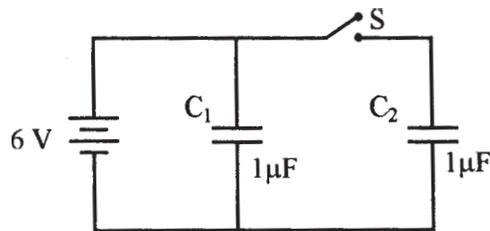
12. Two convex lenses of same focal length but of aperture A_1 and A_2 ($A_2 < A_1$), are used as the objective lenses in two astronomical telescopes having identical eyepieces. What is the ratio of their resolving power ? Which telescope will you prefer and why ? Give reason. **2**

13. Draw the output waveform at X, using the given inputs A and B for the logic circuit shown below. Also, identify the logic operation performed by this circuit. **2**
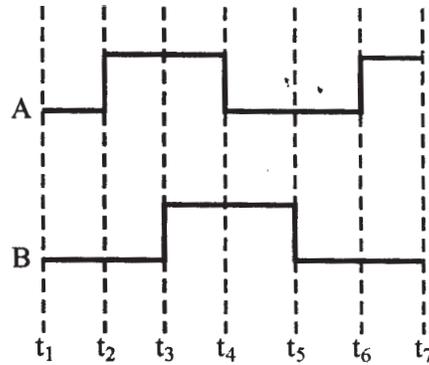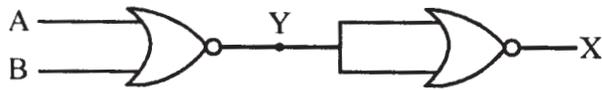
14. Name the semiconductor device that can be used to regulate an unregulated dc power supply. With the help of I-V characteristics of this device, explain its working principle.　　　2

15. How are infrared waves produced ? Why are these referred to as 'heat waves' ? Write their one important use.　　　2

16. Draw the transfer characteristic curve of a base biased transistor in CE configuration. Explain clearly how the active region of the V_0 versus V_i curve in a transistor is used as an amplifier.　　　2

17. (i) Define modulation index.　　　2

    (ii) Why is the amplitude of modulating signal kept less than the amplitude of carrier wave ?

18. A current is induced in coil C_1 due to the motion of current carrying coil C_2. (a) Write any two ways by which a large deflection can be obtained in the galvanometer G. (b) Suggest an alternative device to demonstrate the induced current in place of a galvanometer.　　　2
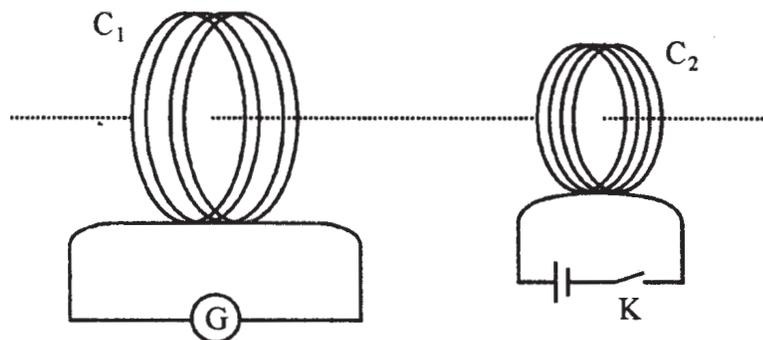
19. Define the terms (i) drift velocity, (ii) relaxation time. 3

A conductor of length L is connected to a dc source of emf ε. If this conductor is replaced by another conductor of same material and same area of cross-section but of length 3L, how will the drift velocity change ?

20. Using Gauss's law obtain the expression for the electric field due to a uniformly charged thin spherical shell of radius R at a point outside the shell. Draw a graph showing the variation of electric field with r, for r > R and r < R. 3

21. An electron and a photon each have a wavelength 1.00 nm. Find 3

(i)   their momenta,

(ii)   the energy of the photon and

(iii)   the kinetic energy of electron.

22. Draw a schematic diagram showing the (i) ground wave (ii) sky wave and (iii) space wave propagation modes for em waves. 3

Write the frequency range for each of the following:

(i)   Standard AM broadcast

(ii)   Television

(iii)   Satellite communication

23. Describe Young's double slit experiment to produce interference pattern due to a monochromatic source of light. Deduce the expression for the fringe width. 3

OR

Use Huygen's principle to verify the laws of refraction.

24. (a) Describe briefly, with the help of suitable diagram, how the transverse nature of light can be demonstrated by the phenomenon of polarization. 3

(b) When unpolarized light passes from air to a transparent medium, under what condition does the reflected light get polarized ?

25. The energy levels of a hypothetical atom are shown below. Which of the shown transitions will result in the emission of a photon of wavelength 275 nm ? 3

Which of these transitions correspond to emission of radiation of (i) maximum and (ii) minimum wavelength?
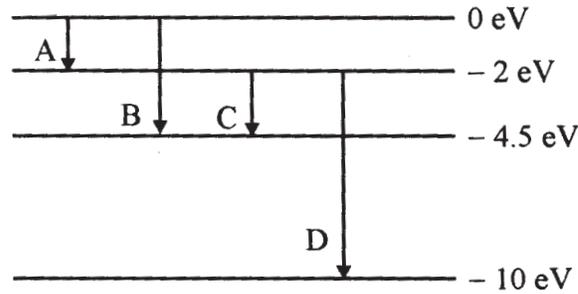
26. State the law of radioactive decay. 3

Plot a graph showing the number (N) of undecayed nuclei as a function of time (t) for a given radioactive sample having half life $T_{1/2}$.

Depict in the plot the number of undecayed nuclei at (i) $t = 3\, T_{1/2}$ and (ii) $t = 5\, T_{1/2}$.

27. In the circuit shown, $R_1 = 4\,\Omega$, $R_2 = R_3 = 15\,\Omega$, $R_1 = 30\,\Omega$ and $E = 10$ V. Calculate. the equivalent resistance of the circuit and the current in each resistor. 3
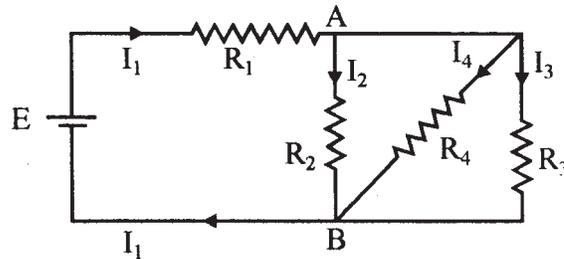
28. State Biot-Savart law, giving the mathematical expression for it. 5

Use this law to derive the expression for the magnetic field due to a circular coil carrying current at a point along its axis.

How does a circular loop carrying current behave as a magnet ?

OR

With the help of a labelled diagram, state the underlying principle of a cyclotron. Explain clearly how it works to accelerate the charged particles.

Show that cyclotron frequency is independent of energy of the particle. Is there an upper limit on the energy acquired by the particle ? Give reason.

29. (a) Draw a ray diagram to show refraction of a ray of monochromatic light passing through a glass prism. 5

Deduce the expression for the refractive index of glass in terms of angle of prism and angle of minimum deviation.

(b) Explain briefly how the phenomenon of total internal reflection is used in fibre optics.

OR

(a) Obtain lens makers formula using the expression

$$\frac{n_2}{v} - \frac{n_1}{u} = \frac{(n_2 - n_1)}{R}$$

Here the ray of light propagating from a rarer medium of refractive index (n_1) to a denser medium of refractive index (n_2) is incident on the convex side of spherical refracting surface of radius of curvature R.

(b) Draw a ray diagram to show the image formation by a concave mirror when the object is kept between its focus and the pole. Using this diagram, derive the magnification formula for the image formed.

30. (i) With the help of a labelled diagram, describe briefly the underlying principle and working of a step up transformer. 5

(ii) Write any two sources of energy loss in a transformer.

(iii) A step up transformer converts a low input voltage into a high output voltage. Does it violate law of conservation of energy ? Explain.

OR

Derive an expression for the impedance of a series LCR circuit connected to an AC supply of variable frequency.

Plot a graph showing variation of current with the frequency of the applied voltage.

Explain briefly how the phenomenon of resonance in the circuit can be used in the tuning mechanism of a radio or a TV set.

1.   Define electric dipole moment. Write its S.I. unit.   1

2.   Where on the surface of Earth is the angle of dip 90° ?   1

3.   A hollow metal sphere of radius 5 cm is charged such that the potential on its surface
        is 10 V. What is the potential at the centre of the sphere?   1

4.   How are radio waves produced ?   1

5.   Write any two characteristic properties of nuclear force.   1

6.   Two bar magnets are quickly moved towards a metallic loop connected across a
        capacitor 'C' as shown in the figure. Predict the polarity of the capacitor.   1
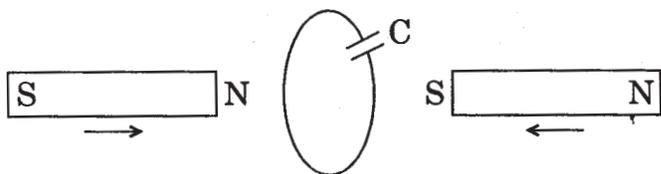
7.   What happens to the width of depletion layer of a p-n junction when it is (i) forward
        biased, (ii) reverse biased ?   1

8.   Define the term 'stopping potential' in relation to photoelectric effect.   1

9.   A thin straight infinitely long conducting wire having charge density λ is enclosed by
        a cylindrical surface of radius r and length l, its axis coinciding with the length of the
        wire. Find the expression for the electric flux through the surface of the cylinder.   2

10.   Plot a graph showing the variation of coulomb force (F) versus $\left(\dfrac{1}{r^2}\right)$; where r is the

        distance between the two charges of each pair of charges: (1 µC, 2 µC) and (2 µC,
        − 3 µC). Interpret the graphs obtained.   2

11.   Write the expression for Lorentz magnetic force on a particle of charge 'q' moving

        with velocity $\vec{v}$ in a magnetic field $\vec{B}$. Show that no work is done by this force on
        the charged particle.   2

A steady current (I_1) flows through a long straight wire. Another wire carrying steady current (I_2) in the same direction is kept close and parallel to the first wire. Show with the help of a diagram how the magnetic field due to the current I_1 exerts a magnetic force on the second wire. Write the expression for this force. 2

12. What are eddy currents ? Write any two applications of eddy currents. 2

13. What is sky wave communication ? Why is this mode of propagation restricted to the frequencies only upto few MHz ? 2

14. In the given circuit, assuming point A to be at zero potential, use Kirchhoff's rules to determine the potential at point B. 2
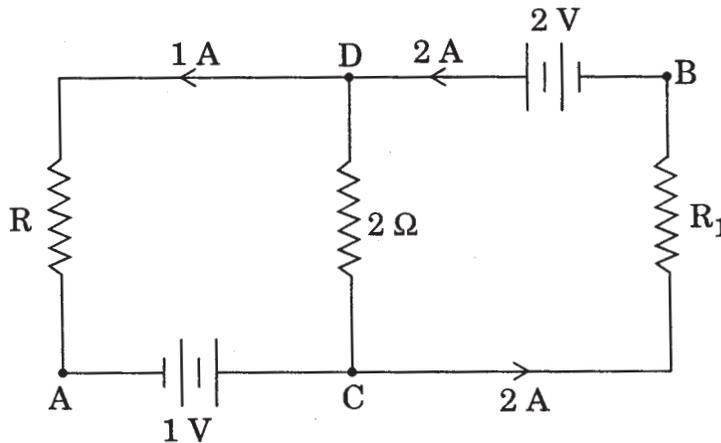
15. A parallel plate capacitor is being charged by a time varying current. Explain briefly how Ampere's circuital law is generalized to incorporate the effect due to the displacement current. 2

16. Net capacitance of three identical capacitors in series is 1 μF. What will be their net capacitance if connected in parallel ?

Find the ratio of energy stored in the two configurations if they are both connected to the same source. 2

17. Using the curve for the binding energy per nucleon as a function of mass number A, state clearly how the release in energy in the processes of nuclear fission and nuclear fusion can be explained. 2

18. In the metre bridge experiment, balance point was observed at J with AJ = l.

    (i) The values of R and X were doubled and then interchanged. What would be the new position of balance point ?

    (ii) If the galvanometer and battery are interchanged at the balance position, how will the balance point get affected ?   2
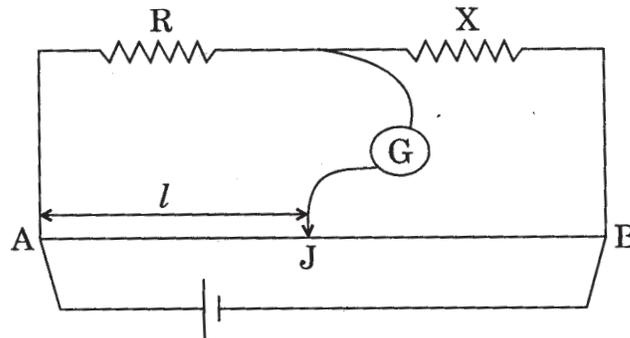
19. A convex lens made up of glass of refractive index 1.5 is dipped, in turn, in (i) a medium of refractive index 1.65, (ii) a medium of refractive index 1.33.

    (a) Will it behave as a converging or a diverging lens in the two cases ?

    (b) How will its focal length change in the two media ?   3

20. Draw a plot showing the variation of photoelectric current with collector plate potential for two different frequencies, $v_1 > v_2$, of incident radiation having the same intensity. In which case will the stopping potential be higher ? Justify your answer.   3

21. Write briefly any two factors which demonstrate the need for modulating a signal.

    Draw a suitable diagram to show amplitude modulation using a sinusoidal signal as the modulating signal.   3

22. Use the mirror equation to show that

    (a) an object placed between f and 2f of a concave mirror produces a real image beyond 2f.

    (b) a convex mirror always produces a virtual image independent of the location of the object.

    (c) an object placed between the pole and focus of a concave mirror produces a virtual and enlarged image.   3

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23. Draw a labelled diagram of a full wave rectifier circuit. State its working principle. Show the input-output waveforms. 3

24. (a) Using de Broglie's hypothesis, explain with the help of a suitable diagram, Bohr's second postulate of quantization of energy levels in a hydrogen atom.

(b) The ground state energy of hydrogen atom is - 13.6 eV. What are the kinetic and potential energies of the electron in this state ? 3

25. You are given a circuit below. Write its truth table. Hence, identify the logic operation carried out by this circuit. Draw the logic symbol of the gate it corresponds to. 3
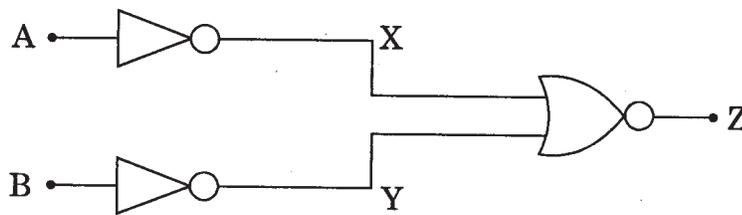
26. A compound microscope uses an objective lens of focal length 4 cm and eyepiece lens of focal length 10 cm. An object is placed at 6 cm from the objective lens. Calculate the magnifying power of the compound microscope. Also calculate the length of the microscope. 3

OR

A giant refracting telescope at an observatory has an objective lens of focal length 15 m. If an eyepiece lens of focal length 1.0 cm is used, find the angular magnification of the telescope.

If this telescope is used to view the moon, what is the diameter of the image of the moon formed by the objective lens ? The diameter of the moon is 3.42 x 10⁶ m and the radius of the lunar orbit is 3.8 x 10⁶ m. 3

27. Two heating elements of resistances R_1 and R_2 when operated at a constant supply of voltage, V, consume powers P_1 and P_2 respectively. Deduce the expressions for the power of their combination when they are, in turn, connected in (i) series and (ii) parallel across the same voltage supply. 3

28. (a) State the principle of the working of a moving coil galvanometer, giving its labelled diagram.

(b) "Increasing the current sensitivity of a galvanometer may not necessarily increase its voltage sensitivity." Justify this statement.

(c) Outline the necessary steps to convert a galvanometer of resistance R_G into an ammeter of a given range.   5

OR

(a) Using Ampere's circuital law, obtain the expression for the magnetic field due to a long solenoid at a point inside the solenoid on its axis.

(b) In what respect is a toroid different from a solenoid ? Draw and compare the pattern of the magnetic field lines in the two cases.

(c) How is the magnetic field inside a given solenoid made strong ?   5

29. State the working of a.c. generator with the help of a labelled diagram.

The coil of an a.c. generator having N turns, each of area A, is rotated with a constant angular velocity ω. Deduce the expression for the alternating e.m.f. generated in the coil.

What is the source of energy generation in this device ?   5

OR

(a) Show that in an a.c. circuit containing a pure inductor, the voltage is ahead of current by $\pi/2$ in phase.

(b) A horizontal straight wire of length L extending from east to west is falling with speed v at right angles to the horizontal component of Earth's magnetic field B.

(i)   Write the expression for the instantaneous value of the e.m.f. induced in the wire.

(ii) What is the direction of the e.m.f.?

(iii) Which end of the wire is at the higher potential ?   5

30. State the importance of coherent sources in the phenomenon of interference.

In Young's double slit experiment to produce interference pattern, obtain the conditions for constructive and destructive interference. Hence deduce the expression for the fringe width.

How does the fringe width get affected, if the entire experimental apparatus of Young is immersed in water ? 5

OR

(a) State Huygens' principle. Using this principle explain how a diffraction pattern is obtained on a screen due to a narrow slit on which a narrow beam coming from a monochromatic source of light is incident normally.

(b) Show that the angular width of the first diffraction fringe is half of that of the central fringe.

(c) If a monochromatic source of light is replaced by white light, what change would you observe in the diffraction pattern ? 5

Marking Scheme — Physics (Theory)

General Instructions :

1. The Marking Scheme provides general guidelines to reduce subjectivity in the marking. The answers given in the marking scheme are suggested answers. The content is thus indicative. If a student has given any other answer, which is different from the one given in the Marking Scheme, but conveys the meaning correctly, such answers should be given full weightage.

2. Evaluation is to be done as per instructions provided in the marking scheme. It should not be done according to one's own interpretation or any other consideration. Marking Scheme should be adhered to and religiously followed.

3. If a question has parts, please award marks in the right hand side for each part. Marks awarded for different part of the question should then be totalled up and written in the left hand margin and circled.

4. If a question does not have any parts, marks are to be awarded in the left hand margin only.

5. If a candidate has attempted an extra question, marks obtained in the question attempted first should be retained and the other answer should be scored out.

6. No marks are to be deducted for the cumulative effect of an error. The student should be penalized only once.

7. Deduct ½ mark for writing wrong units, missing units, in the final answer to numerical problems.

8. Formula can be taken as implied from the calculations even if not explicitly written.

9. In short answer type questions, asking for two features/characteristics/ properties, if a candidate writes three features, characteristics/properties or more, only the correct two should be evaluated.

10. Full marks should be awarded to a candidate if his/her answer in a numerical problem, is close to the value given in this scheme.

Q. No.	Expected Answer/value Points	Marks	Total Marks
1.	(i) Positive	½	
	(ii) Negative	½	1
2.	$\vec{E}$ along X-axis, $\vec{B}$ along Y-axis	½+½	
	Alternatively,		
	$\vec{E}$ along Y-axis, $\vec{B}$ along X-axis		1
3.	$r = R\left\{\dfrac{E}{V} - 1\right\}$	1	1
4.	Diamagnetic	1	
	Alternatively,		
	Ferromagnetic (if the given value is considered as absolute permeability)		
	(Accept either of the two)		1
5.		1	
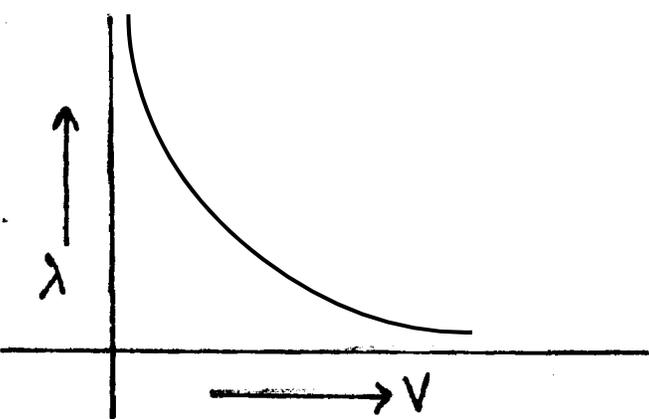
			1
6.	Collector current decreases slightly	½	
	Base current increases slightly	½	1

7. Current flowing in a circuit without any net dissipation of power, is called wattless current. 1 1

8. Atoms (of the second medium) oscillate with the same (incident light) frequency and in turn, emit light of the same frequency.

Alternatively,

Frequency of light may be viewed as a property of the source and not of the medium.

Alternatively,

From Huygen's principle, we find that $\dfrac{v_1}{\lambda_1} = \dfrac{v_2}{\lambda_2} = n$

Hence frequency remains the same. 1 1

9 | | |
|---|---|
| Depiction of equipotential surface | 1 |
| Magnitude of electric field | ½ |
| Direction of electric field | ½ |

Depiction of equipotential surtace
(Parallel to the X - Z plane) 1

qE = mg ½

$\Rightarrow E = \dfrac{mg}{q}$: direction vertically downwards ½

OR

Resultant dipole moment	1
Magnitude of torque	½
Direction of torque	½

Resultant dipole moment $= p$

The magnitude of torque is $pE \sin 30^\circ = \dfrac{pE}{2}$ 1

The direction of torque is clockwise when viewed from above ½

(or $\vec{\tau}$ is perpendicular to both $\vec{p}$ and $\vec{E}$). ½ 2

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10.	Formula	1	
	Substitution and Calculation of B	1	

$$B_H = B \cos \theta \qquad\qquad 1$$

$$B = \frac{B_H}{\cos 60^\circ} = 0.8 \text{ G} \qquad\qquad 1 \qquad\qquad 2$$

11.	Formula	1	
	Conclusions about C_1 and C_2	1	

P.D. across $C_1 = 6V$ ½

Final charge on $C_1 = 18\mu C$ ½

P.D. across $C_2 = 2V$ ½

Final charge on $C_2 = 6\mu C$ ½

Alternatively,

$Q = CV$ ½

$C' = KC$ ½

Across C_1, V remains same but charge increases   ½

Across C_2, charge Q remains same but p.d. decreases   ½   2

12.	Ratio	1
	Preference	½
	Reason	½

Ratio of resolving power $= \dfrac{A_1}{A_2}$ 1

Telescope of aperture A_1 is preferred   ½

Reason: (Any one)

     Higher resolving power / More light gathering power   ½   2

13.

| Correct output wavefonn | 1 |
| Identification | 1 |

Drawing correct output waveform
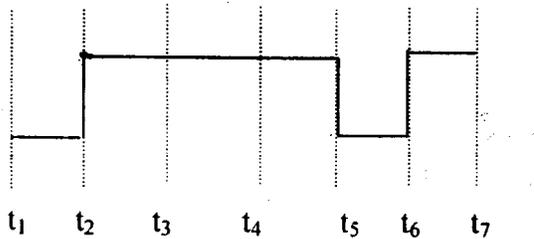
OR gate 1

(However if the output wavefonn is drawn wrong but the student correctly identifies the logic operation (according to the output wavefonn drawn) award 1 mark only) 2

14.

Naming of Device	½
I - V characteristic	½
Working principle	1

Zener diode ½

Alternatively

I- V characteristic

½
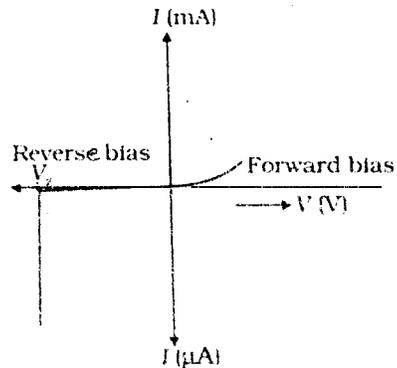
After the breakdown voltage. there is an insigniticant change in the (reverse) bias voltage across the Zener diode (and hence the load) even for large changes in current.   1   2

15.

Production	1
Reason	½
Any one use	½

Method of production (any one)   1

     by hot bodies and molecules /

     due to vibrations of atoms and molecules /

     due to transition of electrons between two (closely spaced)

     energy levels in an atom.

Infrared waves are called heat waves as they cause heating etfect / rise in temperature   ½

Any one use

Maintains earth's warmth, physical therapy, remote switches etc. or any other correct use   ½   2

16.

Graph	1
Explanation	1
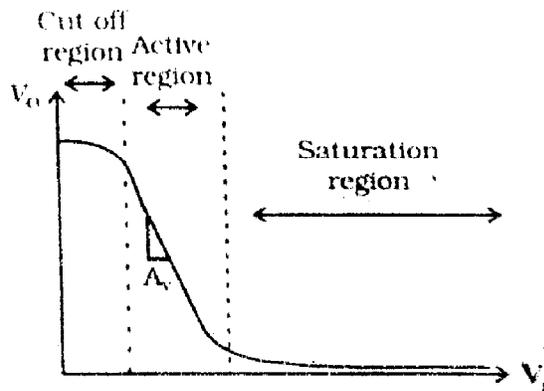
                                                                    1

(Award one mark even if the student does not label the three regions)

In the active region, a (small) increase of V_i results in a (large, almost linear) increase in I_c. This results in an increase in the voltage drop across R_c.

[Note: The student may be awarded this 1 mark even if she/he gives a (brief) explanation of the transistor amplifier action without any reference to the transfer characteristic]   2

| 17. | Modulation index | 1 |
| | Reason | 1 |

Modulation index is defined as the ratio of amplitude of modulating signal and amplitude of carrier wave

Alternatively,

$$\mu = \frac{A_m}{A_c}$$ 1

The amplitude of modulating signal is kept less than amplitude of carrier wave to avoid/ minimize distortion / noise.   1   2

| 18. | Any two ways | 1 |
| | Alternative device | 1 |

Any two ways to obtain large deflection in G   ½+½

Moving C_2 faster towards C_1 / Increasing current in C_2 /

Insertion of soft iron core in C_1 /

Increasing number of turns of C_1 /

Increasing area of cross section of C_1

Alternative device (any one)

Bulb / LED / Compass needle / any other device responsive to (small) current.   1   2

19.	Drift velocity	1
	Relaxation time	1
	Change in drift velocity	1

Drift velocity: The average velocity with which the free electrons drift under the influence of an external field. 1

Relaxation Time: Average time interval between two succesive collisions of an electron with the ions / atoms of the conductor. 1

The drift velocity will be inversely proportional to l (or $v_d \propto \dfrac{1}{l}$)

and hence it will become one third of its initial value 1

Alternatively,

$$V_d' = \frac{v_d}{3}$$

[Note: If the candidate directly writes $\dfrac{v_d}{3}$ without giving any reason,

award one mark] 3

20.

Obtaining the field expression	2
Graph	1

½
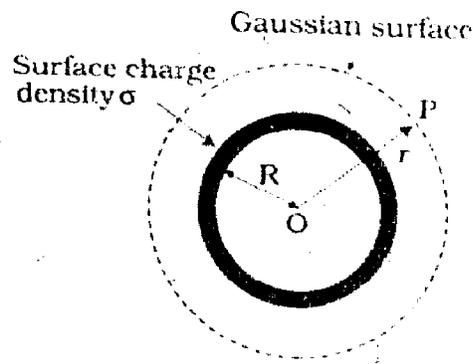
From Gauss's theorem, $f = \oint_s \vec{E}.d\,\vec{S} = \dfrac{q_m}{\varepsilon_0}$ ½

Flux f through S'. ½

$f = \oint_{s'} \vec{E}.d\,\vec{S} = \oint_{s'} EdS \;=\; E.\,4\,\pi r^2$ ½

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$$\Rightarrow \text{E}.\, 4\,\pi r^2 = \frac{q_m}{\varepsilon_0} \quad \Rightarrow \text{E} = \frac{1}{4\pi e_0}\frac{q_m}{r^2}$$ ½

$\text{E} \propto \dfrac{1}{r^2}$

$r < R \qquad r > R$

$\longrightarrow r$

½+½
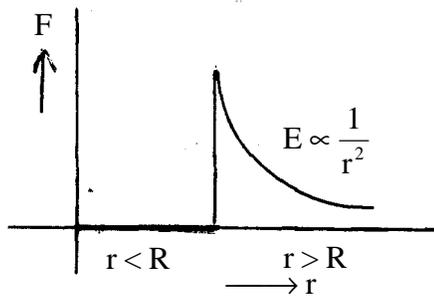
[Note: ½ mark for r<R and ½ mark for r>R] 3

21	Momenta	1
	Energy of photon	1
	Kinetic energy of electron	1

$\lambda_e = \lambda_{photon} = 1.00\text{nm} = 10^{-9}$ m

i) for electron or photon, momentum $p = p_e = p_r = \dfrac{h}{l}$ ½

$$p = \frac{(6.63\times10^{-34})}{10^{-9}} = 6.63 \times 10^{-25} \text{ kg m/s}$$ ½

ii) Energy of photon

$$E = \frac{hc}{l}$$

$$= \frac{(6.63\times10^{-34})\times(3\times10^8)}{10^{-9}} \text{ J}$$ ½

$$\approx 19.89 \times 10^{-17} \text{ J} \; (\approx 1243 \text{ eV})$$

iii) Kinetic energy of electron $= \dfrac{p^2}{2m}$ ½

$$= \frac{1}{2}\times\frac{(6.63\times10^{-25})^2\times(3x10^8)}{9.1\times10^{-31}} \text{ J} \approx 2.42 \times 10^{-19} \text{ J}$$ ½

$(\approx 1.51\text{eV})$ ½ 3

22.	Schematic diagrams	1½
	Ranges for the three cases	1½

Communication satellite

Space wave

Ionosphere

Los

Los

Ground wave

Sky wave

Earth

½+½+½

i)	Standard AM Broadcast	540-1600kHz	½
ii)	Television	54-890 MHz	½
iii)	Satellite Communication	5.925 – 6.425 GHz uplink	
		3.7 – 4.2 GHz Downlink	½

[Note: Award these 1½ (= ½ + ½ + ½) marks even if the student just gives the correct orders of magnitude but does not give any numerical values]   3

23.	Diagram	½
	Description	½
	Derivation of Expression for fringe width	2

½

SCREEN

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S is the source of monochromatic light of wavelength λ.

The double slits S_1 and S_2 act as the two coherent sources. ½

Let $x = S_2P - S_1P$

$S_2P^2 = D^2 + (y + d/2)^2$

and $S_1P^2 = D^2 + (y - d/2)^2$ ½

$\therefore\ S_2P^2 - S_1P^2 = (y + d/2)^2 - (y - d/2)^2$

$\Rightarrow (S_2P+S_1P)(S_2P-S_1P) = 2y.d$

$\Rightarrow (S_2P + S_1P\ x = 2yd$

$\Rightarrow x = \dfrac{2yd}{(S_2P + S_1P)} \approx \dfrac{2yd}{2D} = \dfrac{yd}{D}$ ½

For maxima: $x = n\,l \Rightarrow y = \dfrac{n\lambda\,D}{d}$ ($n = 0, 1, 2, ...$) ½

$\therefore$ Fringe width $\beta = y_{n+1} - y_n = \dfrac{l\,D}{d}$ ½

[Note: Alternatively, if the student uses the condition for minima, award
the last (½ + ½) marks] 3

OR

Diagram	1
Verification	1
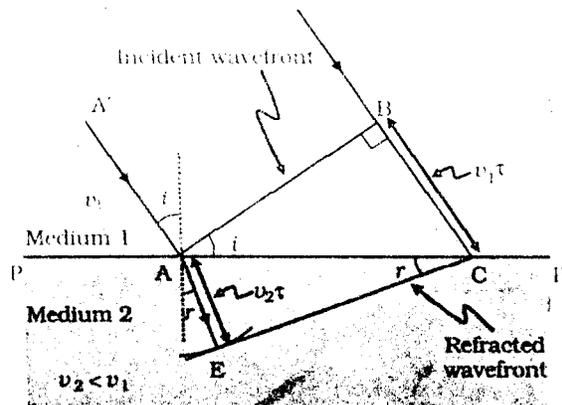
In $\triangle$ ABC, $\sin i = \dfrac{BC}{AC} = \dfrac{v_1 t}{AC}$ ½

and in $\triangle ADC$, $\sin r = \dfrac{AD}{AC} = \dfrac{v_2 t}{AC}$ **½**

$$\dfrac{\sin i}{\sin r} = \left(\dfrac{v_1 t / AC}{v_2 t / AC}\right) = \dfrac{v_1}{v_2} = \text{constant} = \text{(relative) refractive index}$$ 1

[Note: The student can also draw the diagram for light going from denser to rarer medium and use that for verification of the law of refraction]   3

24.
a)	Diagram	1
	Description	1
b)	Condition	1

a)
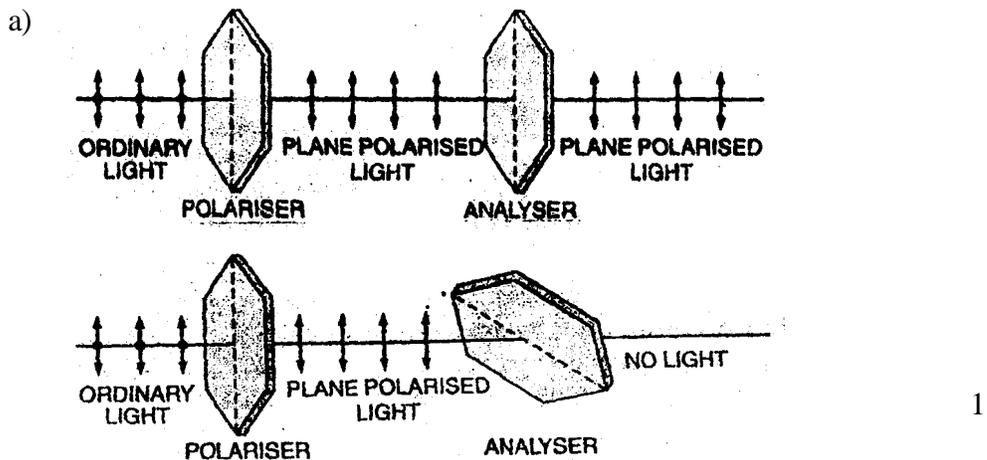
When a polaroid P_1 is rotated in the path of an unpolarised light. there is no change in transmitted intensity.

The light transmitted through polaroid P_1 is made to pass through polaroid P_2.

On rotating polaroid P_2 in path of light transmitted from P_1 we notice a change in intensity of transmitted light. This shows that light transmitted from P_1 is polarized. Since light can be polarized, it has transverse nature.   1

[Note: Award full marks even if the student explains with the help of only one diagram]

(b) Whenever the reflected and refracted rays are perpendicular to each other.   1

Alternatively,

Whenever unpolarised light is incident from air to a transparent medium at an angle of incidence equal to polarizing angle, the reflected light gets polarized. 3

25.

$E=hc/l$	½ mark
Calculation of E	1 mark
Identification of correct transition	½ mark
Transition for maximum wavelength	½ mark
Transition for minimum wavelength	½ mark

If a photon of wavelength $l = 275$nm is to be emitted. then energy of photon is given by

$$E = \frac{hc}{l}$$ ½

$$= \frac{6.63 \times 10^{-34} \times 3 \times 10^8}{275 \times 10^{-9} \times 1.6 \times 10^{-19}} \text{ eV}$$ ½

$$= 4.5 \text{ eV}$$ ½

Hence transition B would result in the emission of a photon of wavelength 275nm ½

(i)   Transition A corresponds to maximum wavelength ½

(ii)   Transition D corresponds to minimum wavelength ½ 3

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Statement of law	1
Graph	1
Depiction for time $t = 3\,T_{½}$ and $T = 5\,T_{½}$,	½+½

The number of nuclei undergoing decay per unit time, at any instant, is proportional to the total number of nuclei in the sample at that instant. 1

Alternatively

$$-\frac{dN}{dt} \, a \, N$$

$$\Rightarrow \frac{dN}{dt} = -1\ N$$
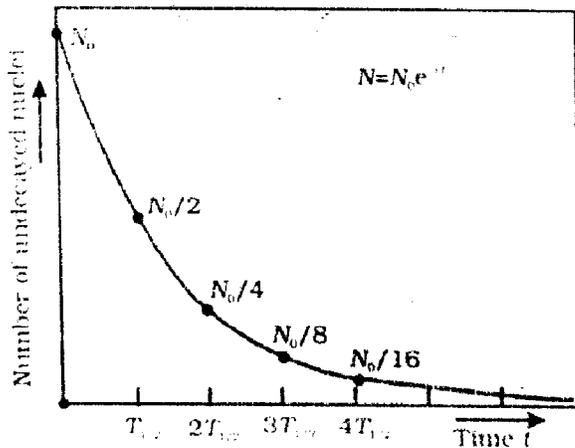
1+1

[Note: The student is to mark the two point only for $t = 3T_{\frac{1}{2}}$ and $t = 5T_{\frac{1}{2}}$]   3

27	Equivalent resistance	1
	Calcualtion of I_1	½
	Calcualtion of I_2	½
	Calcualtion of I_3	½
	Calcualtion of I_4	½

R_2, R_3 and R_4 are in parallel.

$$\frac{1}{R_{234}} = \frac{1}{15} + \frac{1}{30} + \frac{1}{15} = \frac{3+1+2}{30} = \frac{5}{30}$$

$$\Rightarrow R_{234} = 6\ \Omega \qquad\qquad\qquad ½$$

Now R_{234} is in series with R_1, so $R_{eq} = 4\ \Omega + 6\ \Omega = 10\ \Omega$ ½

$$\therefore I = \varepsilon / R_{eq} = \frac{10}{10} A = 1A$$
$$\therefore I_1 = 1A$$

$\therefore$ Current through $R_1 = 1A$ ½

P.D. across $R_1 = 4V$

So, P.D. across $R_{234} = 6V$

$\therefore I_2R_2 = I_4R_4 = I_3R_3 = 6V$

$I_2 = \dfrac{6}{15} A = 0.4 \text{ A}$ ½

$I_3 = \dfrac{6}{15} A = 0.4 \text{ A}$ ½

$I_4 = \dfrac{6}{30} A = 0.2 \text{ A}$ ½ 3

28. Biot Savart Law	1
Derivation	3
Explanation	1

Statement of Biot Savart Law : The magnitude of magnetic field $\vec{dB}$ due to current element is directly proportional to the current I, the element length $|dl|$ and inversely proportional to the square of the distance r of the field point. Its direction is perpendicular to the plane containing $\vec{dl}$ and $\vec{r}$ ½

$$d\vec{B} \, \alpha \, \frac{Id\vec{l} \times \vec{r}}{r^3}$$

Or $d\vec{B} = \dfrac{\mu_o}{4\pi} \dfrac{Id\vec{l} \times \vec{r}}{r^3}$ ½

[Note: Even if the student writes only the (vector) mathematical expression, award this one mark]
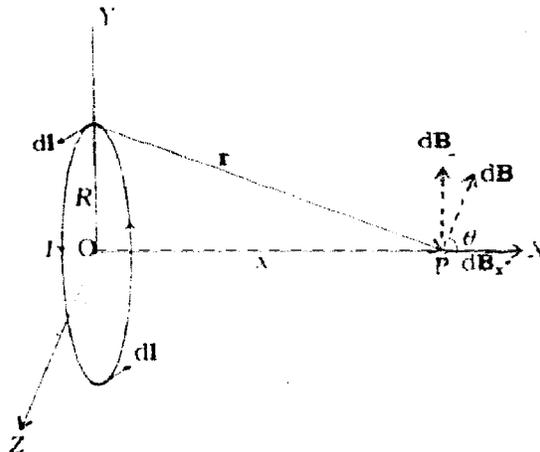
1

The magnetic field due to $\vec{dl}$ is given by Biot Savart law as

$$dB = \frac{\mu_0}{4\pi} \frac{I \mid \vec{dl} \times \vec{r} \mid}{r^3}$$

Now $dB_x = dB \cos\theta = \frac{\mu_0}{4\pi} \frac{Idl}{(x^2 + R^2)} \cos\theta$

$$= \frac{\mu_0}{4\pi} \frac{Idl}{(x^2 + R^2)} \frac{R}{(x^2 + R^2)^{1/2}}$$ 1

So $B_x = \int dB_s = \frac{\mu_0}{4\pi} \frac{IR}{(x^2 + R^2)^{3/2}} \int\limits_{entireloop} dl$

$$= \frac{\mu_0}{4\pi} \frac{IR}{(x^2 + R^2)^{3/2}} 2p R$$

$$= \frac{\mu_0 IR^2}{2(x^2 + R^2)^{3/2}}$$

(The y-components, of the field, add up to zero, due to symmetry)

$\therefore$ Magnetic field at P due to a circular loop

$$= \vec{B} = B_x \vec{i} = \frac{\mu_0 IR^2}{2(x^2 + R^2)^{3/2}} \vec{i}$$ 1

[Note: Also accept if the student writes $\vec{B} = \frac{\mu_0 NIR^2}{2(x^2 + R^2)^{3/2}} \vec{i}$]

Explanation : A circular current loop produces magnetic field and its

magnetic moment is the product of current and its area

$$\vec{M} = I\vec{A}$$

Alternatively
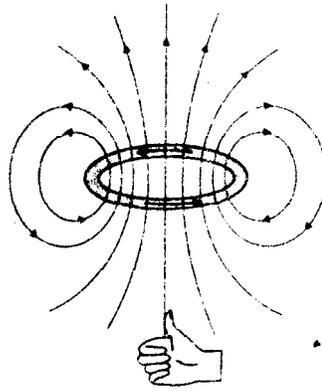
Alternativcly : One side of the current carrying coil behaves like the
N-Pole and the other side as the S-Pole of a magnet.   1   5

<div align="center">

OR

</div>

Labelled diagram	1
Principle	1
Working	1
Proof of frequency independent from energy	1
Yes	½
Reason	½

Principle: A charged particle can be accelerated to high energy by
making it cross the same electric field again and again using a perpen-
dicutar magnetic field.   1
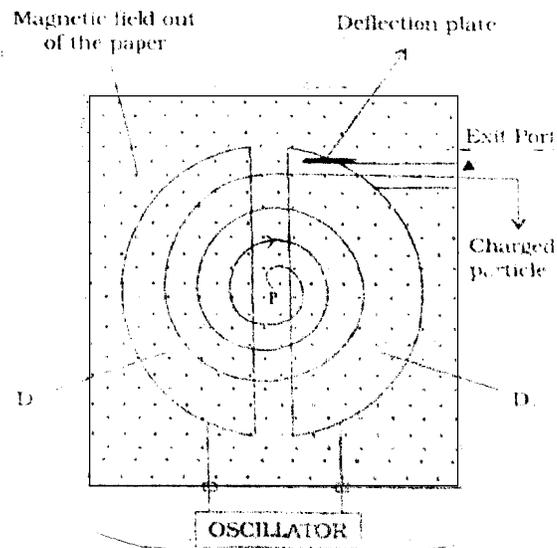
                                                                                1

Working : High frequency oscillator maintains modest alternating potential difference between the dees. This potential difference establishes an electric field that reverses its direction periodically. Suppose a positive ion of moderate mass produced at the centre of the dees, finds D_2 at negative potential. It gets accelerated towards it. A uniform magnetic field, normal to the plane of the dces, makes it move in a circular track. Particle traces a semicircular track and returns back to the region betwecn the dees. The moment it arrives in the region. electric field reverses its direction and accelerates the charge towards D_1. This way charge keeps on getting accelerated until it is removed out of the dees.   1

Centripetal force, needed by the charged particle to move in circular track, is provided by the magnetic field.

$$\frac{mv^2}{r} = qvB$$

$$\Rightarrow v = \frac{qBr}{m}$$

Period of revolution, $T = \dfrac{2\pi r}{r}$

$$= \frac{2\pi rm}{qBr}$$

$$\Rightarrow T = \frac{2\pi m}{qB} \qquad \Rightarrow v = \frac{1}{T} = \frac{qB}{2\pi m}$$

Thus frequency of revolution v is independent of the energy of the particle.   1

Yes, there is an upper limit on the energy acquired by the charged particle.   ½

The charged particle gains maximum speed when it moves in a path of radius equal to the radius of the dces.

i.e. $V_{max} = \dfrac{qBR}{m}$ where $R = $ radius of the dees.

So maximum K.E $= \dfrac{1}{2} mv^2_{max} = \dfrac{1}{2} m \left(\dfrac{qBR}{m} \right)^2 = \dfrac{q^2 B^2 R^2}{2m}$ ½   5

29.	a)	Diagram	1
		Derivation of expression for the refractive index	2
	b)	Explanation	2

a.
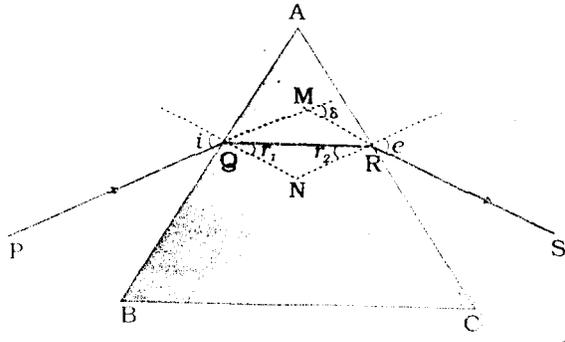
From $\triangle$ MQR, $(i\text{-}r_1) + (e\text{-}r_2) = d$ ½

     So $(i+e)\text{-}(r_1 + r_2) = d$

From $\triangle$ PQN $r_1 + r_2 + \angle QNR = 180°$

Also $A + \angle QNR$ $= 180°$

Thus $A = r_1 + r_2$ ½

So $i + e\text{-}A = d$ ½

At minimum deviation, $i = e,\ r_1 = r_2 = r$ and $d = d_m$

$$\Rightarrow i = \frac{A + \delta_m}{2}$$

$$and \quad r = \frac{A}{2}$$

$$Also \quad \mu = \frac{\sin i}{\sin r}$$

$$Hence \quad \mu = \frac{\sin\left(\dfrac{A + \delta_m}{2}\right)}{\sin\left(\dfrac{A}{2}\right)}$$

b.

Low n

High n
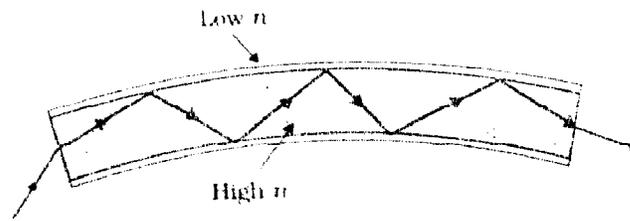
1

Each optical fibre consists of a core and cladding. Refractive index of the material of the core is higher than that of cladding. When a signal, in the form of light, is directed into the optical fibre, at an angle greater than the (relevant) critical angle, it undergoes repeated total internal reflections along the length of the fibre and comes out of it at the other end with almost negligible loss of intensity.

1   5

OR

a)	Diagram	1
	Derivation of Lens Maker's formula	2
b)	Diagram	1
	Derivation	1

a)
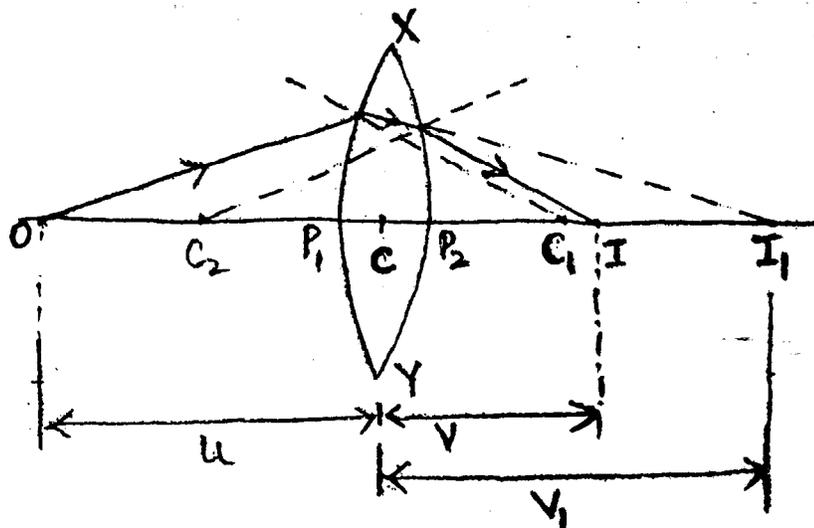
For refraction at the first surface

$$\frac{n_2}{v_1} - \frac{n_1}{u} = \frac{n_2 - n_1}{R_1}$$

½

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For the second surface, I_1 acts as a virtual object (located in the denser medium) whose final real image is formed in the rarer medium at I.

So for refraction at this surface, we have

$$\frac{n_1}{v} - \frac{n_2}{v_1} = \frac{n_1 - n_2}{R_2}$$

½

From above two equations, $\dfrac{1}{v} - \dfrac{1}{u} = \left(\dfrac{n_2}{n_1} - 1\right)\left(\dfrac{1}{R_1} - \dfrac{1}{R_2}\right)$

The point, where image of an object, located at intinity is formed, is called the focus F, of the lens and the distance f gives its focal length.

½

So for $u = \mu$, $v = +f$

$$\Rightarrow \frac{1}{f} = \left(\frac{n_2}{n_1} - 1\right)\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$$

½

b.

1
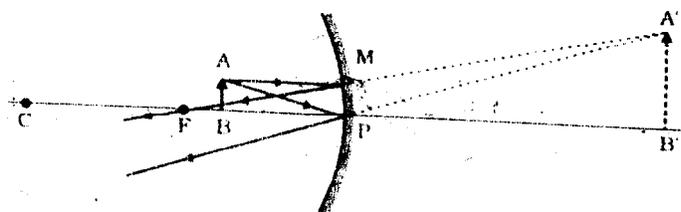
$\triangle$ ABP is similar to $\triangle$ A'B'P

So $\dfrac{A'B'}{AB} = \dfrac{B'P}{BP}$

½

Now A' B' = I, AB = O, B'P = + v and BP = - u

So magnification $m = \dfrac{I}{O} = -\dfrac{v}{u}$

½   5

30.	Diagram	½
	Labelling	½
	Principle	½
	Working	1½
	Two sources of energy loss	½+½
	No	½
	Explanation	½

Step up transformer

Any one of the following:

Soft iron-core
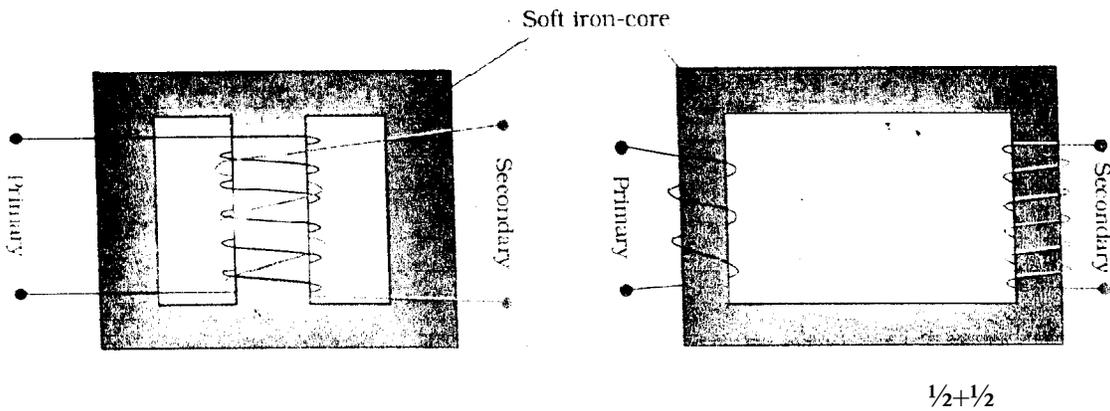
Principle: It works on the principle of mutual induction. ½

Working: When an alternating voltage is applied to the primary, the resulting current produces an alternating magnetic flux which links the secondary and induces an emf in it. We consider an ideal transformer in which the primary has negligible resistance and all the flux in the core links with both primary and secondary windings. Let φ be the flux in each turn in the core at time / due to current in the primary whcn a voltage V_p is applied to it.

Then the induced emf or voltage E_s, in the secondary with N_s, turns is

$$E_s = - N_s \frac{d\varphi}{dt}$$

The alternaling flux φ also induces an emf, called back emf in the primary given by

$$E_p = - N_p \frac{d\varphi}{dt}$$ ½

But $E_p = V_p$ (since resistance of primary is small) and $E_s = V_s$ (since secondary current is small)

So, $V_s = - N_s \dfrac{d\varphi}{dt}$

$$V_p = - N_p \frac{d\varphi}{dt}$$

Thus $\dfrac{V_s}{V_p} = \dfrac{N_s}{N_p}$ ½

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For a step up transtormer, $\dfrac{V_s}{V_p} > 1$

So, $\dfrac{V_s}{V_p} > 1$ ½

(ii)   Sources of energy loss in transformer (any two)

flux leakage / Joule's loss in the resistance of windings / ½+½

loss due to eddy currents / hysteresis loss / humming loss

(iii)   No ½

A step up transfonner steps up the voltage while it steps down the current.
So the input and output power remain same (provided there is no loss).
Hence there is no violation of the principle of energy conservation. ½   5

OR

Phasor diagram	1
Derivation of expression for impedance	2
Graph	1
Explanation	1
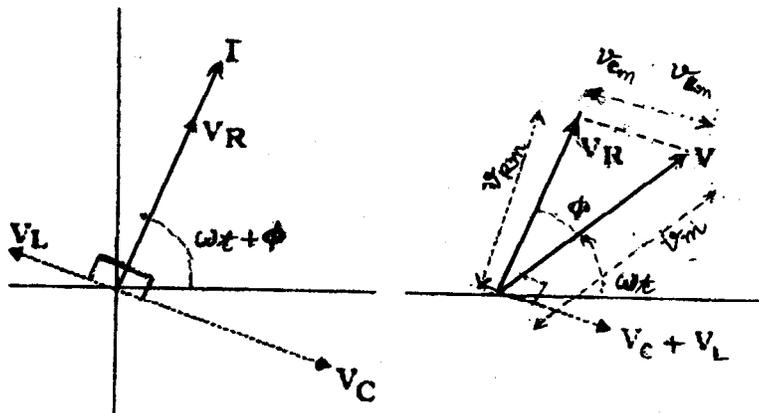
1

Let V_L, V_R, V_C and V represent the voltage across the inductor, resistor, capacitor and the source respectively. V_R is parallel to I. V_C is $\pi/2$ behind I and V_L is $\pi/2$ ahead of I.

Now $V_{OR} = V_{OC} = i_0X_C$ and $V_{0L} = I_0X_L$ ½

Clearly. $V_0^2 = V_{0R}^2 + (V_{0L} - V_{0C})^2$

$\qquad = i_0^2 \; [R^2 + (X_L - X_C)^2]$ ½

Thus $i_0 = \dfrac{V_0}{\sqrt{R^2 + (X_L - X_C)^2}}$ ½

Impedance $= \dfrac{V_0}{i_0} \;\; = \; \sqrt{R^2 + (X_L - X_C)^2}$

$\qquad = \sqrt{R^2 + \left(\omega L - \dfrac{1}{\omega C}\right)^2}$

½

[**Alternatively :** Accept Impedance Triangle Method]

1
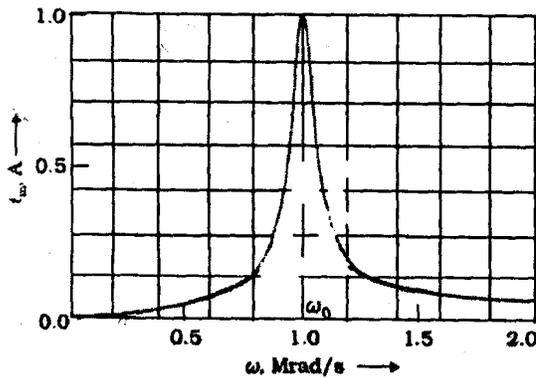
The capacitance of a capacitor in the tuning circuit is varied such that the resonant frequency of the circuit becomes nearly equal to the frequency of the radio signal to be received. When this happens, the amplitude of the current becomes maximum in the receiving circuit.   1   5

Q. No.	Expected Answer/value Points	Marks	Total Marks

1. Electric dipole moment is defined as the numerical product of charge and distance between the charges, and is directed from negative to positive charge. ... ½

Alternatively

$$2\bar{a}$$

-q $\longrightarrow$ +q
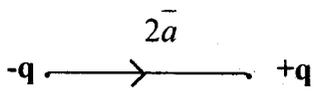
$$\vec{p} = q(2\vec{a})$$

Unit: coulomb metre or Cm ... ½ ... 1

2. Magnetic pole or Pole

(If geographic pole is written award ½ Mark.) ... 1 ... 1

3. 10 V ... 1

(If formula alone is written as $V = \dfrac{Kq}{r}$ then give ½ Mark) ... 1

4. Accelerated motion of charges in conducting wires ... 1

Alternatively

Rapid acceleration and deceleration of electrons in aerials

Alternatively

LC circuit

Alternatively

oscillating charge ... 1

5. Short ranged, strong, attractive, charge independent, spin dependent, does not obey inverse square law, saturated, non central

(Any two) ... ½+½ ... 1

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6. Upper plate is positive and lower plate is negative. 1

   Alternatively

   Upper plate is negative and lower plate is positive
   (because axis is not given)

   Alternatively

   Accept diagrammatic answer also 1

7. (i) (slightly) decreases ½

   (ii) (slightly) Increases ½

   (Even if the student misses the word "slightly" award full marks.) 1

8. Stopping potential is the minimum negative(retarding) potential of anode
   for which photo current stops or becomes zero. 1 1

9.
Evaluation of charge enclosed	1
Evaluation of flux	1

   Charge enclosed by the cylindrical surface $q = l\ l$ 1

   Flux $\varphi = \dfrac{q}{\varepsilon_0}$ ½

   $= \dfrac{\lambda l}{\varepsilon_0}$ ½

   Alternatively,

   $\varphi = \oint \vec{E}.d\vec{S} = \dfrac{q}{\varepsilon_0}$ 1

   $\varphi = \dfrac{\lambda l}{\varepsilon_0}$ 1 2

10.
Each graph	½+½
Interpretation	½+½

160

F

$1/r^2$

½

Repulsive   ½

(b) $1/r^2$ ———→

F   ½

                                                                                    ½

Attractive

Alternatively

F

Attractive   ½+½

Repulsive   ½+½

$1/r^2$

(Attractive force is greater than repulsive force since magnitude of the slope is more for attraction.)   2

| 11. | Expression for force | 1 |
| | Work done is zero | 1 |

$\vec{F} = q(\vec{v} \times \vec{B})$ 1

Alternatively

$\vec{F} = qv\,B\,\mathrm{Sin}\,\theta\,\hat{n}$

(If a student writes only magnitude for force i.e. $F = Bqv \sin\theta$ award ½ mark only)

Work done $= \vec{F}.\vec{S}$ ½

as $\vec{F}$ is perpendicular to $\vec{S}$, $W = 0$ ½

Alternatively

(Award this 1 mark even if the student gives correct work done)   2

<div align="center">

OR

</div>

Diagram	1
Expression for force	1

$F_{21} = I_2 l B_1$ ½

$F_{21} = \dfrac{\mu_o I_1 I_2}{2\pi d} l$ ½
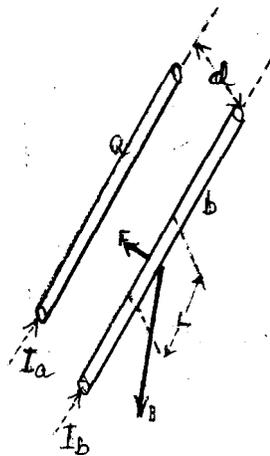
Alternatively

(If a student directly writes $F_{21} = \dfrac{\mu_o I_1 I_2}{2\pi d} l$ award this 1 Mark)   2

12.	Definition	1
	Two applications	½ + ½

When a bulk piece of conductor is subjected to changing magnetic flux, the induced currents, developed in it is called Eddy current.   1

Any two uses: ½ + ½

    l   Magnetic brakes in trains

    l   Electromagnetic damping

	Induction furnaces	
l	Electric power meter	
l	Induction therapy	
l	To find the melting point of precious metals	
l	In speedometer of vehicles.	2

13.

Sky wave Communication	1
Reason	1

Ionospheric reflection of radio waves, back towards the earth, is known as sky wave communication. 1

The ionospheric layers act as a reflector for a certain range of frequencies (3-30 MHz.)

Electromagnetic waves of frequencies higher than 30MHz (or few MBz) penetrate the ionosphere and escape. 1

Alternatively

Diagrammatic explanation   2   2

14.

Calculation of potential at B	2

Current division applying Kirchhoffs law   ½

Along the path ACDB,

$V_B = 1 + 2(1) - 2 = 1$ volt   1½

Alternatively

Finding the current through CD alone   ½

Writing any two correct loop equations   ½+½

Calculations   ½   2

15.

Ampere's circuital law	2
Inconsistency	½
Introduction of displacement current	½
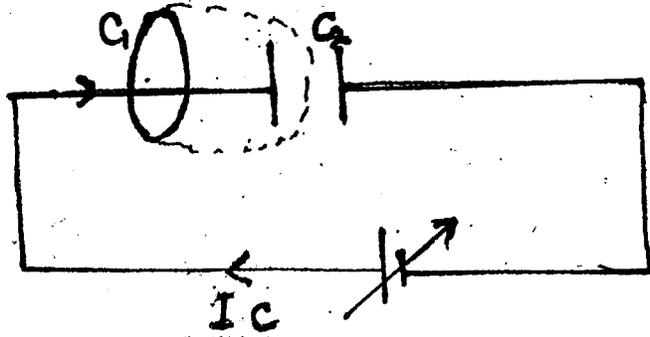
According to Ampere's circuital law, $\oint \overline{B}.\overline{dl} = \mu_0 I_{en}$ ½

For C_1 $\oint \overline{B}.\overline{dl} = \mu_0 I_{cn}$

For C_2 $\oint \overline{B}.\overline{dl} = 0$ ½

There is an inconsistency in Ampere's circuital law. To explain this displacement current was incorporated. ½

Using Ampere's iaw, we tind different values of B for the two loops. ½   2

Hence displacement current was introduced

(Also accept any other (correct) explanation.)

16.	Calculation of each capacitance	½
	Calculation of net capacitance in parallel	½
	Energy ratio	1

$$\frac{1}{C_s} = \frac{3}{C}$$

$$C_S = C/3$$

$$1 = C/3$$

$$\therefore C = 3\mu F$$

$$C_P = C_1 + C_2 + C_3 = 9\mu F$$

$$\frac{E_S}{E_P} = \frac{\frac{1}{2}C_S V^2}{\frac{1}{2}C_P V^2}$$

$$= 1/9$$

17.	Binding Energy Curve	1
	Explanation	½+½
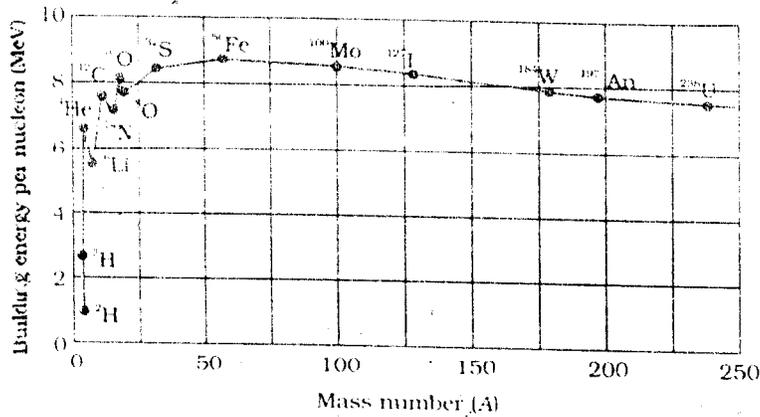
The above curve shows that

(i) When a heavy nucleus breaks into two medium sized nuclei (in nuclear fission) the BE / nucleon increases resulting in the release of energy. ½

(ii) When two small nuclei combine to form a relatively bigger nucleus in nuclear fusion BE / nucleon increases, resulting in the release of energy. ½   2

18.

i	New position of balance point	1
ii.	New position of balance Doint	1

i) $\dfrac{R}{X} = \dfrac{l}{100-l}$ When R and X are doubled and interchanged, new

balance point is   ½

$l' = (100 - l)$ ½

[Note: even if the student does not mention the formula, award this 1 mark]

ii) No change in the position of balance point   1   2

19.

Formula		1
a)	Identification	½+½
b)	Change in focal length	½+½

$$\frac{1}{f} = (\mu - 1)\left(\frac{1}{R_1} - \frac{1}{R_2} \right)$$ 1

a)   i)   diverging lens or concave lens   ½

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ii)	converging lens or convex lens	½

b)   i)   focal length will become negative and its magnitude would
increase   ½

       ii)   focal length increases   ½

(Note: Award the ½ mark, for case (b) (i), even if the student just writes
that the focal length will become negative.)   3

20.

Graph	1½
Identifying higher stopping potential	½
Justification	1

1½
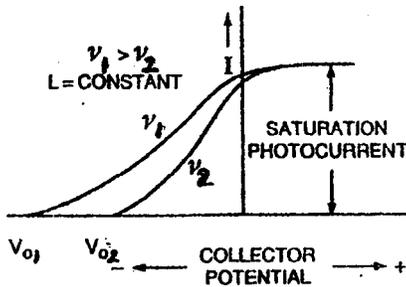
Stopping potential is more for the curve corresponding to frequency ν_1 ½

Stopping potential is directly proportional to the frequency of incident
radiation.   1

Alternatively

The maximum energy (of the emitted photoelectrons) increases with an
increase in the frequency of the incident radiation.   3

21.

Need for modulation (any two factors)	1+1
Diagram	1

Need for modulation:

I   Size of antenna would be very large in the absence of modulation.

I   Effective power radiated by the antenna would be small in the absence
of modulation.

| Mixing up of the signals from different transmitters. | 1+1 |
| (Any Two) | |
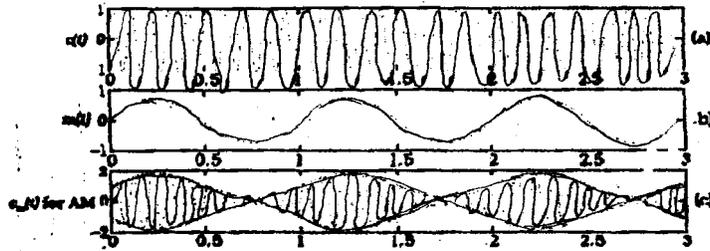
1

(Award this 1 mark for diagram even if only the third part of the diagram
is drawn)

3

22.	Mirror formula	1
	Sign convention for focal length	½
	a) proof of real and beyond 2f	½
	b) proof of virtual image	½
	c) proof of virtual and enlarged image	½

$$\frac{1}{v} + \frac{1}{u} = \frac{1}{f}$$

1

for concave mirror, $f<0$ or $f= $ -ve

for convex mirror, $f>0$ or $f= $ +ve

½

Concave Mirror

Let $f = -c$

Also, Let $u = nf = -nc$

$$\frac{1}{v} = \frac{1}{f} - \frac{1}{u} = -\frac{1}{c} + \frac{1}{nc} = \frac{-n+1}{nc}$$

$$\therefore v = \frac{nc}{(1-n)}$$

a) When object is between f and $2f$, we have $1<n<2$

$\therefore$ v is -ve   real image

(For $n=1$ and $n=2$), magnitude of v becomes ∞ and $2c$, respectively

$\therefore$ Real image is formed beyond 2F.   ½

c) Obiect between pole and F we have 0<0<1

v is +ve $\Rightarrow$ (virtual image) and $|v| > c$

∴ We get a virtual, enlarged image ½

b) Convex Mirror

$f = + d$ Let $u = - pd$ (p can have any value)

$1/v = 1/d + 1/pd = (1+p)/pd$

$$v = \frac{pd}{(p+1)}$$

∴ v is always +ve and always less than d

∴ Convex mirror always produces a virtual image between pole and focus. ½   3

23. | Circuit diagram | 1 |
Working principle	1
Input waveform	½
Output waveform	½

(a)
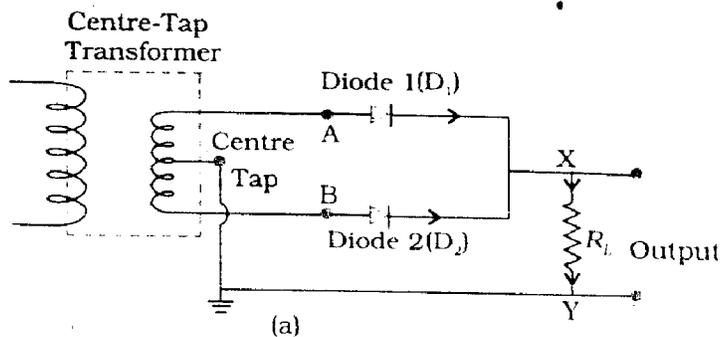
1

Principle

pn junction conducts when it is in forward biased and does not do so when it is reverse biased. 1

[Note: Also accept if the student writes: The two diodes, D_1 and D_2, let current flow, through the load, for alternate half cycles of the input a.c.]
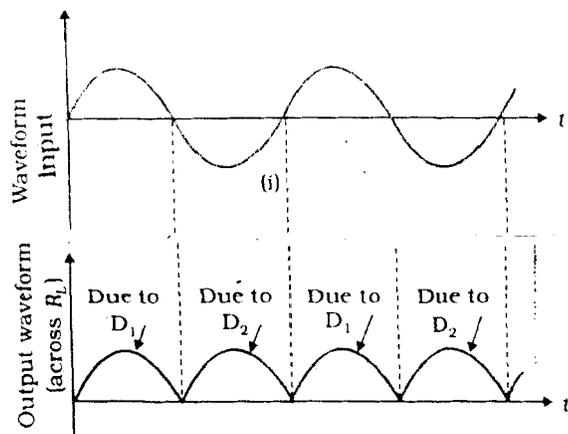
| | | ½ |

| | | ½ | 3 |

24.	de-Broglie's formula	½
	Diagram	½
	Explanation	1
	Kinetic Energy	½
	Potential Energy	½

(a) $\lambda = \dfrac{h}{p} = \dfrac{h}{mv}$ ½

$2\pi r = n\lambda$ ½
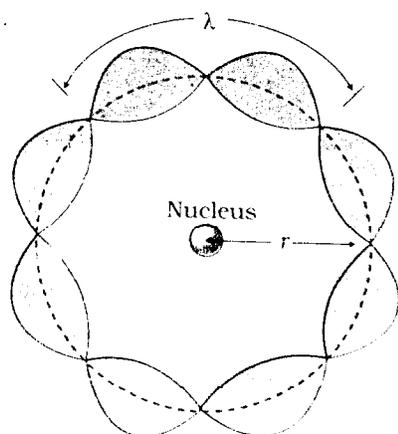
$\qquad = n\dfrac{h}{mv}$

$\Rightarrow mvr = L = \dfrac{nh}{2\pi}$ ½

(b)   Kinetic energy = 13.6 eV   ½

        Potential energy = -27.2 eV   ½   3

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Truth Table			2	
Logic Operation			½	
Logic Symbol			½	

A	B	$X = \overline{A}$	$Y = \overline{B}$	Z
0	0	1	1	0
0	1	1	0	0
1	0	0	1	0
1	1	0	0	1

2

(If only X and Y are correctly identified properly then award 1 mark only)

[Note: Award the 2 marks for the truth table even if the student does not explicitly writes out the values of X and Y.]

Logic operation is AND or (A.B)   ½

Logic Symbol

A   ½   3

B   X
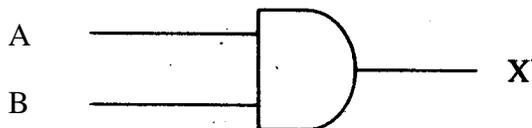
26.

Lens formula	½
Magnification formula for objective	½
Magnification formula for eyepiece	½
Calculation of magnifying power	1
Length of the microscope	½

$$\frac{1}{v_0} - \frac{1}{u_0} = \frac{1}{f_0}$$ ½

$f_0 = 4\,cm ; \quad u_e = -6\,cm$

$$\frac{1}{v_0} = \frac{1}{4} - \frac{1}{6} = \frac{1}{12} \quad \therefore v_0 = 12\ cm$$

magnification by objective, $m_0 = \dfrac{v_0}{|u_0|}$

$$= \dfrac{12}{6} = 2$$

½

Magnification by eyepiece

½

$$m_e = \left(1 + \dfrac{D}{f_e}\right) \qquad \text{or} \qquad \dfrac{D}{f_e}$$

½

$$= \left(1 + \dfrac{25}{10}\right) \qquad \text{or} \qquad \dfrac{25}{10}$$

$= 3.5 \qquad \text{or} \qquad 2.5$

magnification power of the microscope

$m = m_0 \times m_e$

$\quad = 2 \times 3.5 \qquad \text{or} \qquad 2 \times 2.5$

1

$\quad = 7 \qquad \text{or} \qquad 5$

Length of the microscope,

$L = |V_0| + |u_0| \qquad \text{or} \qquad L = |V_0| + f_e$

$u_e = ? \quad v_e = D = -25 \text{ cm}, \ f_e = 10 \text{cm}$

$$\dfrac{1}{u_e} = \dfrac{1}{v_e} - \dfrac{1}{f_e} = -\dfrac{1}{25} - \dfrac{1}{10} = -\dfrac{7}{50}$$

$$u_e = -\dfrac{50}{7} \text{ cm}$$

$$\therefore \ L = 12 \text{cm} + \dfrac{50}{7} \text{ cm}$$

$= 19.1$ cm

½

Alternativley,

$L = |V_0| + |f_0|$

$= 12 + 10 = 22 \text{cm}$

3

OR

| Angular magnification | 1½ |
| Diameter of the image | 1½ |

Angular magnification, $m = \dfrac{f_0}{f_e}$ ½

$\qquad = \dfrac{1500 \text{ cm}}{1 \text{ cm}}$

$\qquad = 1500$ 1

$\dfrac{\text{Diameter of image of moon } (d)}{\text{Focal length of objective } (f_0)} = \dfrac{\text{Diameter of the moon}}{\text{Radius of Lunar orbit}}$ ½

$d = 1500 \times \dfrac{3.42 \times 10^6}{3.80 \times 10^6}$ ½

$\quad = 13.5 \text{ cm}$ ½   3

27.

Expressions for P_1 and P_2	½+½
Expression for power in series	1
Expression for power in parallel	1

$P_1 = \dfrac{V^2}{R_1}$ ½

$P_2 = \dfrac{V^2}{R_2}$ ½

In Series

$P = \dfrac{V^2}{R_1 + R_2}$ 1

Alternatively

$P = \dfrac{V^2}{V^2 \left(\dfrac{1}{P_1} + \dfrac{1}{P_2} \right)}$

$$\frac{1}{P} = \frac{1}{P_1} + \frac{1}{P_2}$$

<u>In Parallel</u>

$$P = \frac{V^2(R_1 + R_2)}{R_1 R_2}$$

Alternatively

1

$$P = \frac{V^2}{R} = \frac{V^2(P_1 + P_2)}{V^2}$$

$$P = P_1 + P_2$$

3

28.	Principle of working	1
	Labelled diagram	1
	Justification	1
	Conversion into an ammeter	2

Principle

a)   A current carrying coil when kept inside a uniform magnetic field, experience a torque

1

Scale

Pointer

Permanent magnet

Coil

Soft-iron core

Uniform radial magnetic field
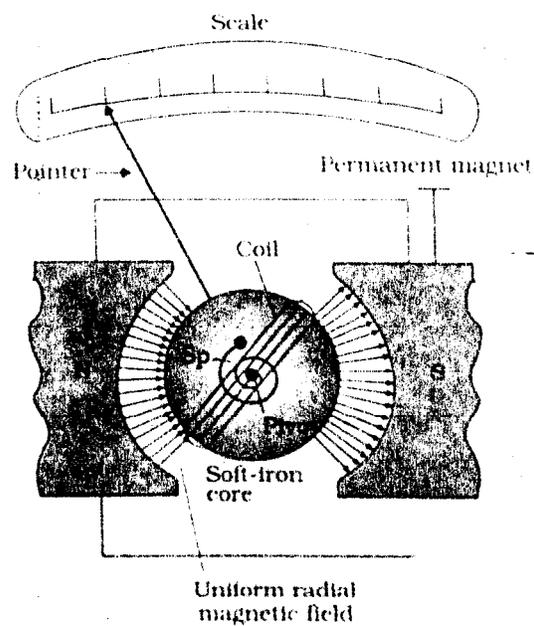
1

b) $I_s = \dfrac{NAB}{k}$, $V_s = \dfrac{NAB}{kR}$ 1

Alternatively,

Unlike current sensitivity, the voltage senstivity depends upon number of turns as well on to the resistance of the coil.

Alternatively,

By increasing number of turns, resistance of the coil also increases proportionally. Hence, the two sensitivities need not show identical variations

c)
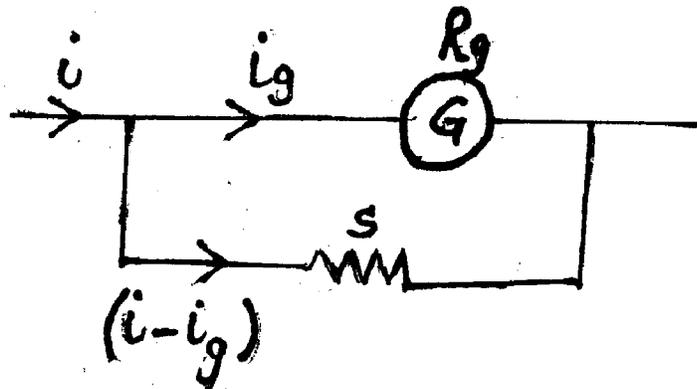
To convert galvanometer into ammeter of range 0 to i, we have to connect a low resistance shunt in parallel.

$$S = \dfrac{i_g}{(i - i_g)} R_g$$

1   5

<center>**OR**</center>

Expression for magnetic field	2
Difference between solenoid and toroid	1
Comparison of magnetic field lines	1
Strengthening of magnetic field	1
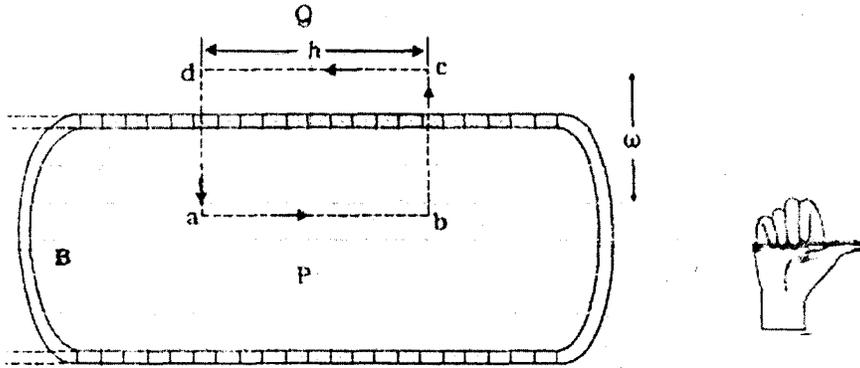
$$\oint \vec{B}.d\vec{l} = \mu_0 \sum i$$

$$\int_a^b \vec{B}.d\vec{l} + \int_b^c \vec{B}.d\vec{l} + \int_c^d \vec{B}.d\vec{l} + \int_d^a \vec{B}.d\vec{l} = \mu_0 I(nh)$$

1

½

$Bh + 0 + 0 + 0 = \mu_0 I(nh)$

$B = \mu_0 nI$ ½

b) (Any one difference ~ In a toroid, magnetic lines do not exist outside
the body.   1

$\rightarrow$ Toroid is closed whereas the solenoid is open on both sides

$\rightarrow$ Magnetic field is uniform inside a toroid whereas for 'solenoid, it is
different at the two ends and centre.

½

Strengthing of magnetic field: (Any one)

ı   By inserting a ferromagnetic substance inside the solenoid

ı   By increasing the amount of current through the solenoid   1   5

29.	Working	1
	Labelled diagram	1
	Expression for alternating emf generated	2
	Source of energy generation	1
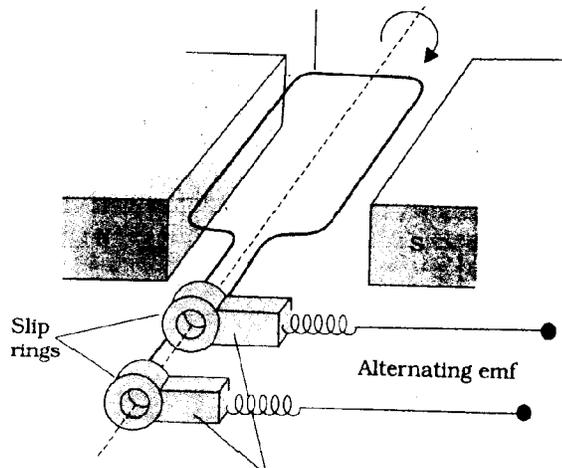
1

Working : When a coil (armature) rotates inside a uniform magnetic field, magnetic flux linked with the coil changes w.r.t. time. This produces an e.m.f according to Faraday's Law.   ½

For first half of the rotation the current will be from one end (first ring) to the other end (second ring). For second half of the rotation it is in opposite sense.   ½

At any instant $\phi = \overrightarrow{NB}.\overrightarrow{A}$

$\qquad = NBA \cos\theta$

$\qquad = NBA \cos\omega t$ 1

From Faraday's Law

$\varepsilon = -\dfrac{d\varphi_B}{dt} = -NBA\dfrac{d(\cos w\, t)}{dt}$ ½

$\qquad = NBA\,\omega\sin\omega t$ ½

$\qquad = \varepsilon_0 \sin\omega t$ 1

Source of energy :- Mechanical energy

(Award ½ wark only if the answer is any of the 'fuels' used for providing mechanical energy)   5

OR

(a)	Phase difference	3
(b)	Instantaneous e.m.f.	1
Direction		½
Identification		½

(a) $\varepsilon = \varepsilon_0 \sin\omega t$ ½

$\varepsilon - L\dfrac{di}{dt} = 0$

$\dfrac{di}{dt} = \dfrac{\varepsilon}{L} = \dfrac{\varepsilon_0}{L}\sin\omega t$ ½

$\displaystyle\int_0^i \dfrac{di}{dt}\,dt = \dfrac{\varepsilon_0}{L}\int_0^i \sin\omega t\,dt$

$i = -\dfrac{\varepsilon_0}{\omega L}\cos\omega t$ ½

$\dfrac{\varepsilon_0}{X_L}\sin(\omega t - \pi/2), X_L = \omega L$ 1

$i = i_0 \sin\left(\omega t - \dfrac{\pi}{2}\right)$

$v_m \sin \omega t$

ωt_1

V

I

$i_m \sin(\omega t_1 - \pi/2)$

v

i

ωt_1

π

2π

ωt

½
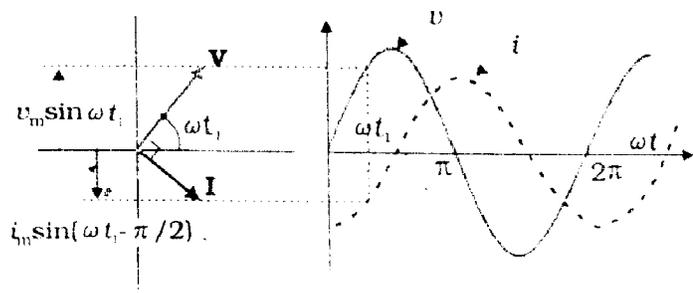
(b) i) $e = BLv$ — 1

ii)   West to east — ½

iii)   East — ½   5

30.	Importance of coherent sources	1
	Conditions for constructive and	
	destructive interference	1½
	Expression for fringe width	2
	Effect of immersing in water	½

If coherent sources are not taken, the phase difference, between the two interfering waves, will change continuously and a sustained interference pattern will not be obtained. — 1

$y_1 = a \cos wt$

$y_2 = a[\cos(wt + f)]$

$y = y_1 + y_2$

$y = a[\cos wt + \cos(wt + f)]$ — ½

$y = 2a \cos\left(\dfrac{\varphi}{2}\right)\cos(wt + f/2)$

Resultant amplitude $= 2a \cos(\phi/2)$

$I = 4I_0 \cos^2(\phi/2)$

Condition for constructive interference

$\phi = 0, \pm 2\pi, \pm 4\pi, ... $ or $\phi = \pm 2n\pi \ (n = 0,1,2,...........)$ — ½

Condition for destructive interference

$\phi = \pm\pi, \pm 3\pi, \pm 5\pi, ... $ or $\phi = \pm (2n +1)\pi \ (n = 0,1,2,.........)$ — ½

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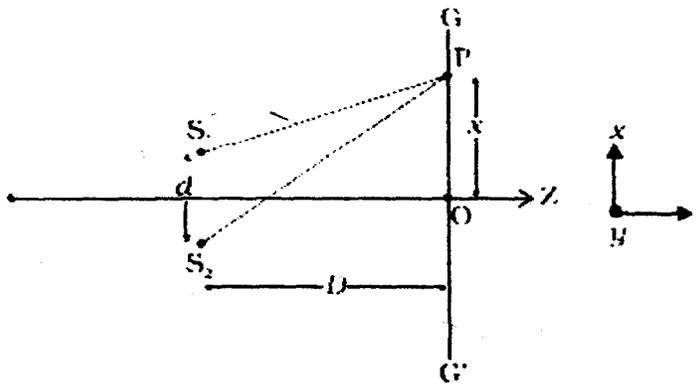
We have

$$\left(S_2P\right)^2 - \left(S_1P\right)^2 = \left[D^2 + \left(x+\frac{d}{2}\right)^2\right] - \left[D^2 + \left(x-\frac{d}{2}\right)^2\right] = 2xd$$

$$\therefore S_2P - S_1P = \frac{2xd}{S_2P + S_1P} \approx \frac{2xd}{2D} = \frac{xd}{D}$$

For maxima,

$$S_2P - S_1P = n\lambda$$

Hence position of maxima is given by

$$x_n = \frac{nl\ D}{d}\ \text{where}\ n = 0, \pm1, \pm2........$$

Hence fringe width

$$\beta = x_{n+1} - x_n$$

$$\beta = \frac{l\ D}{d}$$

$\therefore$ Fringe width will decrease in water as $\lambda_w < \lambda_a$

½
½
½
½
½
½

5

a)	Statement of Huygen's principle	1
	explanation of diffraction pattern	1½
b)	Angular width of the first diffraction fringe	1
	Width of central fringe	½
	Relation between the two	½
c)	Effect of using white light	½

(i) Each point of the wavefront is the source of a secondary disturbance and the wavelets emanating from these points spread out in all directions with the speed of the wave. ½

(ii) These wavelets emanating from the wavefront are usually referred to as secondary wavelets and if we draw a common tangent to all these spheres, we obtain the new position of the wavefront at a later time. ½

½
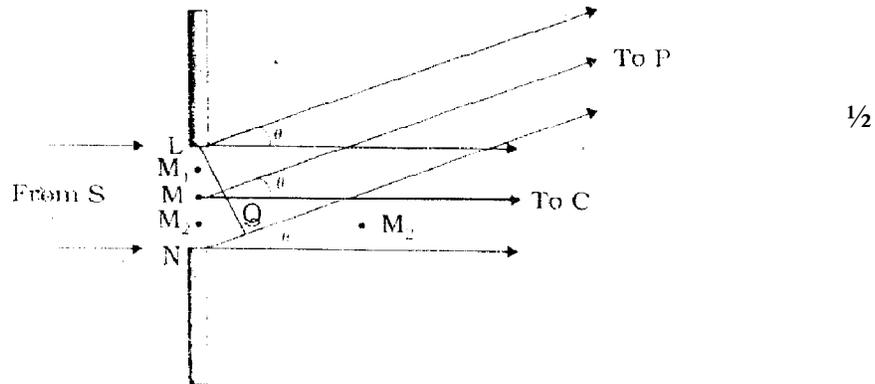
Divide the slit into (smaller) parts, and add their contributions at P with the proper phase differences. We are treating different wavefront at the slit as secondary sources,

These sources are in phase.

The path difference NP-LP := NQ

$$= a \sin \theta$$

$$\cong a \theta$$ ½

Similarly $M_2P - M_1P = y \phi$

Destructive superposition of secondary wavelets can take place and hence a diffraction pattern is obtained on the screen

nth secondary minima

$$\theta_n = \frac{n\lambda}{a}$$

Width of first diffraction fringe $\theta_2 - \theta_1 = \dfrac{2\lambda}{a} - \dfrac{\lambda}{a} = \dfrac{\lambda}{a}$ 1

The width of central maxima is the distance between the first secondary minimum on either side of the central point O

$$\theta_1 = \frac{\lambda}{a}$$

$$\theta_{-1} = \frac{\lambda}{a}$$

Width of the central fringe $= [\theta_1 - \theta_1] = \dfrac{\lambda}{a} - \left(-\dfrac{\lambda}{a}\right)$

$$= \frac{2\lambda}{a}$$ 1

Hence the fringe width of the first diffraction fringe is half that of the central fringe.   ½

(c)   When source is emitting white light, the diffraction pattern is coloured.   ½

Alternatively,

The central maximum is white, but other bands are coloured.   5

CHEMISTRY (Theory)

Time allowed : 3 hours   *Maximum Marks : 70*

General Instructions:

(i)   All questions are compulsory.

(ii)   Marks for each question are indicated against it.

(iii) Question numbers 1 to 8 are very short-answer questions and carry 1 mark each.

(iv)   Question numbers 9 to 18 are short-answer questions and carry 2 marks each.

(v)   Question numbers 19 to 27 are also short-answer questions and carry 3 marks each.

(vi)   Question numbers 28 to 30 are long-answer questions and carry 5 marks each.

*(vii) Use Log Tables, if necessary, Use of calculators is **not** allowed.*

QUESTION PAPER CODE 56/1/1

1.   'Crystalline solids are anisotropic in nature.' What does this statement mean?

2.   Express the relation between conductivity and molar conductivity of a solution held in a cell.

3.   Define 'electrophoresis'.

4.   Draw the structure of XeF_2 molecule.

5.   Write the IUPAC name of the following compound:

     $(CH_3)_3 CCH_2Br$

6.   Draw the structure of 3-methylbutanal.

7.   Arrange the following compounds in an increasing order of their solubility in water:

     $C_6H_5NH_2$, $(C_2H_5)_2NH$, $C_2H_5NH_2$

8. What are biodegradable polymers?

9. The chemistry of corrosion of iron is essentially an electrochemical phenomenon. Explain the reactions occurring during the corrosion of iron in the atmosphere.

10. Determine the values of equilibrium constant (K_C) and ΔG^o for the following reaction:

$$Ni(s) + 2Ag^+ (aq) \longrightarrow Ni^{2+}(aq) + 2Ag(s), E^o = 1.05 \text{ V}$$

$$(IF = 96500 \text{ C mol}^{-1})$$
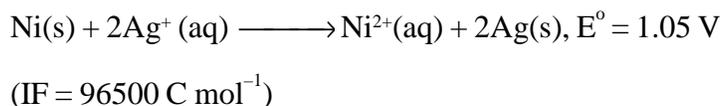
11. Distinguish between 'rate expression' and 'rate constant' of a reaction.

12. State reasons for each of the following:

    (i) The N – O bond in NO_2^- is shorter than the N – O bond in NO_3^-.

    (ii) SF_6 is kinetically an inert substance.

OR

State reasons for each of the following:

    (i) All the P-Cl bonds in PCl_5 molecule are not equivalent.

    (ii) Sulphur has greater tendency for catenation than oxygen.

13. Assign reasons for the following:

    (i) Copper (I) ion is not known in aqueous solution.

    (ii) Actinoids exhibit greater range of oxidation states than lanthanoids.

14. Explain the following giving one example for each:

    (i) Reimer-Tiemann reaction.

    (ii) Friedel Craft's acetylation of anisole.

15. How would you obtain

    (i) Picric acid (2, 4, 6-trinitrophenol) from phenol,

    (ii) 2-Methylpropene from 2-methylpropanol ?

16. What is essentially the difference between α-form of glucose and β-form of glucose? Explain.

17. Describe what you understand by primary structure and secondary structure of proteins.

18. Mention two important uses of each of the following:

    (i)   Bakelite

    (ii) Nylon 6

19. Silver crystallizes in face-centered cubic unit cell. Each side of this unit cell has a length of 400 pm. Calculate the radius of the silver atom. (Assume the atoms just touch each other on the diagonal across the face of the unit cell. That is each face atom is touching the four comer atoms.)

20. Nitrogen pentoxide decomposes according to equation: $2N_2O_5(g) \longrightarrow 4\,NO_2(g) + O_2(g)$.

    This first order reaction was allowed to proceed at 40 °C and the data below were collected:

$[N_2O_5]$ (M)	Time (min)
0.400	0.00
0.289	20.0
0.209	40.0
0.151	60.0
0.109	80.0

    (a) Calculate the rate constant. Include units with your answer.

    (b) What will be the concentration of N_2O_5 after 100 minutes?

    (c) Calculate the initial rate of reaction.

21. Explain how the phenomenon of adsorption finds application in each of the following processes:

    (i)   Production of vacuum

    (ii)   Heterogeneous catalysis

    (iii) Froth Floatation process

OR

Define each of the following terms:

    (i)   Micelles

    (ii)   Peptization

    (iii) Desorption

22. Describe the principle behind each of the following processes:

    (i)   Vapour phase refining of a metal.

    (ii)   Electrolytic refining of a metal.

    (iii) Recovery of silver after silver ore was leached with NaCN.

23. Complete the following chemical equations:

    (i) $MnO_4^- + C_2O_4^{2-} + H + \longrightarrow$

    (ii) $KMnO_4 \xrightarrow{\text{heated}}$

    (iii) $Cr_2O_4^{2-} + H_2S + H^+ + \longrightarrow$
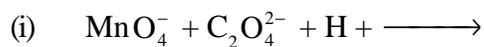
24. Write the name, stereochemistry and magnetic behaviour of the following:

    (At.nos. Mn = 25, Co = 27, Ni = 28)

    (i) $K_4[Mn(CN)_6]$

    (ii) $[Co(NH_3)_5 \, Cl] \, Cl_2$

    (iii) $K_2[Ni(CN)_4]$

25. Answer the following:

(i) Haloalkanes easily dissolve in organic solvents, why?

(ii) What is known as a racemic mixture? Give an example.

(iii) Of the two bromoderivatives, $C_6H_5CH(CH_3)Br$ and $C_6H_5CH(C_6H_5)$ Br, which one is more reactive in S_N1 substitution reaction and why?

26. (a) Explain why an alkylamine is more basic than ammonia.

(b) How would you convert

(i) Aniline to nitrobenzene

(ii) Aniline to iodobenzene ?

27. Describe the following giving one example for each:

(i) Detergents

(ii) Food preservatives

(iii) Antacids

28. (a) Differentiate between molarity and molality for a solution. How does a change in temperature influence their values?

(b) Calculate the freezing point of an aqueous solution containing 10.50 g of $MgBr_2$ in 200 g of water. (Molar mass of $MgBr_2 = 184$ g)

$$(Kf \text{ for water} = 1.86 \text{ K kg mol}^{-1})$$

OR

(a) Define the terms osmosis and osmotic pressure. Is the osmotic pressure of a solution a colligative property? Explain.

(b) Calculate the boiling point of a solution prepared by adding 15.00 g of NaC*l* to 250.0 g of water. (K_b for water $= 0.512$ K kg mol^{-1},

Molar mass of NaCl $= 58.44$ g)

29. (a) Give chemical tests to distinguish between

(i) Propanal and propanone,

(ii) Benzaldehyde and acetophenone.

(b)   How would you obtain

(i)   But-2-enal from ethanal,

(ii)   Butanoic acid from butanol,

(iii) Benzoic acid from ethylbenzene ?

OR

(a)   Describe the following giving linked chemical equations:

(i)   Cannizzaro reaction

(ii)   Decarboxylation

(b)   Complete the following chemical equations:

(i) $\xrightarrow[\text{KOH, heat}]{\text{KMnO}_4}$

(ii) $\xrightarrow[\text{heat}]{\text{SOC}l_2}$

(iii) $C_6H_5CONH_2 \xrightarrow[\text{heat}]{H_3O^+}$
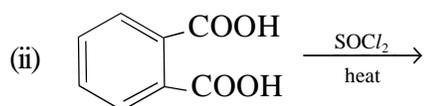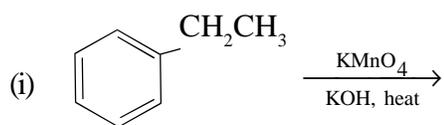
30.   (a)   Explain the following:

(i) NF_3 is an exothermic compound whereas NCl_3 is not.

(ii) F_2 is most reactive of all the four common halogens.

(b)   Complete the following chemical equations:

(i) $C + H_2SO_4$ (conc) $\longrightarrow$

(ii) $P_4 + NaOH + H_2O \longrightarrow$

(iii) $Cl_2 + F_2 \longrightarrow$
       (excess)
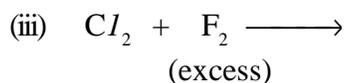
OR

(a) Account for the following:

    (i) The acidic strength decreases in the order $HCl > H_2S > PH_3$

    (ii) Tendency to form pentahalides decreases down the group in group 15 of the periodic table.

(b) Complete the following chemical equations:

    (i) $P_4 + SO_2Cl_2 \longrightarrow$

    (ii) $XeF_2 + H_2O \longrightarrow$

    (iii) $I_2 + HNO_3 \longrightarrow$
            (conc)

QUESTION PAPER CODE 56/1

1. Define 'order of a reaction'.   1

2. What is meant by 'shape selective catalysis' ?   1

3. Differentiate between a mineral and an ore.   1

4. What is meant by 'lanthanoid contraction' ?   1

5. Write the IUPAC name of the following compound: 1

    $CH_2 = CHCH_2Br$

6. Draw the structure of 4-chloropentan-2-one.   1

7. How would you convert ethanol to ethene ?   1

8. Rearrange the following in an increasing order of their basic strengths: 1

    $C_6H_5NH_2$, $C_6H_5N(CH_3)_2$, $(C_6H_5)_2NH$ and CH_3NH_2.

9. Explain how you can determine the atomic mass of an unknown metal if you know its mass density and the dimensions of unit cell of its crystal.   2

10. Calculate the packing efficiency of a metal crystal for a simple cubic lattice. 2

11. State the following: 2

    (i) Raoult's law in its general form in reference to solutions.

    (ii) Henry's law about partial pressure of a gas in a mixture.

12. What do you understand by the rate law and rate constant of a reaction? Identify the order of a reaction if the units of its rate constant are: 2

    (i) $L^{-1} \, mol \, s^{-1}$

    (ii) $L \, mol^{-1} \, s^{-1}$

13. The thermal decomposition of HCO_2H is a first order reaction with a rate constant of $2.4 \times 10^{-3} \, s^{-1}$ at a certain temperature. Calculate how long will it take for three-fourths of initial quantity of HCO_2H to decompose. ($\log 0.25 = -0.6021$) 2

14. Describe the principle controlling each of the following processes: 2

    (i) Vapour phase refining of titanium metal

    (ii) Froth floatation method of concentration of a sulphide ore.

15. How would you account for the following:

    (i) Cr^{2+} is reducing in nature while with the same d-orbital configuration (d^4) Mn^{3+} is an oxidising agent.

    (ii) In a transition series of metals, the metal which exhibits the greatest number of oxidation states occurs in the middle of the senes.

16. Complete the following chemical equations: 2

    (i) MnO_4^- (aq) $+ S_2O_3^{2-}$ (aq) $+ H_2O$ (l) $\rightarrow$

    (ii) $Cr_2O_7^{2-}$ (aq) $+ Fe^{2+}$ (aq) $+ H^+$ (aq) $\rightarrow$

OR

State reasons for the following: 2

    (i) Cu (I) ion is not stable in an aqueous solution.

(ii) Unlike Cr^{3+}, Mn^{3+}, Fe^{3+} and the subsequent other M^{3+} ions of the 3d series of elements, the 4d and the 5d series metals generally do not form stable cationic species.

17. Explain what is meant by the following: 2

    (i)   peptide linkage

    (ii)   pyranose structure of glucose

18. Write the main structural difference between DNA and RNA. Of the four bases, name those which are common to both DNA and RNA.   2

19. A solution prepared by dissolving 8.95 mg of a gene fragment in 35.0 mL. of water has an osmotic pressure of 0.335 torr at 25° C. Assuming that the gene fragment is a non-electrolyte, calculate its molar mass.   3

20. Classify colloids where the dispersion medium is water. State their characteristics and write an example of each of these classes.   3

OR

Explain what is observed when

    (i)   an electric current is passed through a sol

    (ii)   a beam of light is passed through a sol

    (iii) an electrolyte (say NaCl) is added to ferric hydroxide sol   3

21. How would you account for the following: 3

    (i) H_2S is more acidic than H_2O.

    (ii)   The N – O bond in NO_2^- is shorter than the N – O bond in NO_3^-.

    (iii) Both O_2 and F_2 stabilize high oxidation states but the ability of oxygen to stabilize the higher oxidation state exceeds that of fluorine.

22. Explain the following terms giving a suitable example in each case: 3

    (i)   Ambident ligand

    (ii)   Denticity of a ligand

    (iii) Crystal field splitting in an octahedral field

23. Rearrange the compounds of each of the following sets in order of reactivity towards S_N2 displacement: 3

   (i)   2-Bromo-2-methylbutane, 1-Bromopentane, 2-Bromopentane

   (ii)   1- Bromo-3-methylbutane, 2-Bromo-2-methylbutane,
           3- Bromo-2-methylbutane

   (iii)   1- Bromobutane, 1- Bromo-2,2-dimethylpropane,
           1- Bromo-2-methylbutane

24. How would you obtain the following:

   (i)   Benzoquinone from phenol

   (ii)   2-Methylpropan-2-ol from methylmagnesium bromide

   (iii)   Propan-2-ol from propene

25. State reasons for the following: 3

   (i)   pKb value for aniline is more than that for methylamine.

   (ii)   Ethylamine is soluble in water whereas aniline is not soluble in water.

   (iii)   Primary amines have higher boiling points than tertiary amines.

26. Draw the structures of the monomers of the following polymers: 3

   (i)   Polythene

   (ii)   PVC

   (iii)   Teflon

27. What are the following substances? Give one example of each.   3

   (i)   Food preservatives

   (ii)   Synthetic detergents

   (iii)   Antacids

28. (a)   What type of a battery is lead storage battery? Write the anode and cathode
         reactions and the overall cell reaction occurring in the operation of a lead
         storage battery.

(b) Calculate the potential for half-cell containing

0.10 M $K_2Cr_2O_7$ (aq), 0.20 M Cr^{3+} (aq) and 1.0 x 10^{-4} M H^+ (aq)
The half-cell reaction is
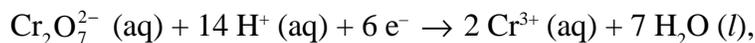
$Cr_2O_7^{2-}$ (aq) + 14 H^+ (aq) + 6 e^- → 2 Cr^{3+} (aq) + 7 H_2O (l),
and the standard electrode potential is given as $E^o = 1.33$ V.   5

OR

(a) How many moles of mercury will be produced by electrolysing 1.0 M
$Hg(NO_3)_2$ solution with a current of 2.00 A for 3 hours?

$[Hg(NO_3)_2 = 200.6$ g $mol^{-1}]$

(b) A voltaic cell is set up at 25° C with the following half-cells Al^{3+}(0.001 M)
and Ni^{2+}(0.50 M). Write an equation for the reaction that occurs when the
cell generates an electric current and determine the cell potential.

(Given: $E^o_{Ni^{2+}/Ni} = -0.25$ V, $E^o_{Al^{3+}/Al} = -1.66$ V)   5

29. (a) Draw the structures of the following molecules:

(i) $(HPO_3)_3$

(ii) BrF_3

(b) Complete the following chemical equations:

(i) $HgCl_2 + PH_3 \rightarrow$

(ii) $SO_3 + H_2SO_4 \rightarrow$
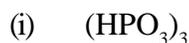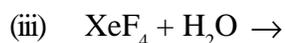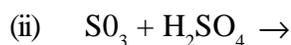
(iii) $XeF_4 + H_2O \rightarrow$ 5

OR

(a) What happens when

(i)   chlorine gas is passed through a hot concentrated solution of NaOH ?

(ii) sulphur dioxide gas is passed through an aqueous solution of a Fe (III)
salt ?

(b) Answer the following:

(i) What is the basicity of H_3PO_3 and why.?

(ii) Why does fluorine not play the role of a central atom in interhalogen compounds?

(iii) Why do noble gases have very low boiling points?   5

30. (a) Illustrate the following name reactions:

(i) Cannizzaro's reaction

(ii) Clemmensen reduction

(b) How would you obtain the following:

(i) But-2-enal from ethanal

(ii) Butanoic acid from butanol

(iii) Benzoic acid from ethylbenzene   5

OR

(a) Give chemical tests to distinguish between the following:

(i) Benzoic acid and ethyl benzoate

(ii) Benzaldehyde and acetophenone

(b) Complete each synthesis by giving missing reagents or products in the following:

(i)

$\xrightarrow[\text{heat}]{\text{SOCl}_2}$

(ii) $C_6H_5CHO \xrightarrow{H_2NCONHNH_2}$

(iii)
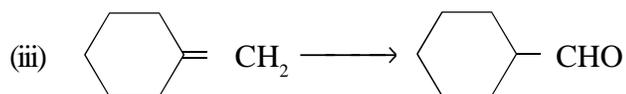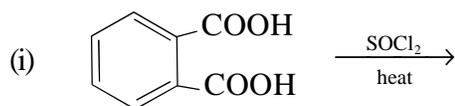
$= CH_2 \longrightarrow$ CHO 5

Marking Scheme — Chemistry

General Instructions

1. The Marking Scheme provides general guidelines to reduce subjectivity in the marking. The answers given in the Marking Scheme are suggested answers. The content is thus indicative. If a student has given any other answer which is different from the one given in the Marking Scheme, but conveys the same meaning, such answers should be given full weightage.

2. The Marking Scheme carries only suggested value point for the answers. These are only guidelines and do not constitute the complete answers. The students can have their own expression and if the expression is correct the marks, will be awarded accordingly.

3. The Head-Examiners have to go through the first five answer-scripts evaluated by each evaluator to ensure that the evaluation has been carried out as per the instruction given in the marking scheme. The remaining answer scripts meant for evaluation shall be given only after ensuring that there is no significant variation in the marking of individual evaluators.

4. Evaluation is to be done as per instructions provided in the Marking Scheme. It should not be done according to one's own interpretation or any other consideration - Marking Scheme should be strictly adhered to and religiously followed.

5. If a question has parts, please award marks in the right hand side for each part. Marks awarded for different parts of the question should then be totalled up and written in the left hand margin and circled.

6. If a question does not have any parts, marks be awarded in the left-hand margin.

7. If a candidate has attempted an extra question, marks obtained in the question attempted first should be retained and the other answer should be scored out.

8. No Marks to be deducted for the cumulative effect of an error. It should be penalized only once.

9. A full scale of marks 0-70 has to be used. Please do not hesitate to award full marks if the answer deserves it.

10. Separate marking schemes for all the three sets have been provided.

EXPECTED ANSWERS/VALUE POINTS

1   It means that some of their physical properties show different values when measured along different directions in the same crystal.   1

2    $\Lambda_m = \kappa / c$ 1

where Λm is molar conductivity, κ is conductivity, c is concentration in mol L^{-1}

3   The movement of colloidal particles under an applied electric potential towards oppositely charged electrodes is called electrophoresis.   1

4
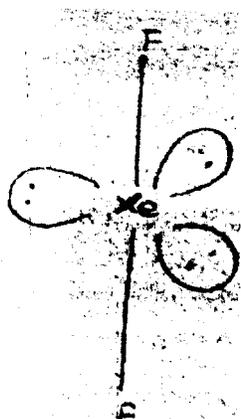
5   1-bromo-2, 2 - dimethyl propane   1

6   CH_3 -CH -CH_2-CHO   1

          |

       CH_3

7    $C_6H_5NH_2 < (C_2H_5)_2NH < C_2H_5NH_2$ 1

8   Polymers which undergo bacterial degradation in the environment and are thus eco-friendly.   1

9   oxidation: $Fe\,(s) \rightarrow Fe^{2+}\,(aq) + 2e^+$ 1

Reduction: $O_2\,(g) + 4H^+\,(aq) + 4c^- \rightarrow 2H_2O(1)$

Atmospheric oxidation: $2Fe^{2+}(aq) + 2H_2O(l) + \dfrac{1}{2} O_2(g) \rightarrow Fe_2O_3(s) + 4H^+(aq)$
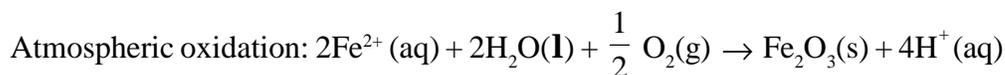
10    $\Delta rG^0 = -n \, FE^0_{cell}$

      $= -2 \times (96500 Cmor1^{-1}) \times 1.05V$ 1

      $= -202650 J \, mol^{-1}$ or $-202.6 kJ \, mor^{-1}$

  $\log Kc = \dfrac{nE^0}{0.0591}$

      $= \dfrac{2 \times 1.05V}{0.0591}$

      $= 35.53$

    $K_c = 3.412 \times 10^{35}$ 1

[Marks to be given if substitution is done with proper units]

11   Rate Law is the expression in which reaction rate is given in terms of molar con-   1
centration of reactants with each term raised to some power which may or may
not be same as the stoichiometric coeffcient of the reacting species in a balanced
chemical equation, whereas the rate constant is defined as the rate of reaction when
the concentration of the reactant(s) is unity.   1

(or properly explained in any other way)

12   i)   In the resonance structure of these two species, in NO_2^-, 2 bonds are sharing
a double bond while in NO_3^-, 3 bonds are sharing a double bond which
means that bond in NO_2 will be shorter than in NO_3^-.

Or

In NO_2^-, bond order is 1.5 while in NO_3^-, bond order is 1.33

    ii)   Because SF_6 is sterically protected by six F atoms / co-ordinatively saturated.

OR

    i)   Because PCl_5 has a trigonal bipyramidal structure in which three P-Cl bonds
are equatorial and two P-Cl bonds are axial.   1+1

    ii)   Because S-S single bond is stronger than O-O single bond

13 i)   Because copper(I) ion is unstable in aqueous solution and undergoes, dis-
         proportionation.   1+1

    ii)   Because of comparable energies of Sf; 6d and 7s orbitals in actinoids.

14 (i)   Reimer-Tiemann Reaction

                    Internediate   Salicylaldehyde
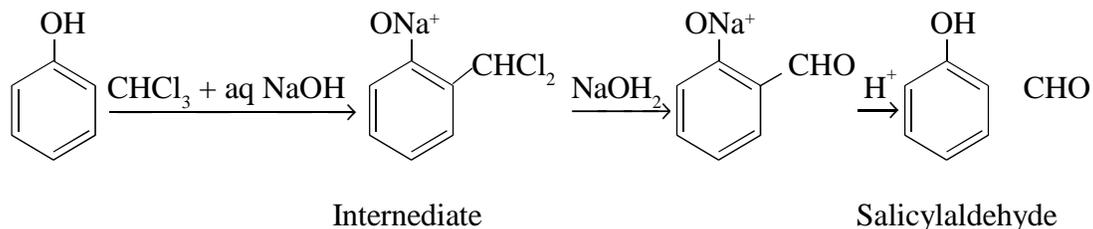
    (or any other example)

    ii)   Friedal-Craft's acetylation of anisole

    (or any other example)

15 i)
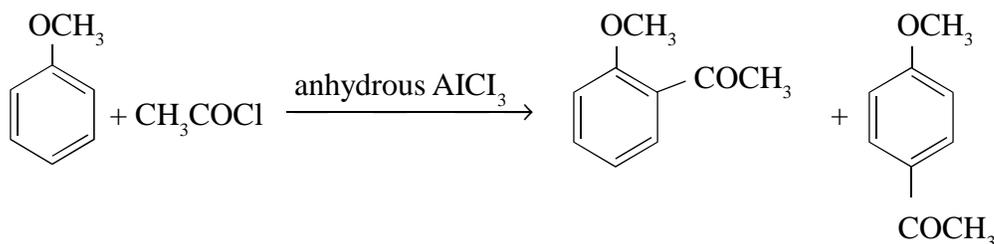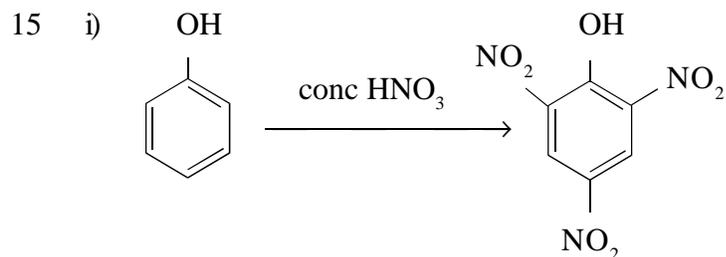
    (or by action of conc.HNO_3 on phenol)
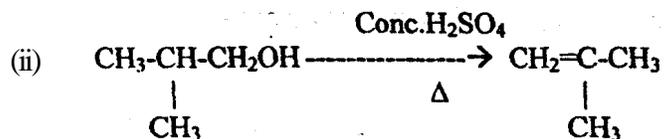
    (or by action of hot conc. H_2SO_4)

16 α - form of glucose and β - form of glucose differ only in the configuration of the
    hydroxyl group at C_1 in cvclic structure of glucose/hemiacetal form of glucose/
    pyranose structure of glucose. (or structure drawn)   2

17 **Primary structure of proteins:**

The protein in which amino acids are linked with each other in a specific sequence is said to be the primary structure of that protein.   1

Secondary structure of proteins:

It refers to the shape in which a long polypeptide chain can exist i.e. α - helix and β-pleated structure.   1

18 **i) Bakelite**

For making combs, electrical switches, handles of utensils, computer discs (or any other use) any two   ½+½

ii) Nylon-6

For making tyre cords, fabrics, ropes(or any other use) any two   ½+½

19 For fcc unit cell

$$r = \frac{a}{2\sqrt{2}}$$ 1

Given $a = 400$ pm

$\therefore$ $r = 400 / 2\sqrt{2}$ pm

$r = 141.4$ pm   1

20 a) $k = \frac{2.303}{t} \log \frac{[A_0]}{[A]}$

$k = \frac{2.303}{20 \text{ min}} \log \frac{0.400}{0.289}$

$k = 0.0163 \text{min}^{-1}$ 1

b) $k = \frac{2.303}{t} \log \frac{[A_0]}{[A]}$

$0.0163 = \frac{2.303}{100} \log \frac{0.400}{[A]}$

$[A] = 0.078$M   1

c) Initial rate $R = k \ [N_2O_5]$

$= 0.0163 \text{ min}^{-1} \times (0.400 \text{ M})$

$= 0.00652 \text{ M min}^{-1}$ 1

198

21 **i) Production of vacuum:**

The remaining traces of air can be adsorbed by charcoal from a vessel to create a vacuum.

ii) Heterogeneous catalysis:

Adsorption of reactants on the solid surface of the catalysts increases the rate of reaction.

iii) Froth floatation process:

In this process, sulphide ore is concentrated by using pine oil which adsorbs the ore particles and imurities are wetted by water which settle at the bottom.   1x3 = 3

<div align="center">**OR**</div>

i) Micelles:

Micelles are associated colloids which show colloidal behaviour at high concentration and act as strong electrolytes at low concentration.

ii) Peptization:

The process of converting a precipitate into colloidal sol by shaking it with dispersion medium in the presence of a small amount of electrolyte is called Peptization.

iii) Desorption:

The process of removing an adsorbed substance from a surface on which it is adsorbed is called desorption.   1x3 = 3

22 **i) Vapour phase refining of a metal:**   1

In this method the metal is converted into its volatile compound which is then decomposed to give pure metal.

ii) Electrolytic refiniing of a metal: 1

In this method, the impure metal is made to act as anode and metal in pure form is used as cathode. They are put in a suitable electrolytic bath containing soluble salt of the same metal. The more basic metal goes to the anode and the less basic metal gets deposited at the cathode.

iii) **Recovery of silver after silver ore was leached with NaCN:**

More basic and cheaper zinc can displace silver from the complex and silver 1
metal can be recovered.

$$2\,[Ag(CN)_2]^-\,(aq) + Zn(s) \longrightarrow [Zn\,(CN)_4]^{2-}_{(aq)} + 2Ag(s)$$

23 i) $5C_2O_4^{2-} + 2MnO_4^- + 16H^4 \longrightarrow 2Mn^{2+} + 8H_2O + 10CO_2$ 1

ii) $2KMnO_4 \xrightarrow{heat} K_2MnO_4 + MnO_2 + O_2$ 1

iii) $Cr_2O_7^{2-} + 3H_2S + 8H^+ \rightarrow 2Cr^{3+} + 3S + 7H_2O$ 1
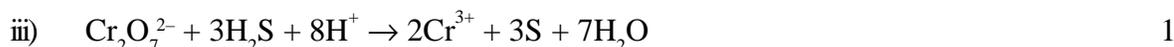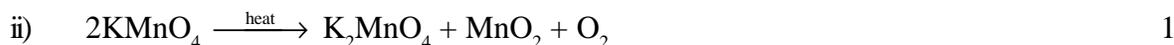
24 i) $K_4\,[Mn(CN)_2]$: Potassium hexacyanomanganate (II), Octahedral /
paramagnetic.

ii) $[Co(NH_3)_5Cl]\,Cl_2$: pentaamminechloridocobalt(III) chloride, octahederal/
diamagnetic.

iii) $K_2[Ni(CN)_4]$: potassium tetracyanonickelate(II), square planar / diamagnetic. ½+½=1

(½ mark for the nomenclature and ½ mark for the property in each part)

25 (i) Because the new intermolecular attractions between haloalkanes and solvent
molecules have about the same strength or stronger than the existing ones in
the molecules. 1

(ii) A mixture containing two enantiomers in equal proportions is known as a
racemic mixture. e.g. ($\pm$) butan-2-ol (or any other example) ½+½=1

(iii) $C_6H_5CH(C_6H_5)$ Br, because it forms more stable carbocation.

26 a) Due to +1 effect / electron donating character of alkyl group, alkylamine is
more basic than ammonia. 1

b) i) $C_6H_5NH_2 \xrightarrow[\text{273 K}]{\text{NaNO}_2\,+\text{HCl}} C_6H_5N_2^+Cl^- \xrightarrow[\text{ii) NaNO}_2\,/\text{Cu, }\Delta]{\text{i) HBF}_4} C_6H_5NO_2$ 1

ii) $C_6H_5NH_2 \xrightarrow[\text{273 K}]{\text{NaNO}_2\,+\text{HCl}} C_6H_5N_2^+Cl^- \xrightarrow{\text{KI}} C_6H_5\,I$ 1
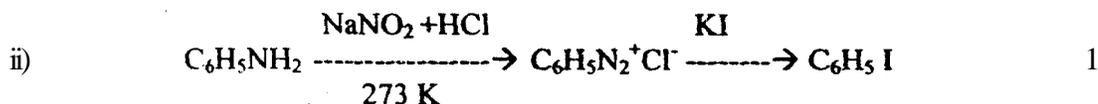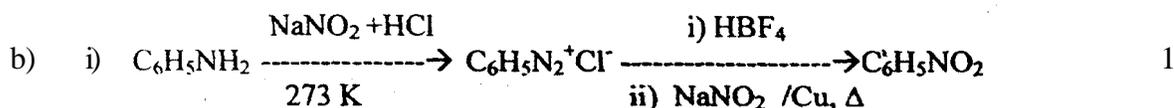
27 (i) Detergents are sodium salts of long chain alkyl sulphonates or benzene sul-
phonates. eg: Sodium Lauryl sulphate. $\frac{1}{2}+\frac{1}{2}=1$

(ii) Food preservatives: are the compounds which prevent spoilage of food due
to microbial growth. eg: sodium benzoate, vinegar (or anyone example) $\frac{1}{2}+\frac{1}{2}=1$

(iii) Antacids: are the drugs used to prevent the overproduction of acid in the
stomach. e.g. Sodium hydrogen carbonate / or any other suitable example0 $\frac{1}{2}+\frac{1}{2}=1$

28 a) Molality (m) is the number of moles of the solute per kilogram (kg) of the
solvent whereas Molarity is the number of moles of solute present in one
litre (or one cubic decimeter) of solution at a particular temperature. 1

Molality is independent of temperature whereas Molarity is function. of
temperature because volume depends on temperature and the mass does not
or Molarity decreases with increase of temperature. 1

b) $\Delta T_f = 7.5^0C$

$\Delta T_f = iK_f m$

$T_f^0 - T_f = 3 \times 1.86^0C \text{ kg mol}^{-1} \times \dfrac{10.50g}{184 \text{ gmol-1}} \times \dfrac{1000}{200kg}$ 2

$0^0C - T_f = 1.59^0C$

$T_f = -1.59^0C$ or 271.41 K 1

OR

a) The flow of solvent motecutes from solution of low concentration to higher concentration
through semipermeable membrane is called osmosis. $\frac{1}{2}$

The hydrostatic pressure that has to be applied on the solution to prevent the
entry of the solvent into the solution through the semipermeable membrane is
called the Osmotic Pressure. $\frac{1}{2}$

Yes osmotic pressure is a colligative property as it depends upon the number
of particles of the solute in a solution. 1

b) $\Delta T_b = iK_b m$

$T_b - T_b^0 = 2 \times 0.512K \text{ kg mol}^{-1} \times \dfrac{15 g}{58.44 \text{ gmol}-1} \times \dfrac{1000}{250kg}$ 2

$T_b - 373 K = 1.05 K$

$T_b = 374.05K$ or 101.05^0C 1

29 (a) (i) Propanal and Propanone

Iodoform lest. Warm each compound with iodine and sodium hydroxide on a water bath With.

Propanal (CH_3CH_2CHO) : No yellow ppt is formed with

Propanone (CH_3COCH_3) : Yellow crystals of Iodoform are formed.

(Other relevant test can be accepted)

(ii) Benzaldehyde and Actopbenone

Iodoform test. Warm each organic compound with I_2 and NaOH solution.   1+1=2

Acetophenone ($C_6H_5COCH_3$) Yellow precipitates of iodoform are formed with Benzaldehyde does not respond to this test.

(Other relevent test can be accepted)

(b)

i) $CH_3\text{-}CHO$ ----dil. NaOH----→ $CH_3\text{-}CH(OH)\text{-}CH_2\text{-}CHO$ ----Δ----→ $CH_3\text{-}CH\text{=}CH\text{-}CHO$
                                                                  $-H_2O$

ii) $CH_3\text{-}CH_2\text{-}CH_2\text{-}CHO$ ----KMnO$_4$----→ $CH_3\text{-}CH_2\text{-}CH_2\text{-}COOH$

iii) $C_6H_5\text{-}CH_2\text{-}CH_3$ ----i) KMnO$_4$, KOH / ii) H$^+$----→ $C_6H_5\text{-}COOH$
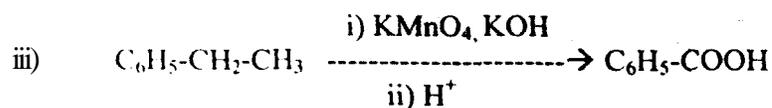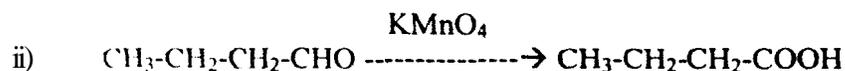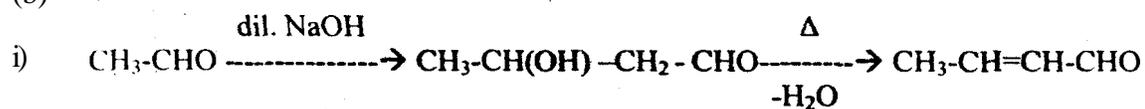
(Or by any other suitable method)   1x3=3

OR

i) Cannizzaro reaction: Aldehydes which do not have an a-hydrogen atom, undergo self oxidation and reduction reaction on treament with concentrated alkali   1

formaldehyde

methanol   sodium formate
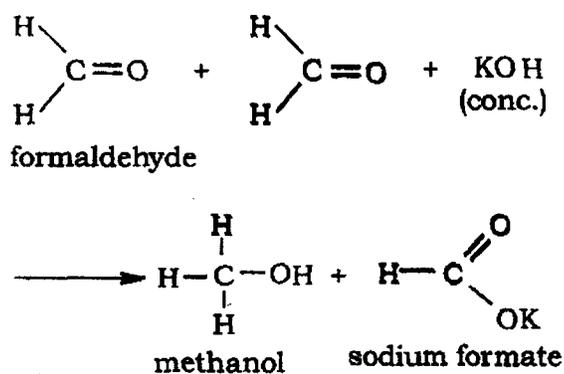
(or any other correct equation)

ii) Decarboxylation: Carboxylic acids lose carbon dioxide to form hydrocarbons when their sodium salts are heated with sodalime. The reaction is known as decarboxylation.   1

$$R\text{-}COONa \xrightarrow[\text{Heat}]{\text{NaOH, CaO}} R\text{-}H + Na_2CO_3$$
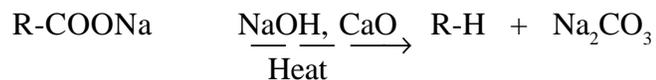
(Note: Award full marks for correct chemical equation; award ½ mark if only statement is written)

b) (i)

(ii)

     1x3=3

(iii) C_6H_5COOH

30 (a)
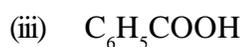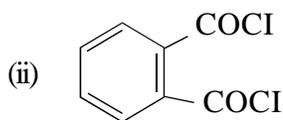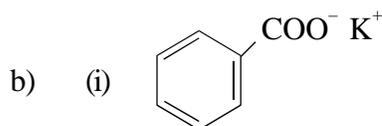
i) Becuase bond energy of F_2 is lower than that of Cl_2 and N-F bond is smaller & stronger than N-Cl bond.   1

ii) Because of low bond dissociation enthalpy of F-F bond.   1

b)

i) $C + 2H_2SO_4(\text{conc}) \longrightarrow CO_2 + 2SO_2 + 2H_2O$

ii) $P_4 + 3NaOH + 3H_2O \longrightarrow PH_3 + 3NaH_2PO_2$

iii) $Cl_2 + 3F_2 \longrightarrow 2ClF_3$ 1x3=3
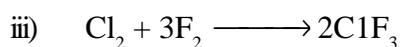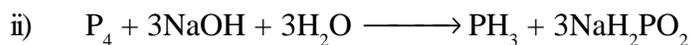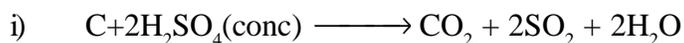
203

OR

i)   Because of increase in bond dissociation enthalpy from H-Cl bond to H-P bond / Because of decrease in electronegativity from to Cl to P.

ii) Because of the energy factor (inert pair effect) , stability of + 3 oxidation state increases than that of +5 oxidation state.

b)

i) $P_2 + 10SO_2Cl_2 \longrightarrow 4PCl_5 + 10SO_2$ 1 + 1

or

$P_4 + 8SO_2Cl_2 \longrightarrow 4PCl_3 + 4SO_2 + 2S_2Cl_2$

ii) $XeF_2 - 2H_2O \rightarrow 2Xe + 4HF + O_2$ 1x3=3

iii) $I_2 + 10 HNO_3 (conc) \rightarrow 2HIO_3 + 10 NO_2 + 4H_2O$
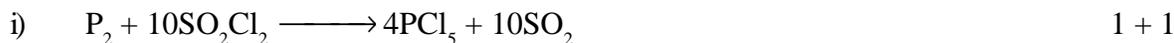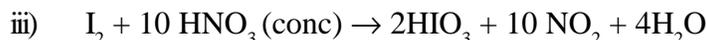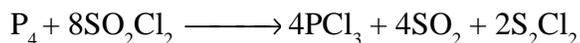
QUESTION PAPER CODE 56/1

EXPECTED ANSWERS/VALUE POINTS

1   The sum of powers of the concentration terms of the reactants in the rate law expression is called the order of that chemical reaction.   1

Or

$rate = k[A]^P[B]^q$

Order of reaction = P+q

2   The catalytic reaction in which the pore structure of the catalyst and the size of the reactant and product molecules are comparable.   1

3   The naturally occurring chemical substances which occur in the earth's crust and are obtainable by mining are called minerals, while the mineral from which the element is extracted economically is called an ore.   1

4   The regular decrease in the atomic and ionic radii / (having the same charge) of Lathanoids with increasing atomic number is known as Lanthanoid contraction.   1

5   3-Bromoprop-I-ene / 3-Bromopropene   1

6   $CH_3 - CO - CH_2 - CH(Cl)-CH_3$ 1

7    $CH_3CH_2OH \xrightarrow[443K]{H_2SO_4} CH_2 = CH_2 + H_2O$ 1

8    $(C_6H_5)_2NH < C_6H_5NH_2 < C_6H_5N(CH_3)_2 < CH_3NH_2$ 1

9   We can determine the atomic mass of an unknown by using the formula.

$M = \dfrac{d \times a^3 \times NA}{Z}$ 1

By knowing d, a, NA & Z We can calculate the M

Where

d = density of the element

N_A = Avogadro number   1

a = cell edge or edge length

Z = no. of atoms present in one unit cell.

10   Packing efficiency

$= \dfrac{Z \times \text{volume of one atom}}{\text{Volume of cubic unit cell}}$ 1

$= \dfrac{1 \times 4/3\ \pi r^3}{a^3}$

For simple cubic lattice a= 2r

Therefore packing effieciency $= \dfrac{1 \times 4/3\ \pi r^3}{8r^3}$

= 0.524 or 52.4%   1

11   i)   Raoult's law states that for a solution of volatile liquids, the partial vapour
           pressure of each component in the solution is directly proprtional to its mole
           fraction.   1

     ii)   Henry's law states that at a constant temperature, the solubility of a gas in a
           liquid is directly proportional to the pressure of the gas over the solution.   1

12 The representation of rate of reaction in terms of concentration of the reactants is
    known as rate law.   ½x4 = 2

    The rate constant is defined as the rate of reaction when the concentration of reactants
    is unity.

        i)   zero order

        ii)   second order

13 $t = \dfrac{2.303}{k} \times \log \dfrac{[A]_0}{[A]}$

    $t = \dfrac{2.303}{2.4 \times 10^{-3} \text{ s}^{-1}} \times \log \dfrac{[A]_0}{[A]_0/4}$ ½

    $t = \dfrac{2.303}{2.4 \times 10^{-3} \text{ s}^{-1}} \times \log 4$ ½

    $t = \dfrac{2.303}{2.4 \times 10^{-3} \text{ s}^{-1}} \times 0.60212$

    t = 578s   1

14 (i)   In this method the titanium metal is heated with I_2 to form a volatile compound
          TiI_4 which on further heating at higher temperature decomposes to give pure
          titanium metal. (or explanation by chemical equations)   1

    (ii) This method is based upon the fact that the surface of the sulphide ores is
          preferentially wetted by oil while that of gangue is wetted by water.   1

15 (i) Cr^{2+} is reducing as its configuration changes from d^4 to d^3, the latter having
          half filled t_{2g} level whereas Mn^{3+} to Mn^{2+} results in half filled orbitals (d^5)   1

    ii)   In a transition metal series the oxidation state first increases and then decreases;
          At the middle it is maximum due to greater number of unpaired electron in
          (n-l)d and ns orbitals.   1

16 (i) $8MnO_4^- (aq) + 3S_2O_3^{2-} (aq) + H_2O (1) \rightarrow 8 MnO_2 (s) + 6 SO_4^{2-} (aq) + 20H^- (aq)$ 1

    ii) $Cr_2O_7^{2-} (aq) + 14 H^+ (aq) + 6 Fe^{+2} (aq) \rightarrow 2 Cr^3 (aq) + 6 Fe^{+3} (aq) + 7H_2O (1)$ 1
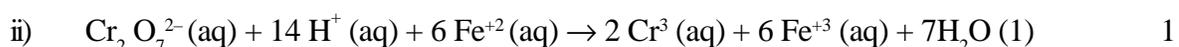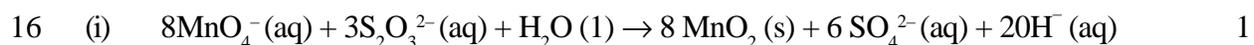
                                            OR

    i)   Because Copper(I) ion is unstable in aqueous solution and undergoes dispro-
          portionation.

ii) Due to lanthanoid contraction the expected increase in size does not occur.

17 (i) **Peptide linkage:** A link between two amino acids with loss of water / – CO - NH –   1

(ii) The six membered cyclic structure of glucose is called pyranose structure in analogy with pyran heterocyclic compound / or structure.   1

18 In DNA, sugar is Deoxyribose while in RNA, it is ribose./ DNA is as double stranded while RNA is single stranded.(any one)   1

The common bases present in both are adenine, cytosine & guanine.   1

19 $\pi = CRT$ 1

$$M_2 = \frac{w_2 R T}{\pi V}$$

$$M_2 = \frac{8.95 \times 10^{-3} g \times 0.0821 L\ atm\ mol^{-1}\ K^{-1} \times 298\ K \times 760 \times 1000}{0.335\ atm \times 35\ L}$$ 1

M_2 = 14193.3 g mol⁻¹ or 1.42x10⁴g mol⁻¹   1

20 They are of two types

i) Hydrophilic   ii) hydrophobic   ½+½

The hydrophile sol is more stable and reversible while hydrophobic sol is less stable and is irreversible.   1

Hydrophilic sol e.g. $\rightarrow$ Starch, gum, gelatin etc. (anyone)

Hydrobhobic sol e.g $\rightarrow$ metal sulphide, metal hydroxide (anyone)   1

OR

i) Electrophoresis takes place when sol **particles move towards opposite electrodes due to attraction.**

ii) Tyndall effect will be observed due to **scattering of light by colloidal particles.**

iii) Coagulation takes place (due to neutralisation of charges.)   1x3= 3

21 i) Because bond dissociation enthalpy of H-S bond is lower that of H-O bond. / oxygen is more electronegative than S.

ii) In the resonance structure of these two species, in NO_2^-, 2 bonds are sharing a double bond while in NO_3^-, 3 bonds are sharing a double bond which means that bond in NO_2^- will be shorter than in NO_3^-.

Or

iii) In NO_2^-, bond order is 1.5 while in NO_3^-, bond order is 1.33 Because of the tendency of oxygen to form multiple bonds with metal.　　　　　　1x3 = 3

22　i)　Ambident ligand: a unidentate ligand which can co-ordinate to the central metal atom through more than one co-ordinating bond.e.g. NO_2^-, SCN^-　　　1

ii)　The number of donor atoms in ligating groups is known as denticity of that ligand. e.g. in $C_2O_4^{2-}$ denticity is 2 (or any other example)　　　　　　　　1

iii)　Crystal field splitting in an Octahedral field: The splitting of d-orbitals under the influence of approaching ligand is known as crystal field splitting for example for d^4, configuration is $t_{2g}^3 e_g^1$ / **or diagrammatic representation.**　　　1

23　i)　1-Bromopentane > 2-Bromopentane > 2-Bromo -2-methyle butane.

ii)　1- Bromo-2 - methyl butane> 3-Bromo- 2-methyl butane> 2-Bromo-2-methyl butane　　　　　　　　　　　　　　　　　　　　　　　　　　1

iii)　1- Bromobutane > 1-Bromo- 2-methyl butane> 1-Bromo-2, 2-dimethyl propane　　1

24　(i)

(ii) $CH_3Mg\,Br \xrightarrow[\text{(ii) } H_2O]{\text{(i) } CH_3COCH_3} CH_3 - \underset{\underset{CH_3}{|}}{\overset{\overset{OH}{|}}{C}} - CH_3$

(iii) $CH_3 - CH = CH_2 \xrightarrow{\text{(i) } H_2O/H^+} CH_3 - \underset{\underset{OH}{|}}{CH} - CH_3$
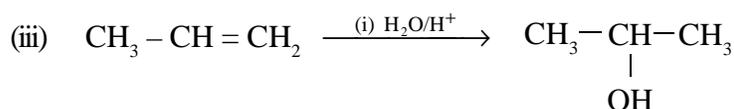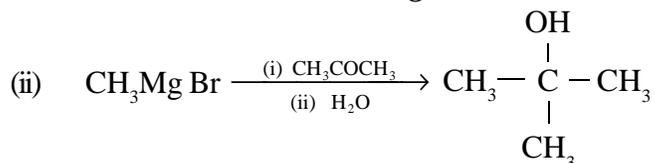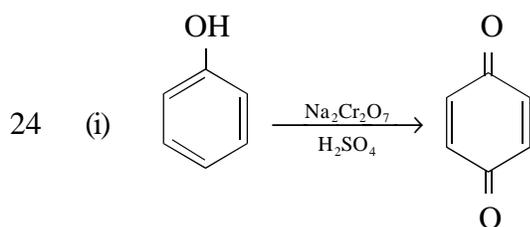
(or by any other suitable method.)　　　　　　　　　　　1x3 = 3

25 (i) Due to resonance in aniline, N acquires + charge which increases its pK_b whereas due to electron donating methyl group electron density increases on N which decreases its pK_b.

(ii) Due to formation of hydrogen bond with water ethyl amine is soluble in water whereas due to bulky phenyl group aniline does not form H-bond and thus is insoluble.

(iii) Due to hydrogen bonding in primary amines, they have higher boiling points whereas there is no hydrogen bonding in tertiary amines.   1x3=3

26 i) $CH_2 = CH_2$ 1

ii) $CH_2 = CHCl$ 1

iii) $CF_2 = CF_2$ 1

27 (i) Food preservatives: are the compounds which prevent spoilage of food due to microbial growth. eg: sodium benzoate, vinegar (or anyone example)   ½+½

(ii) Synthetic detergents are sodium salts of long chain alkyl sulphonates or benzene sulphonates. eg: Sodium Lauryl sulphate.   ½+½

(iii) Antacids: are the drugs used to prevent the overproduction of acid in the stomach. e,g, Sodium hydrogencarbonate.   ½+½

28 a) It is secondary cell   ½

Anode Reaction: $- Pb + SO_4^{2-} \rightarrow PbSO_4(s) + 2e^-$ ½

Cathode. Reaction: $- PbO_2 + 4H^+ + SO_4^{2-} + 2e^- \rightarrow PbSO_4 + 2H_2O$ ½

Net reaction:- $Pb + PbO_2 + 2SO_4^{2-} + 4H^+ \rightarrow 2PbSO_4 + 2H_2O$ ½

b) $E_{cell} = E^o_{cell} - \dfrac{0.0591}{n} \log \dfrac{[Cr^{3+}]^2}{[Cr_2O_7^{2-}][H^+]^{14}}$ 1

$E_{cell} = 1.33 \text{ V} - \dfrac{0.0591}{6} \log \dfrac{(0.20)^2}{(0.10)(10^{-4})^{14}}$ 1½

$= 1.33V - 0.55V$

$= 0.78V$

OR

a) $m = Zlt$

$$m = \frac{M \times I \times t}{nF}$$

$$m = \frac{M}{2 \times 96500\,Cmol^{-1}} \times 2A \times 3 \times 60 \times 60\,s$$

$$m = 0.112\,mol \times M$$

$$\text{no. of moles of mercury} = \frac{0.112mol \times M}{M}$$

$$= 0.112\,mol$$

b) $2Al + 3Ni^{2+} \rightarrow 2Al^{3+} + 3Ni$

$E^{o}_{cell} = E^{o}_{Cathode} - E^{o}_{anode} = [-0.25\,V - (-1.66\,V)] = 1.41\,V$

$E^{o}_{cell} = 1.41\,V$ ½

Nernst equation: $2Al + 3Ni^{2+} \rightarrow 2Al^{3+} + 3Ni$ 1

                 n=6 electrons

                                           1
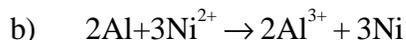
$$E_{cell} = E^{o}_{cell} - \frac{0.059}{n} \log \frac{[Al^{3+}]^2}{[Ni^{2+}]^3}$$

$$E_{cell} = 1.41\,V - \frac{0.059}{6} \log \frac{(0.001\,M)^2}{(0.50\,M)^3}$$

$$= 1.41\,V - \frac{0.059}{6}[-5.097] \log(10^4)$$ ½

$$= 1.41\,V + 0.050\,V = 1.46\,V$$

(a)

ii)

210

b)

i) $3HgCl_2 + 2PH_3 \rightarrow Hg_3P_2 + 6HCl$

ii) $SO_3 + H_2SO_4 \rightarrow H_2S_2O_7$

iii) $6\ XeF_4 + 12H_2O \rightarrow 4Xe + 2XeO_3 + 24HF + 3O_2$

OR

a)

i) $3Cl_2 + 6NaOH \rightarrow 5NaCl + NaClO_3 + 3H_2O$

ii) $2Fe^{3+} + SO_2 + 2H_2O \rightarrow 2Fe^{2+} + SO_4^{2-} + 4H^+$
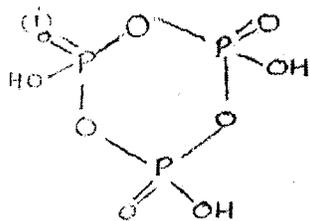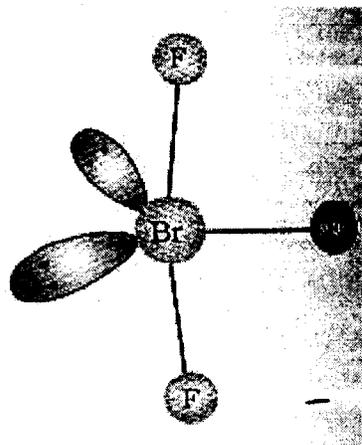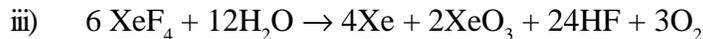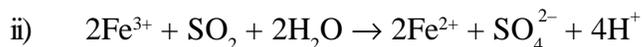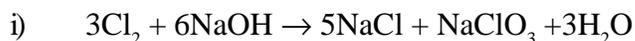
b)   i)   Two, due to presence of two P-OH bonds.

   ii)   Due to high electronegativity of fluorine.

   iii)   There are no interatomic forces except weak dispersion forces.

30   a)

i)   **Cannizzaro reaction:** Aldehydes which do not have an

   α-hydrogen atom, uhdergo self oxidation and reduction reaction on treament with concentrated alkali

formaldehyde

methanol   sodium formate
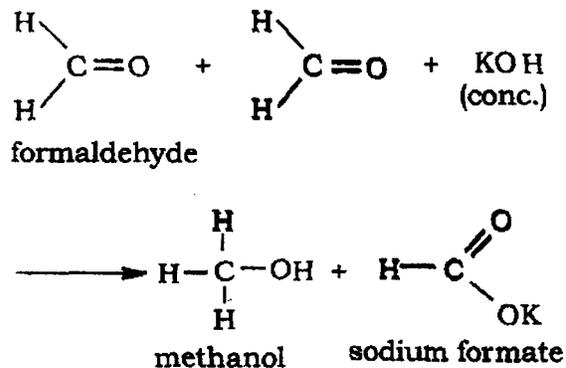
(or any other correct equation)

ii)   **Clemmensen reduction:** The carbonyl group of aldehydes and ketones is reduced to CH_2 group on treatment with zinc amalgam and concentrated HCI   1+1

211

$$\underset{\diagdown}{\diagup}C=O \xrightarrow[\text{HCl}]{\text{Zn-Hg}} \underset{\diagdown}{\diagup}CH_2 + H_2O \qquad \text{(Clemmensen reduction)}$$

b)

i) $2CH_3\text{-CHO} \xrightarrow{\text{dil. NaOH}} CH_3\text{-CH(OH)} –CH_2 \text{- CHO} \xrightarrow[-H_2O]{\Delta} CH_3\text{-CH=CH-CHO}$

ii) $CH_3\text{-CH}_2\text{-CH}_2\text{-CH}_2OH \xrightarrow{CrO_3,\ H_2SO_4} CH_3\text{-CH}_2\text{-CH}_2\text{-COOH}$

iii) $C_6H_5\text{-CH}_2\text{-CH}_3 \xrightarrow[\text{ii) H}^+]{\text{i) KMnO}_4,\ \text{KOH}} C_6H_5\text{-COOH}$ 1x3 = 3
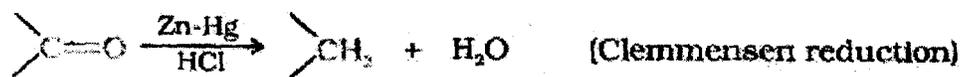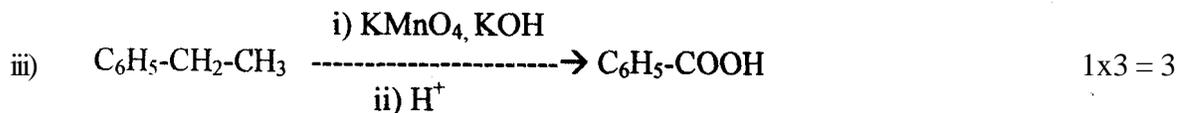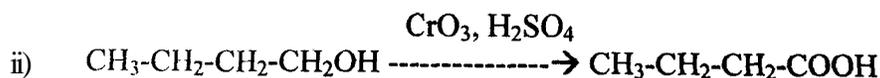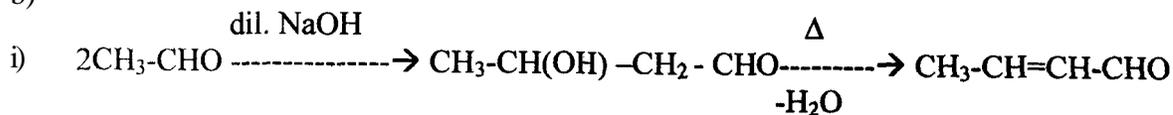
(Or by any other suitable method)

OR

(i) Benzoic acid and ethyl benzoate

Sodium bicarbonate test. Warm each compound with $NaHCO_3$,

Bezoic acid gives brisk effervesence of CO_2 gas whereas ethyl benzoate does not respond to this test

(Other relevant test can be accepted)

(ii) Benzaldehyde and Actophenone

Iodoform test: Warm each organic compound with I_2 and NaOH solution. with   1+1
Acetophenone ($C_6H_5COCH_3$) Yellow precipitates of iodoform is formed white
Benzaldehyde does not respond to this test.

(Other relevent test can be accepted)

b)   (i)   (benzene ring with COCl and COCl substituents)
            COCl
            COCl

(ii) $C_6H_5CH = NNHCONH_2$

iii)   a) $B_2H_6.\ H_2O_2\ /OH^-$ b) PCC
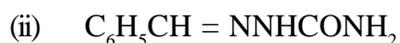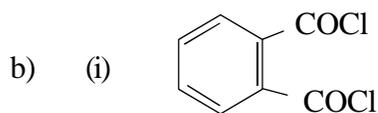
BIOLOGY (Theory)

Time allowed : 3 hours   *Maximum Marks : 70*

General Instructions:

(i)   *All questions are compulsory.*

(ii) *The question paper consists of four sections A, B, C and D. Section A contains 8 questions of one mark each, Section B is of 10 questions of two marks each, Section C is of 9 questions of three marks each and Section D is of 3 questions of five marks each.*

(iii) *There is no overall choice. However, an internal choice has been provided in one question of 2 marks, one question of 3 marks and all the three questions of 5 marks weightage. A student has to attempt only one of the alternatives in such questions.*

(iv) *Wherever necessary, the diagrams drawn should be neat and properly labelled.*

QUESTION PAPER CODE 57/1/1
SECTION A

1.   Name the type of cell division that takes place in the zygote of an organism exhibiting haplontic life cycle.   1

2.   Write the scientific name of the microbe used for fermenting malted cereals and fruit juices.   1

3.   Write the unit used for measuring ozone thickness.   1

4.   Name the event during cell division cycle that results in the gain or loss of chromo-some.   1

5.   How can bacterial DNA be released from the bacterial cell for biotechnology experiments?   1

6.   Write the importance of cryopreservation in conservation of biodiversity.   1

7.   Mention the role of the codons AUG and UGA during protein synthesis.   1

8. Normally one embryo develops in one seed but when an orange seed is squeezed many embryos of different shapes and sizes are seen. Mention how it has happened. 1

SECTION-B

9. How do histones acquire positive charge ? 2

10. Why is CuT considered a good contraceptive device to space children ? 2

11. Differentiate between albuminous and non-albuminous seeds, giving one example of each. 2

12. Explain the process of RNA interference. 2

13. List the key tools used in recombinant DNA technology. 2

14. Name the two types of immune systems in a human body. Why are cell mediated and humoral immunities so called ? 2

OR

Write the scientific names of the causal organisms of elephantiasis and ringworm in humans. Mention the body parts affected by them.

15 Justify with the help of an example where a deliberate attempt by humans has led to the extinction of a particular species. 2

16. Identify A, D, E and F in the diagram of an antibody molecule given below : 2
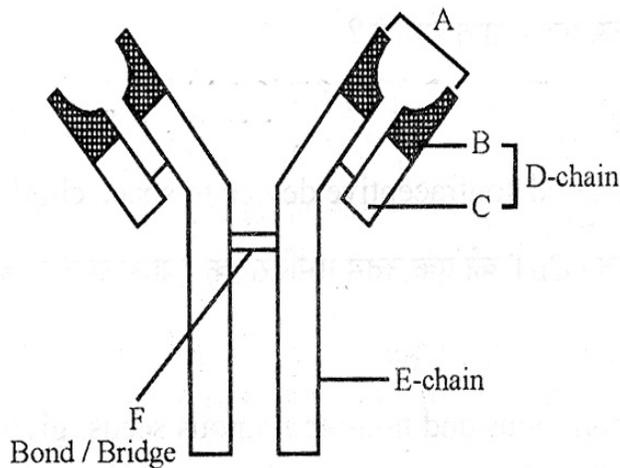
17. Study the graph given below. Explain how is oxygen concentration affected in the river when sewage is discharged into it.   2
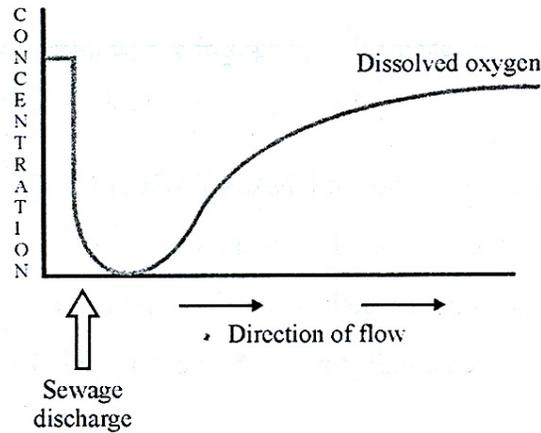
18. Explain how a hereditary disease can be corrected. Give an example of first successful attempt made towards correction of such diseases.   2

SECTION-C

19. Draw a diagram of a male gametophyte of an angiosperm. Label any **four** parts. Why is sporopollenin considered the most resistant organic material ?   3

20. How are dominance, codominance and incomplete dominance patterns of inheritance different from each other ?   3

21. The base sequence in one of the strands of DNA is TAGCATGAT   3

    (i)   Give the base sequence of its complementary strand.

    (ii)   How are these base pairs held together in a DNA molecule ?

    (iii) Explain the base complementarity rules. Name the scientist who framed this rule.

22. (a)   Sickle celled anaemia in humans is a result of point mutation. Explain.   3

    (b)   Write the genotypes of both the parents who have produced a sickle celled anaemic offspring.

23. What is inbreeding depression and how is it caused in organisms ? Write any two advantages of inbreeding.   3

24. (a) Identify (A) and (B) illustrations in the following :   3
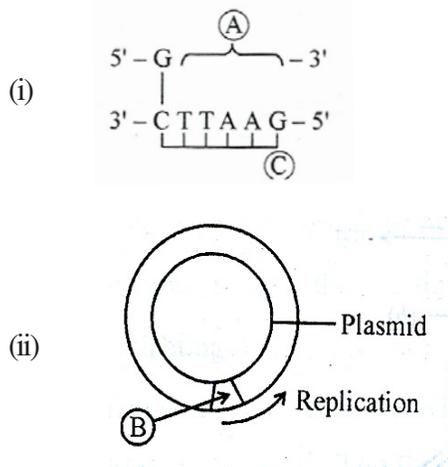
(i)
$$5' - G \longrightarrow A \longrightarrow 3'$$
$$3' - C\ T\ T\ A\ A\ G - 5'$$
$$\underbrace{}_{C}$$

(ii)

— Plasmid

— Replication

B

(b) Write the term given to (A) and (C) and why ?

(c) Expand PCR. Mention its importance in biotechnology

25.

→ Gas

— (b)

(c)

(a)

Digestor
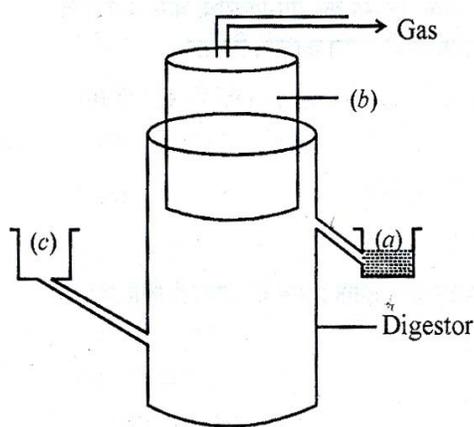
The diagram above is that of a typical biogas plant. Explain the sequence of events
occurring in a biogas plant. Identify a, b and c.   3

26. How can crop varieties be made disease resistant to overcome food crisis in India ?
Explain. Name one disease resistant variety in India of: 3

(a) Wheat to leaf and stripe rust

(b) <u>Brassica</u> to white rust

OR

Write the source and the effect on the human body of the following drugs :

(i)   Morphine

(ii)   Cocaine

(iii) Marijuana

27. Name the type of interaction seen in each of the following examples :   3

(i)   <u>Ascaris</u> worms living in the intestine of human

(ii)   Wasp pollinating fig inflorescence

(iii) Clown fish living among the tentacles of sea-anemone

(iv) Mycorrhizae living on the roots of higher plants

(v)   Orchid growing on a branch of a mango tree

(vi)   Disappearance of smaller barnacles when <u>Balanus</u> dominated in the Coast of Scotland.

SECTION-D

28. (a)   Draw a labelled diagram of the human female reproductive system.   5

(b)   Enumerate the events in the ovary of a human female during :

(i)   Follicular phase

(ii)   Luteal phase of menstrual cycle

OR

(a)   Write the specific location and the functions of the following cells in human males :

(i)   Leydig cells

(ii)   Sertoli cells

(iii) Primary spermatocyte

(b)   Explain the role of any **two** accessory glands in human male reproductive system

29. Explain the salient features of Hugo de Vries theory of mutation. How is Darwin's theory of natural selection different from it ? Explain. 5

OR

(a) Name the primates that lived about 15 million years ago. List their characteristic features.

    (b) (i) Where was the first man-like animal found ?

        (ii) Write the order in which Neanderthals, <u>Homo</u> <u>habilis</u> and <u>Homo</u> <u>erectus</u> appeared on earth. State the brain capacity of each one of them.

        (iii) When did modern <u>Homo</u> <u>sapiens</u> appear on this planet ?

30. (a) Explain primary productivity and the factors that influence it. 5

(b) Describe how do oxygen and chemical composition of detritus control decomposition.

OR

(a) What is El Nino effect ? Explain how it accounts for biodiversity loss.

(b) Explain any three measures that you as an individual would take, to reduce environmental pollution.

QUESTION PAPER CODE 57/1
SECTION A

1. Name the embryonic stage that gets implanted in the uterine wall of a human female. 1

2. State the importance of biofortification. 1

3. Biotechnologists refer to *Agrobacterium tumifaciens* as a natural genetic engineer of plants. Give reasons to support the statement. 1

4. How do algal blooms affect the life in water bodies ? 1

5. Name the common ancestor of the great apes and man. 1

6. Write a difference between net primary productivity and gross productivity. 1

7. Mention the contribution of genetic maps in human genome project.   1

8. Name the phase all organisms have to pass through before they can reproduce sexually.   1

SECTION B

9. Name the enzyme produced by *Streptococcus* bacterium. Explain its importance in
    medical sciences.   2

10. How is 'Rosie' considered different from a normal cow ? Explain.   2

11. State the use of Biodiversity in modern agriculture.   2

12. Write the full form of VNTR. How is VNTR different from 'Probe'?   2

13. Differentiate between benign and malignant tumours.   2

14.
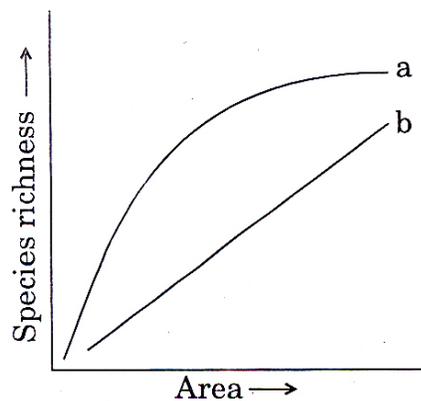
    The above graph shows Species-Area relationship. Write the equation of the curve
    'a' and explain.   2

OR

    Differentiate between *in situ* and *ex situ* approaches of conservation of biodiversity.

15. The cell division involved in gamete formation is not of the same type in different
    organisms. Justify.   2

16.
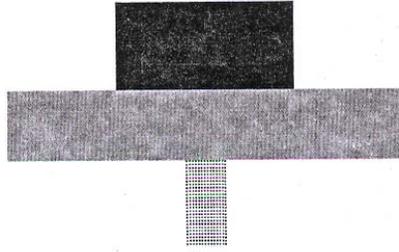
Identify the type of the given ecological pyramid and give one example each of pyramid of number and pyramid of biomass in such cases. 2

17. Describe the Lactational Amenorrhea method of birth control. 2

18. Name the type of bioreactor shown. Write the purpose for which it is used. 2
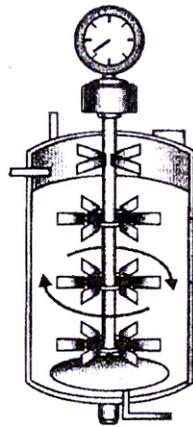
SECTION C

19. Draw a labelled diagram of the reproductive system in a human female. 3

20. Branching descent and natural selection are the two key concepts of Darwinian Theory of Evolution. Explain each concept with the help of a suitable example. 3

21. Scientists have succeeded in recovering healthy sugarcane plants from a diseased one.

    (a)   Name the part of the plant used as explant by the scientists.

    (b)   Describe the procedure the scientists followed to recover the healthy plants.

    (c)   Name this technology used for crop improvement. 3

22. (i) Name the enzyme that catalyses the transcription of hnRNA.

    (ii) Why does the hnRNA need to undergo changes ? List the changes hn RNA undergoes and where in the cell such changes take place. 3

23. (i) Write the scientific names of the two species of filarial worms causing filariasis.

    (ii) How do they affect the body of infected person(s) ?

    (iii) How does the disease spread ? 3

24. Name the genus to which baculoviruses belong. Describe their role in the integrated pest management programmes. 3

25. Unambiguous, universal and degenerate are some of the terms used for the genetic code. Explain the salient features of each one of them. 3

26. Water is very essential for life. Write any three features both for plants and animals which enable them to survive in water scarce environment. 3

OR

How do organisms cope with stressful external environmental conditions which are localised or of short duration ?

27. (i) State the consequence if the electrostatic precipitator of a thermal plant fails to function.

    (ii) Mention any four methods by which the vehicular air pollution can be controlled. 3

SECTION D

28. Give reasons why :

    (i) most zygotes in angiosperms divide only after certain amount of endosperm is formed.

    (ii) groundnut seeds are exalbuminous and castor seeds are albuminous.

    (iii) Micropyle remains as a small pore in the seed coat of a seed.

    (iv) integuments of an ovule harden and the water content is highly reduced, as the seed matures.

(v)   apple and cashew are not called true fruits.   5

OR

(a)   Draw a labelled diagram of L.S. of an embryo of grass (any six labels).

(b)   Give reason for each of the following :

     (i)   Anthers of angiosperm flowers are described as dithecous.

     (ii)   Hybrid seeds have to be produced year after year.

29.   Describe the mechanism of pattern of inheritance of ABO blood groups in humans.   5

OR

(a)   Why is haemophilia generally observed in human males ? Explain the conditions under which a human female can be haemophilic.

(b)   A pregnant human female was advised to undergo M.T.P. It was diagnosed by her doctor that the foetus she is carrying has developed from a zygote formed by an XX-egg fertilized by Y-carrying sperm. Why was she advised to undergo M.T.P. ?

30.   (i)   Describe the characteristics a cloning vector must possess.

     (ii)   Why DNA cannot pass through the cell membrane ? Explain. How is a bacterial cell made 'competent' to take up recombinant DNA from the medium ?   5

OR

If a desired gene is identified in an organism for some experiments, explain the process of the following :

(i)   Cutting this desired gene at specific location

(ii)   Synthesis of multiple copies of this desired gene

Marking Scheme — Biology (Theory)

General Instructions :

The Marking Scheme and mechanics of marking

1. In the marking scheme the marking points are separated by commas, one oblique line (/) indicates acceptable alternative, two obliques (//) indicate complete acceptable alternative set of marking points.

2. Any words/phrases given within brackets do not have marks.

3. Allow spelling mistakes unless the misspelt word has another biological meaning. Ignore plurals unless otherwise stated in the marking scheme.

4. In any question exclusively on diagram no marks on any description. But in questions on descriptions, same value points may be marked on the diagrams as a subsitute.

5. All awarded marks are to be written in the left hand margin at the end of the question or its part.

6. Place a tick (ü) in red directly on the key/operative term or idea provided it is in correct context. Place "Half-tick" ½ wherever there is ½ mark in the marking scheme. (Do not place tick indiscriminately just to show that you have read the answer).

7. If no marks are awarded to any part or question put a cross (×) at incorrect value portion and mark it zero (in words only).

8. Add up ticks or the half ticks for a part of the question, do the calculation if any, and write the part total or the question total in the left hand margin.

9. Add part totals of the question and write the question total at the end. Count all the ticks for the entire question as a recheck and draw a circle around the question total to confirm correct addition.

10. If parts of a Qustion have been attempted at different places do the totalling at the end of the part attempted last.

11. If any extra part is attempted or any question is reattempted, score out the last one and write "extra".

12. In questions where only a certain number of items are asked evaluate only that many numbers in sequence as is asked ignoring all the extra ones even if otherwise correct.

13. Transcribe the marks on the cover page. Add up question totals. Recheck the script total by adding up circled marks in the script.

14. Points/answer given in brackets in marking scheme are not so important and may be ignored for marking.

EXPECTED ANSWERS/VALUE POINTS

SECTION A

Q.Nos. 1 - 8 are of one mark each.

1. **Name the type of cell division that takes place in the zygote of an organism exhibiting haplontic life cycle.**

Ans. Meiosis   [1 mark]

2. **Write the scientific name of the microbe used for fermenting malted cereals and fruit juices.**

Ans. <u>Saccharomyces</u> <u>cerevisiae</u>   [1 mark]

3. **Write the unit used for measuring ozone thickness.**

Ans. Dobson (Unit) / D.U.   [1 mark]

4. **Name the event during cell division cycle that results in the gain or loss of chromosome.**

Ans. Failure of segregation of chromatids / non-disjunction / aneuploidy.   [1 mark]

5. **How can bacterial DNA be released from the bacterial cell for biotechnology experiments?**

Ans. (Breaking the cell open) Treating with <u>lysozyme</u>. = 1   [1 mark]

6. **Write the importance of cryopreservation in conservation of biodiversity.**

Ans. Gametes of threatened species / seeds of commercially important strains can be preserved , in viable and fertile condition / for long periods = ½ + ½   [1 mark]

7. **Mention the role of the codons AUG and UGA during protein synthesis.**

Ans. AUG - codes for methionine / initiation codon ,

UGA - termination codon / stop codon = ½ + ½   [1 mark]

8. **Normally one embryo develops in one seed but when an orange seed is squeezed many embryos of different shapes and sizes are seen. Mention how it has happened.**

Ans. Some nucellar cells / diploid cells / integument cells surrounding the embryo sac start dividing and protrude into the embryo sac and develop into embryos. (In such spe cies each ovule contains many embryos-polyembryony).   [1 mark]

SECTION-B

9. How do histones acquire positive charge ?

Ans. Histones are rich in basic amino acids, Lysine, Arginine (present as residues in their side chains), which are positively charged $= \frac{1}{2} \times 4$ [2 marks]

10. Why is CuT considered a good contraceptive device to space children ?

Ans. Non-hormonal, non-medicated, releases Copper ions, suppresses sperm motility , suppresses fertilising capacity of sperms , phagocytosis of sperms. *Any two* $= 1 + 1$ [2 marks]

11. Differentiate between albuminous and non-albuminous seeds, giving one example of each.

Ans. Albuminous - (with residual) endosperm is not completely used up during embryonic development eg, wheat / maize / castor / sunflower.

Non albuminous - (without residual) endosperm is completely consumed during embryonic development eg. pea / groundnut. $= \frac{1}{2} \times 4$

(If endosperm present or absent written $= \frac{1}{2}$ mark).   [2 marks]

12. Explain the process of RNA interference.

Ans. This method involves silencing of a specific mRNA of the parasite due to complementary dsRNA molecule that binds to and prevents translation of the mRNA (silencing). The source of this complementary RNA could be from an infection from viruses having RNA genomes or mobile genetic elements (transposons) that replicate via RNA intermediate   [2 marks]

13. List the key tools used in recombinant DNA technology.

Ans. Restriction enzymes / Polymerase enzymes / Ligase enzymes / Vectors / Host organizms / E. coli /Agrobacterium *Any four* $= \frac{1}{2} \times 4$ [2 marks]

14. Name the two types of immune systems in a human body. Why are cell me- diated and humoral immunities so called ?

Ans. Active , Passive // Innate , Acquired // Cell mediated , Humoral // Immune system consisting of Lymphoid organs / tissues / cells , immune system with soluble molecules like antibodies.

Any one pair = ½ + ½ = 1

Cell mediated immunity is called so because cells like T-lymphocytes provide immunity / T-cells kill or destroy the antigens.

Humoral immune system is called so because antibodies which attack antigens are found in the blood. (Humor) = ½ + ½ = 1   [1+1 = 2 marks]

OR

Write the scientific names of the causal organisms of elephantiasis and ringworm in humans. Mention the body parts affected by them.

Elephantiasis is caused by Wuchereria bancrofti , Legs / scrotum / lymphatic vessels of lower limb = ½ + ½

Ringworm is caused by Trichophyton / Microsporum / Epidermophyton ,Skin = ½ + ½

[1 + 1 = 2 marks]

15   **Justify with the help of an example where a deliberate attempt by humans has led to the extinction of a particular species.**

Ans. The Nile perch introduced into Lake Victoria in East Africa , eventually led to the extinction of an ecologically unique assemblage of more than 200 species of cichlid fish in the lake //

Abingdon tortoise in Galapagos islands became extinct , after goats were introduced due to greater browsing efficiency of goats //

Connell's field experiment showed that the competitively superior barnacle Balanus , excludes smaller barnacle Chathamalus **//**

over exploitation by man , caused extinction of Stellar's sea cow / Passenger pigeon.

Any one example with justification = 1 + 1

[2 marks]

16. **Identify A, D, E and F in the diagram of an antibody molecule given below :**
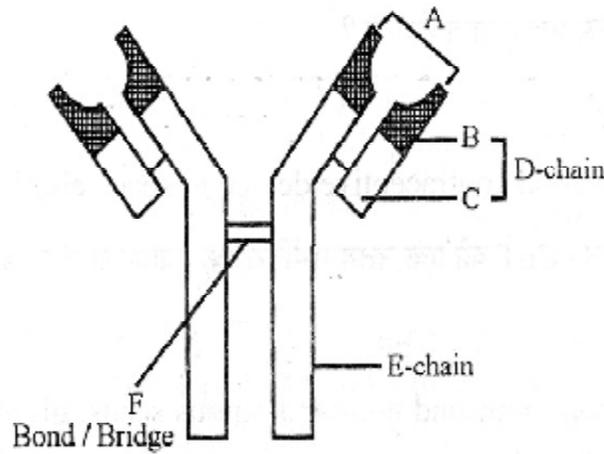
Ans. A - antigen binding site ,

D - light chain ,

E - heavy chain (constant region) ,

F - disulphide bond $= \frac{1}{2} \times 4$ [2 marks]

17. **Study the graph given below. Explain how is oxygen concentration affected in the river when sewage is discharged into it.**
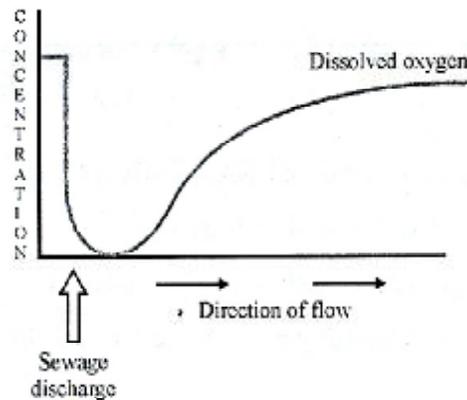
Ans. Oxygen is used up by microorganisms involved in biodegradation resulting in sharp decline at the point of sewage discharge , the concentration of oxygen increases as we move farther from the point of sewage discharge $= 1 + 1$ [2 marks]

18. **Explain how a hereditary disease can be corrected. Give an example of first successful attempt made towards correction of such diseases.**

Ans. Introduction of required genes into cells and tissues to treat diseases / by delivery of normal gene to take over the function of non-functional gene / by gene therapy ,

First gene therapy was given to four year old girl with Adenosine deaminase deficiency.   [2 marks]

SECTION-C

19. **Draw a diagram of a male gametophyte of an angiosperm. Label any four parts. Why is sporopollenin considered the most resistant organic material ?**

Vegetative cell
(½)

Exine (½)
Intine (½)

Generative cell
(½)
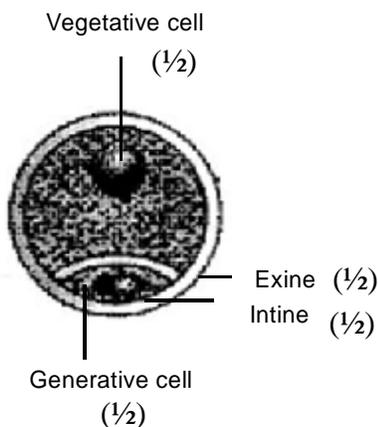
½ × 4 = 2

Sporopollenin can withstand high temperature / strong acids / strong alkali.
Any two = ½ + ½   [3 marks]

20. **How are dominance, codominance and incomplete dominance patterns of inheritance different from each other ?**

Ans. Dominance : one allele expresses itself in the hybrid heterozygous condition , other is suppressed

Co dominance : both the alleles of a gene express in a heterozygous hybrid containing two dominant alleles.

Incomplete dominance : Neither of the two alleles of a gene is completely dominant over the other in heterozygous condition , the hybrid is intermediate. = 1 × 3   [3 marks]

21. **The base sequence in one of the strands of DNA is TAGCATGAT**

     (i)   Give the base sequence of its complementary strand.

     (ii)   How are these base pairs held together in a DNA molecule ?

     (iii) Explain the base complementarity rules. Name the scientist who framed this rule.

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Ans. (i)   ATCGTACTA $= 1$

(ii)   Through Hydrogen bonds , between A and T and C and G on the two strands $= \frac{1}{2} + \frac{1}{2}$

(iii) $A = T$ and $C \equiv G$, Watson and Crick / Chargaff $= \frac{1}{2} + \frac{1}{2}$ [3 marks]

22.   (a)   Sickle celled anaemia in humans is a result of point mutation. Explain.

(b)   Write the genotypes of both the parents who have produced a sickle celled anaemic offspring.

Ans. (a)   Mutation arising due to change in a single base pair of DNA , the defect is caused by the subsititution of Glutamic acid (Glu) by Valine (Val) at the sixth position of the beta globin chain of the haemoglobin molecule. $= 1 + 1 = 2$

(b)   Father - Hb^A Hb^S **,** Mother - Hb^A Hb^S $= \frac{1}{2} + \frac{1}{2}$

(Both parents are heterozygous)   [$2 + \frac{1}{2} + \frac{1}{2} = 3$ marks]

23.   What is inbreeding depression and how is it caused in organisms ? Write any two advantages of inbreeding.

Ans. Continuous close inbreeding for several generations, reduces fertility and productivity is called inbreeding depression $= \frac{1}{2} + \frac{1}{2}$

Advantages - produces pure lines / eliminates inferior genes , accumulation of superior genes

Any two $= 1 + 1 = 2$ [$1 + 2 = 3$ marks]

24.   (a)   Identify (A) and (B) illustrations in the following :
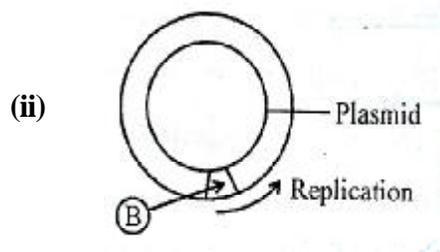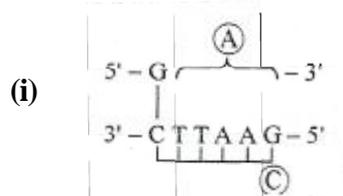
(i)

(ii)

(b) **Write the term given to (A) and (C) and why ?**

(c) **Expand PCR. Mention its importance in biotechnology**

Ans. (a)   (A) - AATTC / Sticky end $= ½$

(B) - Ori / Origin of Replication $= ½$

(b)   Pallindromic sequence , because the sequence of base pairs reads same on the two strands when orientation of reading is kept the same $= ½ + ½ = 1$

(c)   PCR - Polymerase Chain Reaction $= ½$,

Importance - amplification of gene of interest (in vitro) $= ½$ [3 marks]

25.
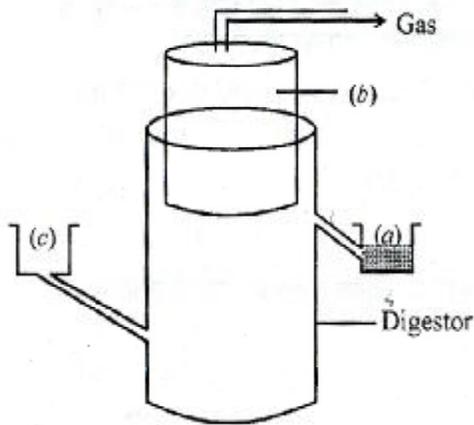
Digestor

The diagram above is that of a typical biogas plant. Explain the sequence of events occurring in a biogas plant. Identify a, b and c.

Ans. Bio wastes are collected and a slurry of dung is fed , a floating cover having gas outlet is placed over slurry which keeps on rising as the gas is produced in the tank, the spent slurry is removed through another outlet and may be used as fertiliser $= ½ \times 3 = 1½$

(a)   sludge loader

(b)   gas holder / CH_4 and CO_2

(c)   dung and water $= ½ \times 3 = 1½$ [3 marks]

26.   **How can crop varieties be made disease resistant to overcome food crisis in India ? Explain. Name one disease resistant variety in India of:**

(a)   **Wheat to leaf and stripe rust**

(b)   **Brassica to white rust**

Ans. By screening germplasm for resistance sources , hybridisation of selected parents ,
selection and evaluation of the hybrids and testing and release of new varieties **//**
mutation breeding - it is possible to induce mutations artificially through use of
chemicals or radiations (like gamma radiations) , and selecting and using the plants
of desirable character as a source in breeding. // Selection amongst somaclonal
variants / Genetic engineering - *Any one* explained = 2

    (a)   Himgiri = ½

    (b)   Pusa swarnim / Karan rai = ½   [2 + ½ + ½ = 3 marks]

OR

Write the source and the effect on the human body of the following drugs :

(i)   Morphine

(ii)   Cocaine

(iii) Marijuana

Ans. (i)   Morphine - poppy plant / <u>Papaver</u> <u>somniferum</u> , depressant = ½ + ½ = 1

     (ii)   Cocaine - <u>Erythroxylum</u> <u>coca</u> , stimulates CNS / causes euphoria / hallucination
           = ½ + ½ = 1

     (iii) Marijuana - <u>Cannabis</u> <u>sativa</u> **,** effects cardiovascular system of the body = ½ + ½ = 1

                                                 [1 + 1+ 1 = 3 marks]

27.   Name the type of interaction seen in each of the following examples :

(i)   <u>Ascaris</u> worms living in the intestine of human

(ii)   Wasp pollinating fig inflorescence

(iii) Clown fish living among the tentacles of sea-anemone

(iv) Mycorrhizae living on the roots of higher plants

(v)   Orchid growing on a branch of a mango tree

**(vi) Disappearance of smaller barnacles when <u>Balanus</u> dominated in the
Coast of Scotland.**

Ans. (i)   Parasitism

     (ii)   Mutualism

     (iii) Commensalism

(iv) Mutualism

(v) Commensalism

(vi) Competition $= \frac{1}{2} \times 6$ [3 marks]

SECTION-D

28. (a) Draw a labelled diagram of the human female reproductive system.

(b) Enumerate the events in the ovary of a human female during :

(i) Follicular phase (ii) Luteal phase of menstrual cycle

Ans. (a)
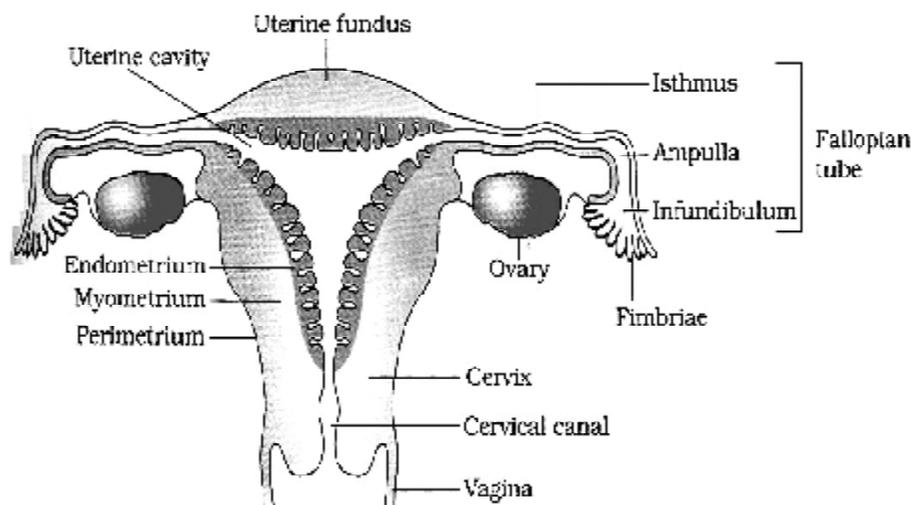
Any six correct labels on a correct diagram $= \frac{1}{2} \times 6 = 3$

(b) (i) Follicular phase - primary follicles grow and mature , secretion of estrogen , first meiotic division (*Any two* $= \frac{1}{2} \times 2$)

(ii) Luteal phase - development of corpus luteum , secretion of progestrone
$= \frac{1}{2} + \frac{1}{2}$ [3 + 1 + 1 = 5 marks]

OR

(a) Write the specific location and the functions of the following cells in human males :

(i) Leydig cells

(ii) Sertoli cells

(iii) Primary spermatocyte

(b) Explain the role of any two accessory glands in human male reproduc tive system

Ans. (a) (i) Leydig cells - found in interstitial spaces between seminiferous tubules , secrete androgens / testosterone = ½ + ½ = 1

(ii) Sertoli cells - found in between spermatocyte inside seminiferous tubules, nourish developing spermatozoa / sperms / germ cells = ½ +½ = 1

(iii) Primary spermatocytes - found in the inner lining of seminiferous tubules, they undergo meiosis and form sperms = ½ + ½ = 1

(b) The accessory glands are seminal vesicle, protstate gland, bulbourethral gland *any two* mentioned = ½ + ½

Secretions of these glands constitute seminal plasma which is rich in fructose, calcium and certain enzymes provide nourishment to sperms / Secretions of bulbourethral glands also help in lubrication of penis *Any two* mentioned = ½+½

[1 + 1 + 1 + 1 + 1 = 5 marks]

29. **Explain the salient features of Hugo de Vries theory of mutation. How is Darwin's theory of natural selection different from it ? Explain.**

Ans. Hugo de Vries based his work on evening primrose, brought forth the idea of mutations - differences arising suddenly in a population, He believed large single step mutation called saltation, caused speciation. = ½ × 4 = 2

Darwin's theory		Hugo de Vries
(i)	Directional	Directionless
(ii)	Gradual / slow	sudden
(iii)	Continuous variation	Random

$1 \times 3 = 3$

[2 + 3 = 5 marks]

OR

(a) **Name the primates that lived about 15 million years ago. List their characteristic features.**

(b) (i) **Where was the first man-like animal found ?**

(ii) **Write the order in which Neanderthals, <u>Homo habilis</u> and <u>Homo erectus</u> appeared on earth. State the brain capacity of each one of them.**

(iii) **When did modern <u>Homo sapiens</u> appear on this planet ?**

Ans. (a) Dryopithecus , Ramapithecus $= ½ + ½ = 1$

Dryopithecus is ape like and hairy , walked like Gorillas and Chimpanzees , Ramapithecus more man like , *Any two* $= ½ + ½ = 1$

(b) (i) Ethiopia / Tanzania / Eastern Africa $= ½$

(ii) Order $=$ <u>Homo</u> <u>habilis</u> , <u>Homo</u> <u>erectus</u> , Neanderthals $= ½$

Cranial capacity $=$ <u>Homo</u> <u>habilis</u> $= 650 - 800$ cc, <u>Homo</u> <u>erectus</u> $= 900$ cc, Neanderthals $= 1400$ cc $= ½ × 3 = 1½$

(iii) During ice age / 75000 - 10000 years ago $= ½$

$[1 + 1 + ½ + ½ + 1½ + ½ = 5$ marks$]$

30. (a) Explain primary productivity and the factors that influence it.

(b) Describe how do oxygen and chemical composition of detritus control decomposition.

Ans. (a) Primary productivity : amount of biomass / organic matter produced per unit area over a time period by the plant during photosynthesis $= 1$

Factors : availability of nutrients / quality of light available / availability of water / temperature of the given place / type of plant species of the area / photosynthetic capacity of the plants *Any four* $= ½ × 4 = 2$

(b) Oxygen increases rate of decomposition $= 1$

Chemical : decomposition is slow when chitin and lignin are present $= 1$

$[1 + 2 + 1 + 1 = 5$ marks$]$

OR

(a) What is El Nino effect ? Explain how it accounts for biodiversity loss.

(b) Explain any three measures that you as an individual would take, to reduce environmental pollution.

Ans. (a) Rise in temperature leading to deleterious changes in the environment and resulting in odd climatic changes is El Nino effect $= 1$

Increased melting of polar ice / submerging of coastal areas / flood / loss of habitat leading to loss of biodiversity *Any two* $= ½ + ½ = 1$

(b)   Less use of fossil fuel / Planting more trees / Use of lead free petrol or diesel / Use of low sulphur petrol and diesel / Following laws laid down in relation to sound / avoiding use of DDT / Reducing our garbage generation etc.

Any three $= 1 \times 3 = 3$ $[1 + 1 + 3 = 5]$

QUESTION PAPER CODE 57/1

EXPECTED ANSWERS/VALUE POINTS

SECTION A

Q.Nos. 1 - 8 are of one mark each.

1.   Name the embryonic stage that gets implanted in the uterine wall of a human female.

Ans. Blastocyst / blastula   [1 Mark]

2.   State the importance of biofortification.

Ans. Breeding of crops for improvement of nutritional quality , $= \frac{1}{2}$

    higher level of vitamins / proteins / minerals / healthier fats. (Any one) $= \frac{1}{2}$ $[\frac{1}{2} + \frac{1}{2} = 1$ Mark$]$

3.   Biotechnologists refer to *Agrobacterium tumifaciens* as a natural genetic engineer of plants. Give reasons to support the statement.

Ans. Can transfer gene naturally / Can deliver a piece of T DNA / has tumour inducing plasmid $= 1$ [1 Mark]

4.   How do algal blooms affect the life in water bodies ?

Ans. Pollutes water / deterioration of the water quality / oxygen depletion / water becomes toxic / BOD increases $= \frac{1}{2}$

    Fish mortality / death of aquatic organism $= \frac{1}{2}$ $[\frac{1}{2} + \frac{1}{2} = 1$ Mark$]$

5.   Name the common ancestor of the great apes and man.

Ans. Dryopithecus/Ramapithecus   [1 Mark]

6.   Write a difference between net primary productivity and gross productivity.

Ans. Gross productivity - Rate of production of organic matter during photosynthesis $= \frac{1}{2}$

Net primary productivity - Available biomass for the consumption to heterotrophs /

GPP - R = NPP = ½   [½ + ½ =1 Mark]

7.   **Mention the contribution of genetic maps in human genome project.**

Ans. Sequencing of genes , DNA finger printing , tracing human history, chromosomal
      location for disease associated sequences (***Any one***)   [1 Mark]

8.   **Name the phase all organisms have to pass through before they can reproduce
      sexually.**

Ans. Juvenile / growth = 1   [1 Mark]

SECTION B

Q.Nos. 9 - 18 are of 2 marks each.

9.   **Name the enzyme produced by *Streptococcus* bacterium. Explain its
      importance in medical sciences.**

Ans. Streptokinase = 1

      Used as a clot buster / for removing clots from the blood vessels (in a patient suffering
      from myocardial infarction / or in a heart patient) = 1   [1 + 1 = 2 Marks]

10.   **How is 'Rosie' considered different from a normal cow ? Explain.**

Ans. Rosie is a transgenic cow = 1,

      Rosie produced human protein enriched milk, containing human alpha - lactalbumin
      = ½ + ½ =1,   [1 + 1 = 2 Marks]

11.   **State the use of Biodiversity in modern agriculture.**

Ans. A source of hybrids , GM plants , biopesticides , organic farming , biofertiliser ,
      Improved varieties of plants , disease resistant plants or any other relevant use
      (***Any two***)   [1 + 1 = 2 Marks]

12.   **Write the full form of VNTR. How is VNTR different from 'Probe'?**

Ans. VNTR - Variable Number Tandem Repeats = 1

      Probe - is labelled / radio active (single stranded hybridise DNA fragments) = 1

                                                                            [1 + 1 = 2 Marks]

13. Differentiate between benign and malignant tumours.

Ans. Benign tumours | Malignant tumours

- Non - cancerous   - cancerous

- remains confined   - spreads to other parts of the body

- no metastasis   - shows metastasis

- causes limited damage   - causes serious damage (any two comparisons)

[1 + 1 = 2 Marks]

14.
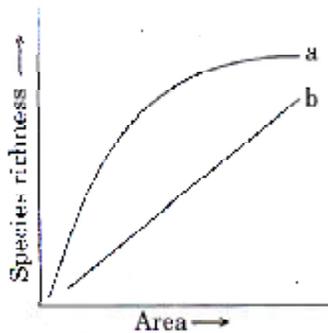
The above graph shows Species-Area relationship. Write the equation of the curve 'a' and explain.

Ans. $S = CA^Z = 1$

(i)   Within a region , species richness increases with increasing explored area but only up to a limit $= \frac{1}{2}$

(ii)   Relationship between species richness and area for a wide variety of taxa turns out to be rectangular hyperbola $= \frac{1}{2}$ $[1 + \frac{1}{2} + \frac{1}{2} = 2$ Marks]

OR

Differentiate between in situ and ex situ approaches of conservation of biodiversity.

Ans.   in situ   ex situ

- Protection of endangered species   - Protection of endangered species by removing

  of plants and animals $= \frac{1}{2}$,   them from the natural habitat $= \frac{1}{2}$,

  by protecting the natural habitat /   by placing under special care $= \frac{1}{2}$

  ecosystem $= \frac{1}{2}$

$[\frac{1}{2} \times 4 = 2$ Marks]

15. **The cell division involved in gamete formation is not of the same type in different organisms. Justify.**

Ans. Parents may be haploid or diploid , but the gametes have to be haploid , diploids undergo meiosis to produce haploid gametes , haploids undergo mitosis to produce gametes $= \frac{1}{2} \times 4 = 2$ [2 Marks]

16.

Identify the type of the given ecological pyramid and give one example each of pyramid of number and pyramid of biomass in such cases.

Ans. Inverted pyramid $= 1$

Inverted pyramid of biomass in a lake - phytoplankton $\rightarrow$ Zooplankton $\rightarrow$ fishes $= \frac{1}{2}$

Inverted pyramid of number - tree $\rightarrow$ insects $\rightarrow$ birds $= \frac{1}{2}$

$[1 + \frac{1}{2} + \frac{1}{2} = 2$ Marks]

17. **Describe the Lactational Amenorrhea method of birth control.**

Ans. During intense lactation / breast feeding $= 1$

No menstrual cycle / No ovulation $= 1$

$[1 + 1 = 2$ Marks]

18. **Name the type of bioreactor shown. Write the purpose for which it is used.**
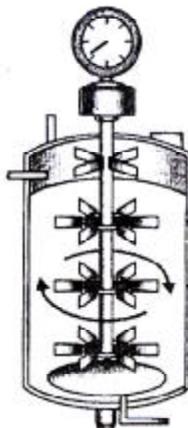
Ans. Simple stirred tank bioreactor = 1

Large scale production of recombinant protein / Raw materials are biologically converted into specific products or enzymes, using microbial plants / animals / human cells = ½ + ½ = 1

[1 + 1 = 2 Marks]

SECTION C

Q.Nos. 19 - 27 are of 3 marks each.

19. **Draw a labelled diagram of the reproductive system in a human female.**

Ans.
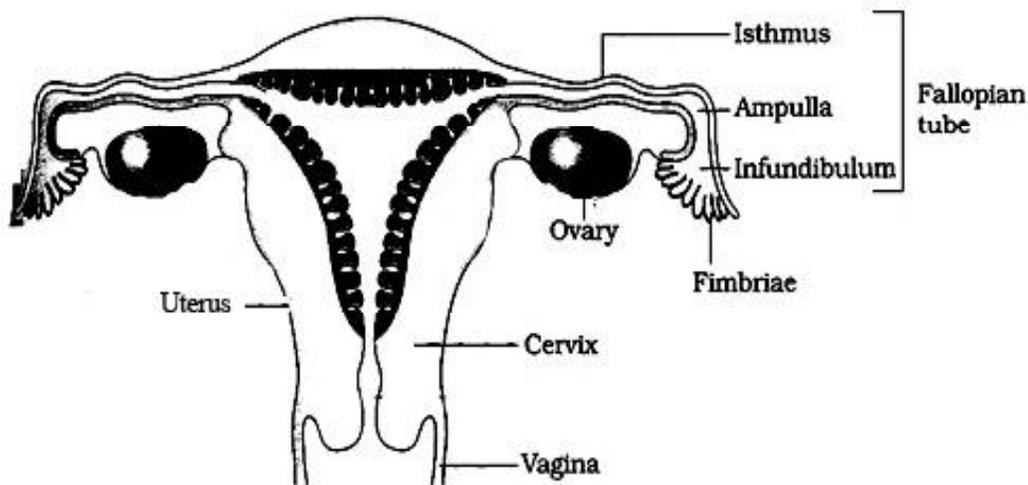
(Any six)   [½ × 6 = 3 Marks]

20. **Branching descent and natural selection are the two key concepts of Darwinian Theory of Evolution. Explain each concept with the help of a suitable example.**

Ans. Branching descent :

Different species descending from the common ancestor - get adapted in different habitats = ½

e.g. Darwins finches - varieties of finches arose from grain eaters / Australian marsupials - evolved from common marsupial = ½ + ½ = 1

Natural selection :

A process in which heritable variations enable better survival of a species to reproduce in large number. = ½

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e.g. White moth surviving before the industrial revolution and black moth surviving after industrial revolution / Long necked giraffe survived / DDT resistant mosquito survive

(Any suitable example) = ½ + ½ = 1   [3 Marks]

21. **Scientists have succeeded in recovering healthy sugarcane plants from a diseased one.**

   (a) **Name the part of the plant used as explant by the scientists.**

   (b) **Describe the procedure the scientists followed to recover the healthy plants.**

   (c) **Name this technology used for crop improvement.**

Ans. (a)   Meristem (apical, axillary) = ½

   (b)   Explant / Virus free meristem is grown in nutrient medium, under aseptic conditions , tissue proliferates to form undifferentiated mass / callus, transferred to a medium containing auxins and cytokinins. = ½ × 4 = 2

   (c)   Tissue culture / micropropagation = ½   [½ + 2 + ½ = 3 Marks]

22. **(i)** **Name the enzyme that catalyses the transcription of hnRNA.**

   (ii) **Why does the hnRNA need to undergo changes ? List the changes hn RNA undergoes and where in the cell such changes take place.**

Ans. (i)   RNA polymerase II = ½

   (ii)   Has (non functional) introns = ½

   (Methyl guanosine tri-phosphate is added to 5' end) capping , tailing (Poly A tail at 3' end added) , splicing (introns are removed and exons are joined) = ½ × 3 = 1½

   Nucleus = ½   [½ + 2 ½ = 3 Marks]

23. **(i)** **Write the scientific names of the two species of filarial worms causing filariasis.**

   (ii) **How do they affect the body of infected person(s) ?**

   (iii) **How does the disease spread ?**

Ans. (i)   <u>Wuchereria</u> <u>bancrofti</u>, <u>Wuchereria</u> <u>malayi</u> $= \frac{1}{2} + \frac{1}{2} = 1$

(ii)   Inflammation of the lymphatic vessels of the lower limbs / inflammation of the genital organs / gross deformity of the lower limbs / deformity of the genital organs (Any two) $= \frac{1}{2} + \frac{1}{2} = 1$

(iii)   Through the bite of female (Culex) mosquito $= 1$ [1 + 1 + 1 = 3 Marks]

24.   Name the genus to which baculoviruses belong. Describe their role in the integrated pest management programmes.

Ans. Nucleopolyhedrovirus $= 1$

They control only species specific pest, do not affect non target organisms / beneficial insects are conserved / they aid in IPM problems / no negative impact on plants or other animals $= 1 + 1 = 2$ [1 + 2 = 3 Marks]

25.   Unambiguous, universal and degenerate are some of the terms used for the genetic code. Explain the salient features of each one of them.

Ans. Unambiguous - One codon codes for one amino acid $= \frac{1}{2}$, e.g. AUG (Methionine) $= \frac{1}{2}$

Universal - Codon and its corresponding amino acid are the same in all organisms $= \frac{1}{2}$

Example:- Bacteria to human UUU codes for phenylalanine(phe) $= \frac{1}{2}$

Degenerate - Some amino acids are coded by more than one codon $= \frac{1}{2}$

Example:- UUU and UUC code for phenylalanine(phe) $= \frac{1}{2}$

[1 + 1 + 1 = 3 Marks]

26.   Water is very essential for life. Write any three features both for plants and animals which enable them to survive in water scarce environment.

Ans. **Plants:** Ephemeral mode (complete life cycle in short period) / Deep tap roots / Deciduous leaves / Waxy cuticle / sunken stomata / Succulence to store water / C_4 Pathway of Photosynthesis (Any three) $= \frac{1}{2} \times 3 = 1\frac{1}{2}$

Animals: No sweating / uricotelic / deposition of fat in sub epidermal layer / burrowing nature / thick skin / body covered with scales (Any three) $= \frac{1}{2} \times 3 = 1\frac{1}{2}$

[1½ + 1½ = 3 Marks]

OR

How do organisms cope with stressful external environmental conditions which are localised or of short duration ?

Ans. Migrate temporarily from the stressful habitat to a hospitable area / suspended activities

/ Form thick walled spores / Form dormant seeds / Hibernate during winter / Aestivate during summer / Planktons diapause (*Any six*) = ½ × 6 = 3   [½ × 6 = 3 Marks]

27. **(i)** **State the consequence if the electrostatic precipitator of a thermal plant fails to function.**

    (ii) **Mention any four methods by which the vehicular air pollution can be controlled.**

Ans. (i) Particulate matter will pollute the air = 1 ,

    (ii) Use of CNG / Phasing out of old vehicles / Use of unleaded petrol / Use of low sulphur fuel / Use of catalytic converters / Application of stringent pollution level norms (*Any four*) = ½ × 4 = 2   [1 + 2 = 3 Marks]

SECTION D

Q.Nos. 28 - 30 are of 5 marks each.

28. **Give reasons why :**
    (i) **most zygotes in angiosperms divide only after certain amount of endosperm is formed.**
    (ii) **groundnut seeds are exalbuminous and castor seeds are albuminous.**
    (iii) **Micropyle remains as a small pore in the seed coat of a seed.**
    (iv) **integuments of an ovule harden and the water content is highly reduced, as the seed matures.**
    (v) **apple and cashew are not called true fruits.**

Ans. (i) To obtain nutrition from the endosperm for the developing embryo = 1

    (ii) ground nut - endosperm completely consumed = ½

    castor - endosperm persists = ½

    (iii) for the entry of water / oxygen, for germination = ½ + ½ = 1

    (iv) Protect the embryo / keep the seed viable , until favourable conditions return for germination = ½ + ½ = 1

    (v) Ovary is not taking part in fruit formation / thalamus contributes to fruit formation = 1

[1 × 5 = 5 Marks]

OR

(a) **Draw a labelled diagram of L.S. of an embryo of grass (any six labels).**

Ans.
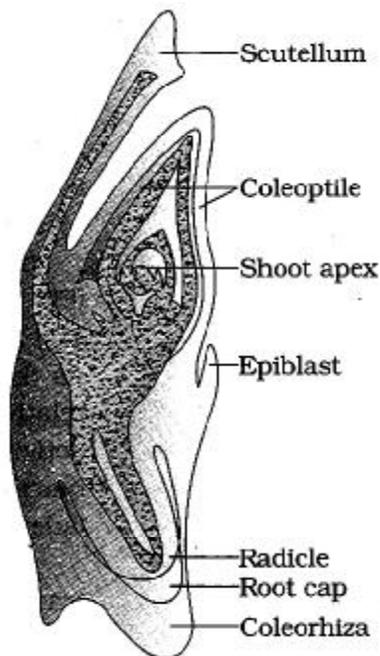
$= \frac{1}{2} \times 6 = 3$

(b) **Give reason for each of the following :**

(i) **Anthers of angiosperm flowers are described as dithecous.**

(ii) **Hybrid seeds have to be produced year after year.**

Ans. (i)   Each bilobed anther has two theca $=1$

(ii)   Progeny show segregation, do not maintain hybrid characters $= \frac{1}{2} + \frac{1}{2} = 1$

$[3 + 2 = 5 \text{ Marks}]$

29. **Describe the mechanism of pattern of inheritance of ABO blood groups in humans.**

Ans. Human blood group is determined by glycoprotein / antigen A , and glycoprotein / antigen B $= 1$

The alleles are I^A , I^B and i - Hence referred to as multiple allelism $=1$

The individual inherits any two of them as given below

$I^A I^A$, I^A i	—	A group
$I^B I^B$, I^B i	—	B group
$I^A I^B$	---	AB group
ii	—	O group $= 1$

In the case of A, B and O — Law of dominance is the pattern of inheritance as I^A / I^B dominant over i = 1

In AB group both the alleles I^A and I^B express — It is the case of Co-dominance = 1

[1 × 5 = 5 Marks]

OR

(a) **Why is haemophilia generally observed in human males ? Explain the conditions under which a human female can be haemophilic.**

(b) **A pregnant human female was advised to undergo M.T.P. It was diagnosed by her doctor that the foetus she is carrying has developed from a zygote formed by an XX-egg fertilized by Y-carrying sperm. Why was she advised to undergo M.T.P. ?**

Ans. (a) Haemophilia is caused due to the recessive , gene on X chromosome , = ½ + ½ = 1

Y has no allele for this / if a male is X^hY then he is haemophilic / if male inherits X^h from the mother he is haemophilic (with the genotype X^hY) = 1

If female inherits $X^h X^h$, one from the carrier mother and one from her haemophilic father (then she can be haemophilic) = 1

(b) Embryo has (trisomy of sex chromosome) XXY / Klinefelter's syndrome = 1

Advised MTP since the child will have the following problems :

Male with feminine traits / like gynaecomastia / under developed testes / sterile =1

[1 + 1 + 1 + 1 + 1 = 5 Marks]

30. **(i)** **Describe the characteristics a cloning vector must possess.**

(ii) **Why DNA cannot pass through the cell membrane ? Explain. How is a bacterial cell made 'competent' to take up recombinant DNA from the medium ?**

Ans. (i) - Should have ori / origin of replication , = ½

- Has selectable marker , genes encoding for an antibiotic resistance / genes encoding for α - galactosidase , = ½ + ½ = 1

- Has cloning site / recognition site , for the restriction enzyme to recognise = ½ + ½ = 1

(ii) DNA is a hydrophilic molecule = 1

Bacterial cell is made competent by treating with specific concentration of Ca^{++} ion / divalent ions , incubating them on ice , heat shock for a short period and placing it back on ice again $= ½ \times 3 = 1½$

[2½ + 2½ = 5 Marks]

OR

If a desired gene is identified in an organism for some experiments, explain the process of the following :

(i)   Cutting this desired gene at specific location

(ii)   Synthesis of multiple copies of this desired gene

Ans   (i)

- Identifying the restriction endonuclease that recognises the palindromic nucleotide sequence of the desired gene.

- The restriction endonuclease inspects the DNA sequences - finds and recognises the site

- Cuts each of the double helix at the specific point - a little away from the centre of the palindromic site - between the same two bases on the opposite strand

- Makes the over hanging stretch single stranded portion as a sticky end. $= ½ \times 4 = 2$

(ii)

- By PCR / Polymerase Chain Reaction

- Desired gene is synthesised *in vitro*

- DNA is denatured

- Annealed using two sets of primers

- Thermostable Taq polymerase extends the primers using nucleotides (provided in the reaction and genomic DNA as template)

- Amplified fragments are ligated $= ½ \times 6 = 3$

[2 + 3 = 5 Marks]

BIO-TECHNOLOGY

Time allowed : 3 hours   *Maximum Marks : 100*

General Instructions:

(i) All questions are compulsory.

(ii) There is no overall choice. However, an internal choice has been provided in one question of three marks and two questions of five marks. You have to attempt only one of the choices in such questions.

(iii) Questions number 1 to 5 are very short answer questions, carrying 1 mark each.

(iv) Questions number 6 to 15 are short answer questions, carrying 2 marks each.

(v) Questions number 16 to 25 are also short answer questions, carrying 3 marks each.

(vi) Questions number 26 to 28 are long answer questions, carrying 5 marks each.

(vii) Use of calculators is not permitted. However, you may use log tables, if necessary.

QUESTION PAPER CODE 99/1
SECTION A

1. Farmers growing cotton find that bollworm is devouring their crop. Suggest a possible way by which genetic engineering can provide a solution to this problem.   1

2. A microbiologist involved in an antibiotic discovery programme has isolated some bacteria from hot springs in the Himalayas. However attempts of growing these bacteria under regular laboratory conditions have failed. What suggestion can you give him?   1

3. An enriched medium containing salts, glucose, proteins and vitamins was made and a commercially available animal cell line was introduced. However the cells began dying. What could have been the mistake?   1

4. In micro-propagation, axillary meristems are used as the source for raising virus free plants, why?   1

5. A given microbial species grows rapidly. Which will be higher, its specific growth rate μ or doubling time 't' ? 1

6. What is the role of Factor VIII? Why are animal cell lines required to produce it ? 2

7. Differentiate between homologous and paralogous genes. 2

8. Write the principle of Southern hybridization. 2

9. 'Whey', in ancient times, was recommended for its therapeutic role. Why? 2

10. Indicate two important properties of animal cell cultures. 2

11. What are haploids and triploids ? What are their uses in plant cell culture? 2

12. Indicate the use of the following in microbial cell culture (a) liquid nitrogen (b) agar (c) nitrosoguanidine (d) glycerol 2

13. Expand SNPs and describe their one application. 2

14. Give the principle of the blue-white screening method in rDNA technology. 2

15. In the enzyme chymotrypsin, why does Ser195 develop a negative charge on its -OH group. 2

16. Why is Agrobacterium tumefaciens referred to as a 'natural genetic engineer' ? How does this bacterium achieve this feat? 3

17. After growth in fermentor, downstream processing involves a number of techniques. Explain the principles behind (a) centrifugation (b) ultrafiltration. What is the rational behind minimizing steps involved in downstream processing? 3

18. What do you understand by the term "genomics" ? Differentiate between structural and functional genomics. 3

19. In an experiment involving cloning of a genomic DNA fragment into a vector: 3

    (a) Suggest a vector to clone this fragment, if its size is approx 300 kb.

    (b) Suggest a cloning strategy if the DNA has very uncommon restriction enzyme sites at its ends.

20. Indicate two disadvantages of vegetative propagation of plants. How does microp-ropagation overcome these and briefly outline the steps involved. 3

21. In a form of Alzheimers, a victim's brain tissue after an autopsy showed abnormal precipitates which appeared to be proteinaceous. Explain the modern methods which may be used to identify these abnormal proteins. 3

22. What are the 3 main features that a vector should possess and explain the role of each. 3

OR

Do you consider phage based vectors superior to plasmids ? Justify your answer.

23. The publication of 'Atlas of Protein Sequence and Structure' under the editorship of Margaret O. Dayhoff was a pioneering effort. Why? 3

24. Briefly describe the commonly used culture methods used for biomass or metabolite production. 3

25. Foot and Mouth Disease Virus (FMDV) vaccine is made by growing the virus in animal cells, harvesting the virus and inactivating it for vaccine formulations. Given the following data, calculate the weight and volume of the harvested virus from a bioreactor.

    (1) Total bioreactor capacity = 1000 1 (atleast 20% space must be kept for oxygen and CO_2)

    (2) No. of animal cells = 10^5/ml.

    (3) No. of virus particles/animal cell = 50

    Assume the virus to be a sphere with a gm molecular weight of 10^6 (1 million) and r = 1 nm. 3

26. Expand the term 'BLAST'. Discuss the steps involved in comparison of DNA sequences using this tool. 5

OR

Name any five major databases commonly used in bioinformatics. Also suggest the type of information available from each of these databases. 5

27. What is the hierarchical organization in protein structure? Indicate the nature of covalent and non-covalent forces which determine the protein structure.   5

OR

How can one use the method of aqueous - two-phase partitioning for separation of proteins? Also suggest various efforts which may be taken to, maximize protein stability during such separation.   5

28. Why have restriction enzymes been so named? Only type II enzymes are used in recombinant DNA technology, why? With an example, illustrate

   (a)   a blunt end cutter

   (b)   a sticky end cutter   5

QUESTION PAPER CODE 99
SECTION A

1. Name the bacterium toxin which is used to engineer crops resistant to bollworms.   1

2. How would you grow a bacterium in the laboratory which has been isolated from a hot spring?   1

3. Animal cells in a culture medium were placed in a regular incubator used for growing bacterial cells. Do you expect the animal cells to grow or not?   1

4. In micropropagation apical meristems are used for raising virus-free plants. Why?   1

5. A given microbial species grows slowly. Of the two - specific growth rate (μ) or doubling time (t), which one would be lower?   1

SECTION B

6. CHO animal cell line is used to express r-HuEPO. Why? What is the function of this protein?   2

7. Indicate any two Bioinformatics databases and their uses.   2

8. Write the structure of a dideoxynucleotide triphosphate and its role in DNA sequencing.   2

9. Why is 'curd' considered beneficial? 2

10. Briefly list the features of finite cell lines and continuous cell lines. 2

11. Differentiate between somaclones and gametoclones. 2

12. Indicate the use of the following in microbial cell cultures: 2

    (a) Aeration, (b) Agar, (c) Antifoams, (d) Corn-steep liquor.

13. Genome analysis has the potential to identify patients with disease susceptibilities.
    Explain. 2

14. Highlight the principle of 'insertional inactivation'. 2

15. How does the charge -relay system operate in the enzyme Chymotrypsin? 2

SECTION C

16. How is transformation of plant tissue achieved using *Agrobacterium tumefaciens* ?
    Indicate the salient steps. 3

17. Outline the steps and principles involved in isolating Streptomycin, an extracellular
    microbial product. 3

18. Schematically depict the steps involved in Fluorescence In Situ Hybridization (FISH). 3

19. In the diagnosis of tuberculosis, the older methods depended on culturing the causative
    bacillus from sputum. Newer methods include PCR-based assays. With the help of
    a diagram explain the principle of PCR-based assay. How is it more effective than
    culturing methods? 3

20. Describe protoplast culture and its applications. 3

21. Thalassaemic patients produce excess alpha or beta sub-units of haemoglobin leading
    to impaired oxygen binding capacity by their erythrocytes. How can it be determined
    as to which sub-unit is produced in excess? 3

22. Describe three vectorless DNA transfer methods. 3

23. Why are sequence databases important? Name atleast three such databases and their
    uses. 3

24. A given recombinant protein is expressed intracellularly in E. coli. Which culturing method is best suited for obtaining maximum yield of this protein? Explain.   3

OR

Differentiate between fed-batch and continuous microbial culture.   3

25. Foot and Mouth Disease Virus (FMDV) vaccine is made by growing the virus in animal cells, breaking the cells, harvesting the virus and finally inactivating it before vaccine formulation. Based on the data given below, calculate the packed volume and weight of virus harvested: 3

   (a)   Total bioreactor/fermentor volume $= 2000$ L
         (atleast 20% space must be kept for oxygen and CO_2)

   (b)   No. of animal cells in culture $= 105/mL$.

   (c)   No. of virus particles per animal cell $= 50$

   (d)   Molecular mass of virus $= 10^6$ (1 million)
         (Assume virus is a sphere of radius 1 nm)

SECTION D

26. What are the advantages of whole genome sequencing projects? How is gene prediction carried out in such projects using computational tools?   5

OR

What is meant by the term "genomics"? Differentiate between structural and functional genomics.   5

27. One of the first examples of molecular disease was sickle cell anaemia. Describe the technique which was used to establish this discovery.   5

28. With a suitable diagram, explain how RFLP technique is useful for differentiating DNA sequences.   5

OR

How is a cDNA library generated and what are its uses?   5

Marking Scheme ó Biotechnology

> ***General Instructions***
>
> 1. All questions are compulsory.
>
> 2. There is no overall choice. However, an internal choice has been provided in one question of three marks and two questions of five marks. You have to attempt only one of the choices in such questions. Question paper contains four sections - A, B, C and D.
>
> 3. Questions number 1 to 5 are very short answer questions, carrying 1 mark each.
>
> 4. Questions number 6 to 15 are short answer questions, carrying 2 marks each.
>
> 5. Questions number 16 to 25 are also short answer questions, carrying 3 marks each.
>
> 6. Questions number 26 to 28 are long answer questions, carrying 5 marks each.
>
> 7. Use of calculators is not permitted. However, you may use log tables, if necessary.

QUESTION PAPER CODE 99/1
EXPECTED ANSWERS/VALUE POINTS

Q1. Bt toxin gene/cry gene can be introduced into the cotton plant.   1

Q2. Maintain cultures at higher temperatures.   1

Q3. Serum/FCS an essential component of animal cell culture media must be added.   1

Q4. Generally meristems are virus free.   1

Q5. Specific growth rate 'μ' will be higher.   1

Q6. Factor VIII is a blood clotting factor.   1

Animal cell lines are required to produce large amounts/post translational modifications. 1

Q7. Homologous genes are descended from a common ancestor. 1

Paralogous genes are duplications within a species/genome. 1

Q8. DNA fragments are separated by agarose gel electrophoresis based on size and transferred to a nitrocellulose membrane. 1

The transferred sequences can be hybridised with DNA probes and specific genes/ sequences can be detected. 1

Q9. Whey causes elevation of glutathione which plays a role in detoxification of xeno-biotics/oxygen intermediates/free radicals. 1

Whey is used for treatment of diseases like jaundice etc. 1

Q10. Animal cell cultures show contact inhibition/finite life span/anchorage dependence (any two). 1 + 1= 2

Q11. Haploids have single set of chromosomes/karyotype/n and triploids have three sets/ 3n. 1

Haploids are used for expression of recessive traits and triploids are used for producing sterile plants/seedless fruits. ½ + ½ = 1

Q12. Liquid nitrogen is used for low temperature storage.

Agar is used for making solid culture media.

Nitrosoguanidine is used for generating mutations.

Glycerol is a cryopreservant/prevents ice crystal formation. ½ x 4 = 2

Q13. Single Nucleotide Polymorphism. 1

SNPs used in prediction of disease/ forensic science/population genetics. 1

Q14. Genes are cloned in vectors which use ß-galactosidase activity as a marker. If enzyme activity is there, a colorless substrate x-gal is hydrolysed to a blue color; however if the ß-gal/lac z' gene is interrupted (insertional inactivation) a white colony results. 2

Q15. Asp 102, His 57 and Ser 195 lie in this order forming a charge relay; 1

The negatively charged aspartate carboxylate residue pulls the serine –OH proton through his, leaving it with a negative charge. Same can be depicted diagrammatically.   1

Q16. A.tumefaciens has a natural ability to infect plants at a wound site.   1

It has a Ti or tumour inducing plasmid.   1

T DNA is transferred into plant cell.   1

Q17. (a)   Centrifugation: removes material difficult to sediment.   1

(b)   Ultrafiltration: Passing broth through filters to remove cells/debris for obtaining clear filtrate.   1

(c)   Minimising steps: Cost effective/ less denaturation of protein higher yield.   1

Q18. Genomics includes mapping, sequencing and analysing genomes of all species.   1

Structural genomics: Assembly/ organisation/ management of DNA sequences.   1

Functional genomics: Biological function/interaction of genes.   1

Q19. (a)   BAC/YAC vector can be used.   1

(b)   Vector containing a MCS(multiple cloning site)/polylinker with that restriction site can be used/ Diagram on pg. 55 can be given.   2

Q20. Disadvantages of vegetative propagation- labour intensive/low productivity/seasonal (any two).   ½ + ½ = 1

Micropropagation is rapid/any other application.   1

Steps- initiation, shoot formation, root formation and transplantation.   1

Q21. Autopsy samples from normal and diseased brain taken as source sample.   ½

Samples subjected to 2D gel electrophoresis, pg.16 & 17.   2

Comparison of stained gels to identify abnormal protein.   ½

Q22. 1. Origin of replication, 2. Selection markers, 3. Restriction sites.

Briefly write about their importance.   1 x 3= 3

Or

Phage based vectors better due to natural infectivity and larger insert capacity. 2

M13 phage can provide single strand DNA required for sequencing. 1

Q23. Macromolecular sequences first compiled in this Atlas. 1

Development of computer methods for comparison of protein sequences. 1

Detection of various features from sequences like duplications, evolutionary histories, alignments. 1

Q24. Description of any two- Batch culture, fed batch culture, continuous culture.pg.105. 1½+1½

Q25. Culture volume = 80/100 x 1000 = 800L ½

No. of animal cells = 10^5 x 1000 x 800 = 8 x10^{10}L ½

No. of virus particles = 50 x 8x 10^{10}= 4 x 10^{12}

10^6 g (M.wt) has 6.023 x 10^{23} virus.

Hence 4x10^{12} particles have wt. = 4x10^{12}x10^6/ 6.023 x 10^{23} = 0.667 x 10^{-5}g 1

Volume of one virus particle = $4/3\pi r3$= 4/3 x 22/7 x $1^3$$nm^3$

Volume of 4x 10^{12} particles = 1.67 x 10^{13} nm^3 1

Q26. Basic Local Alignment Search Tool. ½

Steps b to d as on pg. 93 1½ +1½ +1½

Or

EMBL, SWISS-PROT, PDB, Ribosomal RNA database, PALI with details pg.94. 1x5

Q27. Primary, secondary, tertiary and quaternary structure with details, pg. 9. 2

Covalent- disulfide bonds. 1

Non-covalent- hydrogen, Van der Waals, hydrophobic, ionic. 2

Or

Aqueous two phase partition with diagram on pg.22. 2

Stabilising steps 1-5 (any three)pg. 23. 3

Q28. Restrict growth of phages in bacteria. 1

Type II restriction enzymes recognise and cut within sequence. 1

Blunt end cutter- Sma I/any other with diagram, pg.46. 1½

Sticky end cutter- Eco RI/any other with diagram, pg.46. 1½

QUESTION PAPER CODE 99
EXPECTED ANSWERS/VALUE POINTS
SECTION A

Q1. Bt /cry gene product/CRY 1

Q2. Grow culture at higher temperature. 1

Q3. No, animal cells need a CO_2 incubator. 1

Q4. These are virus free. 1

Q5. Specific growth rate 'μ' is lower. 1

Section B

Q6. CHO cell lines provide appropriate post-translational modifications. 1

EPO, stimulates erythrocyte proliferation. 1

Q7. EMBL/EBI/NCBI/PIR (any two) and their uses. Pg. 87/94 1 + 1

Q8. Structure as on pg.64. 1

Prevents addition of new nucleotide on 3' end terminating DNA synthesis. 1

Q9. Contains beneficial bacteria(probiotics) to manage intestinal infections/rich source of whey which elevates glutathione. 2

Q10. Finite cell lines have limited life span/contact inhibition/anchorage dependence,(any two Continuous cell lines have limited life span/no contact inhibition/anchorage in-dependant/doubling time low etc.(any two) pg. 146. 1 + 1

Q11. Somaclones are from somatic tissue; gametoclones are from pollen or egg. 1 + 1

Q12. (a) Improves oxygen availability for growth.

(b) Used for solidifying media.

(c) Prevents foaming.

(d) Source of Nitrogen.   ½ x 4 = 2

Q13. SNPs/sequences are identified for probable association with disease and other
susceptibilities.   2

Q14. Sequence/insert cloned into vectors within genes of antibiotic resistance/ß- galac-
tosidase enzyme leading to loss of function   2

Q15. In the 3D structure of chymotrypsin asp 102, his 57 and ser 195 are close together
allowing a charge relay to form; the negative charge of asp causes a negative charge
on ser through his/diagram can also be drawn to indicate the same.   2

Section C

Q16. Ti plasmid engineered to carry the relevant gene is used to transform *A.tumefaciens*
which then infects the plant/plant cell using its natural ability to be transferred. Pg.127
for diagram/details.   3

Q17. Steps- fermentation,filtration,clear broth subject to liquid extraction/chromatography,
concentration,purification and crystallisation.pg. 111.   3

Q18. Flourescent nucleotides introduced at selective genes/sequences in chromosomes
by nick translation and analysis. Details on pg.83.   3

Q19. Amplification of gene sequences specific to M.tb using diagram,pg. 60. Technique
is more rapid and sensitive.   1+2

Q20. Generate protoplasts by removing cell wall enzymatically, pg.122.   1

Uses- metabolic studies/ fusion of somatic cells/ making cybrids/ genetic manipulation
(any two).   2

Q21. Normal and thallasaemic erythrocytes obtained and their lysates analysed.   ½

Protein fingerprinting/2-D gel/MALDI-TOF/SDS-PAGE can identify if α or ß chain
is absent. Describe any one technique.   2½

Q22. Chemical mediated/microinjection/electroporation/particle gun (any three)pg.128.   3

Q23. EMBL, SWISS-PROT, PDB, Ribosomal RNA database, PALI (any three) with details pg.94.   1 x 3

Q24. Fed batch culture more useful. Details on pg. 105.   3

Or

Fed batch culture		Continuous culture
1.	Nutrients added without removal of culture.	Nutrients added with removal of culture.
2.	Volume increases.	Volume constant.
3.	Used for high cell density. biomass/metabolite production.	Used for

1 x 3

Q25. Culture volume = 80/100 x 2000 = 1600L   ½

No. of animal cells = 10^5 x 1000 x 1600 = 1.6 x10^{11}L   ½

No. of virus particles = 50 x 1.6 x 1011= 8 x 10^{12}

10^6 g (M.wt) has 6.023 x 10^{23} virus (Avagadro no.).

Hence 8x10^{12} particles have wt. = 8x10^{12}x10^6/ 6.023 x 10^{23} = 1.334 x 10^{-5}g   1

Volume of one virus particle = 4/3πr^3= 4/3 x 22/7 x $1^3 nm^3$

Volume of 8 x 10^{12} = 3.34 x 10^{13} nm^3 1

Section D

Q26. Provides basis for discovery of genes.

Serves as inventory of all genes.

Establishes relationship between genes.

Provides a set of tools for future experimentation.

Acts as index to draw and organise all genetic information.

Acts as an archive. Any four.pg.78.   1 x 4

Gene prediction can be done using various algorithms.   1

Or

Scientific discipline of mapping, sequencing and analysing genomes.	1
Structural genomics: Assembly, organisation and management of DNA sequences.	2
Functional genomics: Biological function of genes and their interaction.	2

Q27. Protein fingerprinting technique. Steps with diagram pg.15- 16 4

Identify peptide different from normal and sequence. 1

Q28. Restriction fragment length polymorphism. 1

Technique details, pg. 48. 3

Uses- forensic science/parentage dispute. 1

Or

cDNA is complementary to mRNA, made using reverse transcriptase. 1

Details of technique on pgs. 56- 57. 3

Useful for obtaining protein encoding genes with no introns. 1

INFORMATICS PRACTICES

Time allowed : 3 hours　　　　　　　　　　　　　　　　　*Maximum Marks : 70*

Instruction:

- Please chck that this quetion paper contains 8 printed pages.
- Code number given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- Please check that this question paper contains 7 questions.
- Please write down the serial number of the question before attempting it.
- 15 minutes time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. Form 10.15 a.m. to 10.30 a.m., the student will read the question paper only and not write any answer script during this period.

QUESTION PAPER CODE NO. 90/1

SECTION A

Q1　**Answer the questions after carefully reading the text.**

(a)　Ms. Taufiq Ahmed wants to prevent unauthorized access to/from his company's local area network. Write the name of a system (software/ hardware), which he should install to do the same　　　　1

(b)　Beauty Lines Fashion Inc. is a fashion company with design unit and market unit 135 metres away from each other. The company recently connected their LANs using Ethernet cable to share the stock related information. But after joining their LANs, they are not able to share the information due to loss of signal in between. Which device out of the following. should you suggest to be installed for a smooth communication?　　　　1

　　(i)　UPS

　　(ii)　Modem

　　(iii)　Repeater

(c)　which of the following is not a feature of Networking?　　　　1

　　(i)　Resource sharing

　　(ii)　Uninterrupted power supply

(iii)   Reduced cost

(iv)   Reliability

(d)   Name any two Indian scripts included in Unicode.   1

(e)   Mr. Jayanto Das is confused between Shareware and Open source software
       Mention at least two points of differences to help her understand the same.   2

(f)   Identify the type of Topology from the following: 2

       (i)   If each node is connected with the help of independent cable with the
              help of a central switching (communication controller)

       (ii)   If each node is connected with the help of a single co-axial cable.

(g)   Define the following with reference to Threats to Network Security.   2

       (i)   Trojan Horse

       (ii)   Worm

Q2   (a)   While working in Netbeans, Ms Kanta Surbhi wants to display 'Cleared' or
             'Re-attempt required' message depending the marks entered in jTextField.
             Help her to choose more appropriate statement out of 'If statement' and 'Switch
             statement'.   1

      (b)   Write a statement to make jTextArea1 as un-editable.   1

      (c)   Which HTML tags are used for making a table and adding rows in a HTML
             document?   1

      (d)   How is <UL> tag different from <OL> tag of HTML?   1

      (e)   What will be the value of A and B after execution of the following code: 2

             int A = 100, B ;

             for (B=10; B<=12; B++)

             {

                     A+=B;

             }

             JOptionPane. showMessageDialog (this, "A:"+A+"B:"+B+"") ;

      (f)   Differentiate between HTML and XML.   2

(g)   Write Java code that takes the price of a pencil from jTextField1 and quantity of pencils from jTextField2 and calculates total amount as price * quantity to be displayed in jTextField3 and also find 10% tax amount to be displayed in jTextField4.   2

Q3   (a)   Write MySql command will be used to open an already existing database "LIBRARY".   1

    (b)   The Mname Column of a table Members is given below: 2

Mname
Aakash
Hirav
Vinavak
Sheetal
Rajeev

Based on the information, find the output of the following queries:

(i)   Select Mname from members where mname like "%v";

(ii)   Select Mname from members where mname like "%e%";

    (c)   A table "TRAINS" in a database has degree 3 and cardinality 8. What is the number of rows and columns in it?   2

    (d)   Differentiate between Alternate key and Candidate key.   1

    (e)   Define data encapsulation with reference to Object Oriented Programming.   1

    (f)   An worker-Id consisting of 4 digits is stored in a string variable strWrkld. Now Mr. Jai wants to store this Id in integer type of variable IntWrkld Write a Java statement to do this.   1

    (g)   Sarthya, a student of class XI, created a table "RESULT". Grade is one of the column of this table. To find the details of students whose Grades have not been entered, he wrote the following MySql query. which did not give the desired result.   2

SELECT*FROM Result WHERE Grade = "Null";

Help Sarthya to run the query by removing the errors from the query and write the correct Query.

Q4 (a) What will be displayed in jTextField1 after executing the following code. 2

int N = 20;

N = N + 1;

If (N<21)

jTextField1.setText(Integer.toString(N+10));

else

jTextField1.setText(Integer.toString(N+15));

(b) Rewrite the following program code using a Switch statement. 2

if (code ==1)

Day = "Monday" ;

else if (code == 2)

Day = "Tuesday" ;

else if (code ==3)

Day = "Wednesday" ;

else if (code == 4)

Day = "Thursday" ;

else

Day = "No Match" ;

(c) What will be displayed In jTextArea1 after executing the following statement: 1

jTextAreal.setText("Live\nIn Peace\t and harmony") ;

(d) The following code has some error(s). Rewrite the correct code underlining all the corrections made: 2

Int P=3; sum = 0; //Declaring P and sum as Integer

{

Sum = P;

P += 3;

}

while (P=<12)

jTextField1 (Integer.tostring(sum)) ;

(e) Given a string object namely 'VALUE', having value as "324" stored in it. What will be result of the following: 1

JOptionPane.showMessageDialog(null,""+(Value.length()+ Integer.parseInt(value))) ;

(f) The following code has some error(s). Rewrite the correct code underlining all the corrections made: 2

int Total = 0, Jump = 5;

int I;

for (i = 0, I =<5, i ++)

{

    Jump+=5,

    Total +=Jump;

}

jTextAreal.showText (" " + Total) ;

(g) Mr. Ram Kishore, the owner of the Kiddi Land Enterprises has asked his programmer Saumya to develop the following GUI in Netbeans.

Mr. Ram accepts payment through three types of credit cards. The offer is given according to the following scheme:

Type of Card	Offer
Platinum	20% of amount
Gold	15% of amount
Silver	10% of amount

If the Bill amount is more than Rs.25,000/- then the customer gets an additional offer of 5%. Write the Java code for the following:

(a) To assign Additional offer as 0(jTextField4) and Net amount as 0 (jTextField5). Also set them as un-editable.

(b) [when "Calculate Offer"(JButton1) is clicked]

To calculate discount as per the given criteria and display the same in jTextField3. To assign Additional offer (jTextField4) as 5% of amount(jTextField2) as per the above condition.

To enable "Calculate Net Amount"(jButton2) button

(c) [When "Calculate Net Amount" (jButton2) is clicked]

To calculate net amount as [TotalCost(jTextField2)]-offer(jTextField3)

-Additional offer (jT extField4)]

To display the net amount in jTextField5

Q5 (a) What is the purpose of DROP TABLE command in MySql ? How is it different from DELETE command?　　　　2

(b) Table Employee has 4 records and Table Dept has 3 records in it. Mr. Jain wants to display all information stored in both of these related tables. He forgot to specify equi-join condition in the query. How many rows will get displayed on execution of this query?　　　　1

(c) Consider the table RESULT given below Write commands in MySql for (i) to (iv) and output for (v) to (vii):

Table : Result

No	Name	Stipend	Subjet	Average	Division
1	Sharon	400	English	38	THIRD
2	Amal	680	Mathematics	72	FIRST
3	Vedant	500	Accounts	67	FIRST
4	Shakeer	200	Informatics	55	SECOND
5	Anandha	400	History	85	FIRST
6	Upasna	550	Geography	45	THIRD

(i)   To list the names of those students, who have obtained Division as FIRST in the ascending order of NAME.   1

(ii)   To display a report listing NAME, SUBJECT and Annual stipend received assuming that the stipend column has monthly stipend.   1

(iii)   To count the number of students, who have either Accounts or Informatics as Subject.   1

(iv)   To insert a new row in the table EXAM:

        6, "Mohan", 500, "English", 73, "Second"

(v)   SELECT AVG (Stipend) FROM EXAM WHERE DIVISION = "THIRD" ;

(vi)   SELECT COUNT(DISTINCT Subject) FROM EXAM;

(vii)   SELECT MIN(Average) FROM EXAM WHERE Subject = "English";

Q6   a)   Write a MySQL command for creating a table "PAYMENT" whose structure is given below: 2

Table: PAYMENT

Field Name	Datatype	Size	Constraint
Loan_number	Integer	4	Primary key
Payment_number	Varchar	3	
Payment_date	Date		
Payment_amount	Integer	8	Not Null

b)   In a database there are two tables "Product" and "Client" as shown below: 2

Table: PRODUCT

P_ID	ProductName	Manufacture	Price
P001	Moisturiser	XYZ	40
P002	Sanitizer	LAC	35
P003	Bath Soap	COP	25
P004	Shampoo	TAP	95
P005	Lens Solution	COP	350

Table: Client

C_ID	ClientName	City	P_ID
01	Dreamz Disney	New Delhi	P002
05	Life Line Inc	Mumbai	P005
12	98.4	New Delhi	P001
15	Appolo	Banglore	P003

Write the commands in SQL queries for the following:

(i) To display the details of Product whose Price is in the range of 40 and 120 (Both values included)   1

(ii) To display the ClientName, City from table Client and ProductName and Price from table Product, with their corresponding matching P_ID

(iii) To increase the Price of all the Products by 20.

(c) In a Database School there are two tables Member and Division as show below.

Table: Member

Empld	Name	Pay	Divno
1001	Shankhya	34000	10
1003	Ridhima	32000	50
1002	Sunish	45000	20

Table: Division

Divno	Divname	Location
10	Media	TF02
20	Dance	FF02
30	Production	SF01

(i) Identify the foreign key in the table Member.   1

(ii) What output, you will get, when an equal-join query is executed to get the Name from Member Table and corresponding from Division table?

Q7 a) What is the impact of e-Learning sites on students learning process?   1

    b) Write two advantages of e-Business sites.   1

    c) Write three important features of e-Governance? Give URL of one of the
        commonly used e-Governance portal.   2

    d) Jaina is creating a form for her practical file. Help her to choose most
        appropriate controls from List Box, Combo Box, TextField, TextArea, Radio
        Button, Check box, Label and Command button for the following entries
        from user.   2

        (i)   A message "Enter Name" in front of a Text Field.

        (ii)   An input to choose more than one subjects from a set of given choices.

        (iii) An input for entering comments of user.

        (iv)   An input for accepting the residential area out of Rural and Urban as
               options.

INFORMATICS PRACTICES
QUESTION PAPER CODE 90

1. (a) Mr. Kant Sengupta wants to prevent unauthorized access to/from his
         company's local area network. Write the name of a system (software/
         hardware), which he should install to do the same.   1

    (b) Seven Brothers Fashion Inc. is a fashion company with design unit and market
         unit 130 meters away from each other. The company recently connected their
         LANs using ethernet cable to share the stock related information, But after
         joining their LANs they are not able to share the information due to loss of
         signal in between. Which device out of the following should you suggest to be
         installed for a smooth communication?   1

         (i)   Modem

         (ii)   Repeater

         (iii) UPS

    (c) Which of the following is not a feature of Networking?   1

         (i)   Resource Sharing

         (ii)   Reliability

(iii) Uninterrupted Power Supply

(iv) Reduced cost

(d) Name any two Indian scripts included in Unicode.   1

(e) Ms. Vidya Chauhan is confused between Proprietary Software and Open Source Software. Mention at least two points of difference to help her understand the same.   2

(f) Identify the type of Topology from the following   2

    (i) In it, each node is connected with the help of a single co-axial cable.

    (ii) In it. each node is connected with the help of independent cable with the help of a central switching (communication controller).

(g) Define the following with reference to Threats of Network Security: 2

    (i) Worm.

    (ii) Trojan Horse   .

2. (a) While working in Netbeans, Mr. Khorana wants to display 'Pass' or 'Needs to Reappear' message depending on the marks entered in jTextField. Help her to choose the more appropriate statement out of 'If statement' and 'Switch statement'.   1

(b) How one can make a Text Field un-editable on a Frame?   1

(c) Which HTML tags are used for making a table and adding rows in HTML document?   1

(d) How is <OL> tag different from <UL> tag of HTML?   1

(e) What will be the value of P and Q after execution of the following code?   2

int P, Q=100;

for (P=10; P<=12; P++)

{

    Q + P ;

}

JOptionPane.showMessageDiaog (this, "P:"+P+" Q:"+Q+"");

(f) Differentiate between XML and HTML. 2

(g) Write Java code that takes the cost of a pencil from jTextField1 and number of pencils from jTextField2 and calculates total amount as cost*number to be displayed in jTextField3 and 20% service tax out of total amount in jTextField4. 2

3. (a) Write MySql command that will be used to open an already existing database "CONTACTS. 1

(b) The Doc_name Column of a table Hospital is given below: 2

Doc name
Avinash
Hariharan
Vinayak
Deepak
Sanjeev

Based on the information, find the output of the following queries:

(i) SELECT doc_name FROM Hospital WHERE doc_name like "%v";

(ii) SELECT doc_name FROM Hospital WHERE doc_name like "%e%";

(c) A table "Transport" in a database has degree 3 and cardinality 8. 2

What is the number of rows and columns in it?

(d) Differentiate between Alternate key and Candidate key. 1

(e) Define a class with reference to object Oriented Programming. 1

(f) An employee_ld consisting of 5 digits is stored in a string variable strEmpld. Now Mr.Deb wants to store this Id in Integer type of variable InteEmpld. Write Java statement to do this. 1

(g) Sarthak, 'a students of class XII, created a table "Class". Grade is one of the columns of this table. To find the details of students whose Grades have not been entered, he wrote the following MySql query, which did not give the desired result: 2

SELECT * FROM Class WHERE Grade ="Null";

Help Sarthak to run the query by removing the errors from the query and write the correct query.

4   (a)   What will be displayed in of jTextField1 after executing the following code?   2

int m = 16 ;

m = m+l ;   .

if (m<15)

    jTextField.setText (Integer. toString (m)) ;

else

    jTextField.setText (Integer. toString (m+15)) ;

(b)   Rewrite the following program code using a Switch statement: 2

if (code ==1)

    Month = "January";

else if (code ==2)

    Month = "February";

else if (code==3)

    Month = "March";

else if (code==4)

    Month = "April";

else

    Month = "No Match";

(c)   What will be displayed in jTextArea1 after executing the following statement?   1
jTextAreal.setText ("cbse\nFinal_Exam \tIp") ; .

(d)   The following code has some errors(s). Rewrite the correct code underlining
all the corrections made: 2

Int k=2 ;Sum = 0; //Declaring k and sum as Integer

{

    sum = k ;

    k + = 2 ;

}

While (k=<20) ;

jTextFieldl (Integer.tostring(sum)) ;

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(e)   Given a String object namely 'subject' having value as "123" stored in it.
What will be result of the following?   1

JOptionPane.showMessageDialoge (null, " " +

(subject.length ( ) + Integer.parseInt (subject))) ;

(f)   The following code has some error(s). Rewrite the correct code underlining
all the corrections made:

int Sum=0, Step=5 ;

int I ;

for (i = 0, i =<5, i++)

{

        Step+=5,

        Sum+=Step ;

}

jTextAreal.showText{" "+Sum) ;

(g)   Mr. Radhey Shyam Bansal the owner of the Kiddi Land Enterprises has asked
his programmer Ekta to develop the following GUI in Netbeans:

Mr. Bansal accepts payment through three types of credit cards The discount is given according to the following scheme:

Type of Card	Discount
Platinum	20% of amount
Gold	15% of amount
Silver	10% of amount

If the Bill amount is more than Rs, 25,000, then the customer gets an additional discount of 5%. Write Java code for' the following:

(i)   To assign Additional Discount as 0 (jTextField4) and Net Amount as 0 (jTextField5). Also set them as un-editable.

(ii)   [When "Calculate Discount" (jButton1) is clicked]

To calculate discount as per the given criteria and display the same in jTextField3

To assign Additional Discount (jTextField4) as 5% of amount (jTextField2) as per the above condition.

To enable "Calculate Net Amount" (jButton2) button

(iii)   [When "Calculate Net Amount" (jButton2) button is clicked]

To calculate Net Amount as [TotalCost (jTextField2) - Discount (jTextField3) - Additional Discount (jTextField4)]

To display the Net Amount in jTextField5

5   (a)   What is the purpose of ALTER TABLE command in MySql? How is it different from UPDATE command?   2

(b)   Table Employee has 4 records and Table Dept has 3 records in it. Mr. Jain wants display all information stored in both of these related tables. He forgot to specify equi-join condition in the query, How many rows will get displayed on execution of this query?   1

(c)   Consider the EXAM given below. Write commands in MySql for (i) to (iv) and output for (v) to (vii).

Table: EXAM

No	Name	Stipend	Subjet	Average	Division
1	Karan	400	English	68	FIRST
2	Aman	680	Mathematics	72	FIRST
3	Javed	500	Accounts	67	FIRST
4	Bishakh	200	Informatics	55	SECOND
5	Sugandha	400	History	35	THIRD
6	Suparna	550	Geography	45	THIRD

(i)   To list the names of those students. who have obtained Division as FIRST in the ascending order of NAME.   1

(ii)   To display a report listing NAME, SUBJECT and Annual stipend received assuming that the stipend column has monthly stipend.   1

(iii)   To count the number of students, who have either Account or Informatics as Subject.   1

(iv)   To insert a new row in the table EXAM:

6 "Mohan", 500, "English", 73, "SECOND";

(v)   SELECT AVG (Stipend) FROM EXAM   1

WHERE DIVISION="THIRD";

(vi)   SELECT COUNT (DISTINCT Subject) FROM EXAM..   1

(vii)   SELECT MIN (Average) FROM EXAM

WHERE Subject = "English";

6   (a)   Write a MySql command for creating a table "BANK" whose structure is given below: 2

Table: BANK

Field Name	Datatype	Size	Constraint
Acct_number	Integer	4	Primary key
Name	Varchar	3	
BirthDate	Date		
Balance	Integer	8	Not Null

(b)   In a database there are two tables "ITEM" and "CUSTOMER" as shown below:

Table: ITEM

ID	ItemName	Company	Price
1001	Moisturiser	XYZ	40
1002	Sanitizer	LAC	35
1003	Bath Soap	COP	25
1004	Shampoo	TAP	95
1005	Lens Solutions	COP	350

Table: CUSTOMER

C_ID	CustomerName	City	ID
01	Samridhh Ltd	New Delhi	1002
05	Big Line Inc	Mumbai	1005
12	97,8	New Delhi	1001
15	Tom N Jerrv	Bangalore	1003

Write the commands in SQL queries for the following:

(i)   To display the details of Item, whose Price is in the range of 40 and 95 (Both values included).   1

(ii)   To display the CustomerName. City from table Customer, and ItemName and Price from table item, with their corresponding matching ID.   2

(iii) To increase the Price of al the Products by 50.   2

(c)   In a Database School there are two tables Employee and Dept as shown below:

Table: Employee

Empld	Name	Sal	Deptno
T001	Vishakha	34000	10
T001	Mridul	32000	50
T001	Manish	45000	20

Table: Dept

Deptno	DName	Locaionld
10	Lights	HH02
20	Dance	FF02
30	Production	AB01

(i) Identify the foreign key in the table Employee. 1

(ii) What output, will you get, when an equi-Join query is executed to get the NAME from Employee table and corresponding DNAME from Dept table? 1

7. (a) Give one social impact of e-Business. 1

(b) Write two advantages of e-Learning sites. 1

(c) Write three important features of e-Governance. Give URL of one of the commonly used - eGovernance portals. 2

(d) Anuja is creating a form for her practical file. Help her to choose most appropriate controls from List Box, Combo Box, TextField, TextArea, Radio Button, Check box, Label and Command button for the following entries from user: 2

    (i) A message "Enter Marks" in front of a Text Field.

    (ii) An input to choose more than one subject from a set of choices.

    (iii) An input for entering remarks

    (iv) An input for accepting Gender.

MARKING SCHEME – INFORMATICS PRACTICES

General Instructions :

- **All answers provided in the marking scheme are SUGGESTIVE.**

- **Examiners are requested to accept all possible alternative correct answers.**

- **Semicolon termination and case sensitivity to be ignored in MySQL statements.**

- **All equivalent MySQL commands for a given query must be accepted.**

- **Both single quotes and double quotes are acceptable in MySQL commands.**

QUESTION PAPER CODE 90/1
EXPECTED ANSWERS

Q1   Answer the questions after carefully reading the text.

(a)   Ms. Taufiq Ahmed wants to prevent unauthorized access to/from his company's local area network. Write the name of a system (software/ hardware), which he should install to do the same   1

Ans: Firewall or Intrusion Detection System

(1 mark for correct answer)

(b)   Beauty Lines Fashion Inc. is a fashion company with design unit and market unit 135 metres away from each other. The company recently connected their LANs using Ethernet cable to share the stock related information. But after joining their LANs, they are not able to share the information due to loss of signal in between. Which device out of the following. should you suggest to be installed for a smooth communication?   1

      (i)   UPS

      (ii)   Modem

      (iii)   Repeater

Ans: Repeater

(1 mark for correct answer)

(c)   which of the following is not feature of Networking?   1

      (i)   Resource sharing

(ii)   Uninterrupted power supply

(iii)   Reduced cost

(iv)   Reliability

Ans: Uninterrupted power supply

(1 mark for correct answer)

(d)   Name any two Indian scripts included in Unicode.   1

Ans: Devnagari, Bengali, Gurmukhi, Gujarati, Kannada, Malayalam, Oriya, Tamil, Arabic, Telugu

(mark each for naming any two correct Indian scripts)

(e)   Mr. Jayanto Das is confused between Shareware and Open source software Mention at least two points of differences to help her understand the same.   2

Ans:

Shareware	Open source software
Is a proprietary software	Is not proprietary software i.e. it does not belong to any person or organization.
Source code is not available to the users free of cost	Source code is available to the users.
It is provided to users without payment on a trial basis and is often limited by any combination of functionality, availability or convenience.	It is provided to users without payment

(1 mark each for any two correct differences)

(f)   Identify the type of Topology from the following: 2

(i)   If each node is connected with the help of independent cable with the help of a central switching (communication controller)

(ii)   If each node is connected with the help of a single co-axial cable.

Ans: (i)   Star Topology

(ii)   Bus Topology

(1 mark for each correct answer)

(g)   Define the following with reference to Threats to Network Security.   2

     (i)   Trojan Horse

     (ii)   Worm

Ans: **Trojan Horse**

- Appears to perform a desirable function for the user

- Steals information through a 'backdoor' /Records browsing activities without the knowledge of the user

- Causes system crash or freeze

Worm

- Self-replicating malware without user intervention

- Consumes high volume of bandwidth leading to Denial of service (DoS)

(1 mark for any 1 point under each definition)

Note: Any relevant explanation with regards to **Threats to Network Security** also to be considered as **the correct answer.**

Q2   (a)   While working in Netbeans, Ms Kanta Surbhi wants to display 'Cleared' or 'Re-attempt required' message depending the marks entered in jTextField. Help her to choose more appropriate statement out of 'If statement' and 'Switch statement'.   1

Ans: IF statement

(1 mark for identifying IF as the correct statement)

(b)   Write a statement to make jTextArea1 as un-editable.   1

Ans: jTextAreal.setEditable (false) ;

(1 mark for the correct answer)

(c)   Which HTML tags are used for making a table and adding rows in a HTML document?   1

Ans: <TABLE></TABLE> tags are used for making a table.

<TR></TR> are used for adding rows in a HTML document.

(mark each for naming both tags)

Note: Mentioning only <TABLE> and <TR> also acceptable

(d)   How is <UL> tag different from <OL> tag of HTML?   1

Ans: <UL> [stands for unordered list] OR [used to display a bulleted list].

        <OL> [stands for ordered list] OR [used to display an ordered/numbered list].

        (1 mark for anyone correct difference)

(e)   What will be the value of A and B after execution of the following code: 2

        int A = 100, B ;

        for (B=10; B<=12; B++)

        {

                A+=B;

        }

        JOptionPane. showMessageDialog (this, "A:"+A+"B:"+B+"") ;

Ans: A:133 B:13

        (1 mark each for correct value of A and B)

(f)   Differentiate between HTML and XML.   2

Ans:

HTML	XML
Defines how webpage is displayed	Defines, stores and retrieves the data
HTML tags are predefined	XML tags are not predefined.
New tags cannot be defined	New tags can be created as per need
HTML tags may not have closing tag	XML tags must have a closing tag.
HTML tags are not case-sensitive.	XML tags are case-sensitive.

        (1 mark each for any 2 correct differences)

(g)   Write Java code that takes the price of a pencil from jTextField1 and quantity
        of pencils from jTextField2 and calculates total amount as price * quantity to
        be displayed in jTextField3 and also find 10% tax amount to be displayed in
        jTextField4.   2

Ans: float Price = Float.parseFloat(jTextField1.getText ());

        int Qty=Integer.parseInt(jTextField2.getText());

float Amt= Price* Qty;

float Tax= Amt*0.l;

jTextField3.setText(""+Amt) ;

jTextField4.setext(""+Tax) ;

(mark for correctly storing the value of price and quantity)

(mark for correct calculation of total amount)

(mark for correct calculation of tax)

(mark for correct displaying of values in TextField3 and TextField4)

Note: double/int Data type may also be accepted for price

Q3 (a) Write MySql command will be used to open an already existing database "LIBRARY". 1

Ans: USE LIBRARY;

(1 mark for correct answer)

Note: Mentioning only USE command is also acceptable.

(b) The Mname Column of a table Members is given below: 2

Mname
Aakash
Hirav
Vinavak
Sheetal
Rajeev

Based on the information, find the output of the following queries:

(i) Select Mname from members where mname like "%v";

(ii) Select Mname from members where mname like "%e%";

Ans: (i) Hirav

Rajeev

(ii)   Sheetal

        Rajeev

(i)   (1/2 mark each for correct line of output)

(ii)   (1/2 mark each for correct line of output)

(c)   A table "TRAINS" in a database has degree 3 and cardinality 8. What is the number of rows and columns in it?   2

Ans: 8

        3

(1 mark for each correct answer)

(d)   Differentiate between Alternate key and Candidate key.   1

Ans:

Alternate Key	Candidate Key
A key that can act as a primary key but is not selected as primary key	A key that can be set as Primary key is called a candidate key.

(1 mark for any correct difference/definition)

OR

(1 mark for illustrating with example)

(e)   Define data encapsulation with reference to Object Oriented Programming.   1

Ans: The wrapping up of data and functions into a single unit (called class) is known as data encapsulation.

(1 mark for any correct definition)

(f)   A worke_ld consisting of 4 digits is stored in a string variable strWrkld. Now Mr. Jai wants to store this Id in integer type of variable IntWrkld Write a Java statement to do this.   1

Ans: IntWrkId = Integer.parseInt (strWrkId) ;

(1 mark for correct answer)

(Declaration of IntWrkld as int is optional)

(g)   Sarthya, a student of class XI, created a table "RESULT". Grade is one of the column of   this table. To find the details of students whose Grades have not been entered, he wrote the following MySql query. which did not give the desired result.   2

SELECT*FROM Result WHERE Grade = "Null";

Help Sarthya to run the query by removing the errors from the query and write the correct Query.

Ans: SELECT * FROM Result WHERE Grade IS NULL;

(2 marks for correct answer)

Q4   (a)   What will be displayed in jTextField1 after executing the following code.   2

int N = 20;

N = N + 1 ;

If (N<21)

    jTextField1.setText(Integer.toString(N+10));

else

    jTextField1.setText(Integer.toString(N+15));

Ans: 36

(2 marks for correct answer)

(b)   Rewrite the following program code using a Switch statement.   2

if (code ==1)

    Day = "Monday" ;

else if (code == 2)

    Day = "Tuesday" ;

else if (code ==3)

    Day = "Wednesday" ;

else if (code == 4)

    Day = "Thursday" ,

else

    Day = "No Match" ;

Ans: switch (code)

{

case 1 : Day = "Monday" ;
         break ;

case 2 : Day = "Tuesday" ;
         break ;

case 3 : Day = "Wednesday" ;
         break ;

case 4 : Day = "Thursday" ;
         break ;

default : Day = "No Match" ;

}

(mark for switch)

(mark for case labels)

(mark for break)

(mark for default)

(c) What will be displayed In jTextArea1 after executing the following statement: 1

jTextAreal.setText("Live\nIn Peace\t and harmony") ;

Ans. Live

In Peace <tab> and harmony

(1 mark for correct output)

(mark if '\n' and/or ' \t' not taken into account)

(d) The following code has some error(s). Rewrite the correct code underlining
all the corrections made: 2

Int P=3; sum = 0; //Declaring P and sum as Integer

{

    Sum = P;

    P += 3;

}

while (P=<12)

jTextField1 (Integer.tostring(sum)) ;

Ans: int P=3, sum=0; // Declaring P and sum as Integer

do

{

    sum = P;

    P + = 3; | sum = sum + P or sum+ = P is also acceptable |

} whi1e(P<=12);

jTextField1.setText (Integer.toString (sum));

(*½ mark each for correcting any four errors*)

OR

(*1 mark for only identifying any four errors - without making any correction*)

(e)   Given a string object namely 'VALUE', having value as "324" stored in it.
What will be result of the following: 1

JOptionPane.showMessageDialog(null,""+(Value.length()+
Integer.parseInt(value))) ;

Ans: 327

(*1 mark for correct answer*)

(f)   The following code has some error(s). Rewrite the correct code underlining
all the corrections made: 2

int Total = 0, Jump = 5;

int I;

for (i = 0, I =<5, i ++)

{

    Jump+=5,

    Total +=Jump;

}

jTextAreal.showText (" " + Total) ;

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Ans: int Total = 0, Jump = 5;

int I ;

for (I=0 ; 1<=5 ; I++) | Using 'i' everywhere is acceptable |

{

    Jump+ = 5 ;

    Total + = Jump ;

}

jTextAreal.setText (" " + Total) ;

(mark each for identifying and correcting 4 errors)

OR

(1 mark for only identifying 4 errors- without making any correction)

(g) Mr. Ram Kishore, the owner of the Kiddi Land Enterprises has asked his programmer Saumya to develop the following GUI in Netbeans.

Mr. Ram accepts payment through three types of credit cards. The offer is given according to the following scheme:

Type of Card	Offer
Platinum	20% of amount
Gold	15% of amount
Silver	10% of amount

If the Bill amount is more than Rs.25,000/- then the customer gets an additional offer of 5% Write the Juva code for the following :

(a) To assign Additional offer as 0(jTextField4) and Net amount as 0 (jTextField5). Also set them as un-editable.

(b) [when "Calculate Offer"(JButton1) is clicked]

To calculate discount as per the given criteria and display the same in jTextField3 To assign Additional offer (jTextField4) as 5% of amount(jTextField2) as per the above condition.

To enable "Calculate Net Amount"(jButton2) button

(c) [When "Calculate Net Amount" (jButton2) is clicked]

To calculate net amount as [TotalCost(jTextField2)]-offer(jTextField3)

-Additional offer (jT extField4)]

To display the net amount in jTextField5

Ans:

g(a) jTextField4.setText("0") ;   1

jTextField5.setText("0");

jTextField4.setEditable(false);

jTextField5.setEditable(false);

(*mark for assigning 0 to anyone of the text fields)*

(*mark for setting anyone as un-editable)*

g(b) double Offer, Aoffer ;   2

int Amount = Integer.parseInt(JTextField2.getText ( ));

if (jRadioButton1.isSelected ( ) == true)

Offer = 0.2*Amount; | If (jRadioButton1.isSelected ()) also accepted |

else if(jRadioButton2.isSelected ( ) == true)

Offer = 0.15*Amount ;

else if (jRadioButton3.isSelected ( ) == true)

Offer = 0.1*Amount ;

jTextField3.setText ("""+0ffer) ;

if (Amount>25000)

Aoffer=0.5*Amount ;

jTextField4.setText (""+Aoffer);

jButton2.setEnabled(true);

(1 mark for calculating discount correctly)

(mark for additional discount)

(mark for enabling the button)

(Any Object names are acceptable for JRadioButton objects)

Note: Use of wrapper class like Integer etc. for converting to string is acceptable

g(c) int AmoUut = Integer.parseInt(jTextField2.getText( )) ;

double Offer = Double.parseDouble(jTextField3.getText( )) ;

double Aoffer = Double.parseDouble (jTextField4.getText ( )) ;

double Total = Amount-Offer-Aoffer;

jTextField5.setText(""+Total) ;

(markior getting the value from textfield)

(1 mark for calculating the net amount)

(mark for displaying the net amount)

Note: Use of wrapper class like Integer etc. for converting to string is acceptable

Q5 (a) What is the purpose of DROP TABLE command in MySql ? How is it different from DELETE command?   2

Ans: The DROP command is used to remove a table

Difference:

- DELETE command removes rows from a table while DROP TABLE removes the table (rows as well as the structure)

- DELETE is a DML command while DROP TABLE is a DOL command

● The effect of DELETE command can be rolled back while the effect of DROP TABLE cannot be rolled back

(1 mark for purpose of DROP TABLE command)

(1 mark for anyone difference between DROP TABLE and DELETE commands)

(b)   Table Employee has 4 records and Table Dept has 3 records in it. Mr. Jain wants to display all information stored in both of these related tables. He forgot to specify equi-join condition in the query. How many rows will get displayed on execution of this query?   1

Ans: 12

(1 mark for correct answer)

(c)   Consider the table RESULT given below Write commands in MySql for (i) to (iv) and output for (v) to (vii)

Table Result

No	Name	Stipend	Subjet	Average	Division
1	Sharon	400	English	38	THIRD
2	Amal	680	Mathematics	72	FIRST
3	Vedant	500	Accounts	67	FIRST
4	Shakeer	200	Informatics	55	SECOND
5	Anandha	400	History	85	FIRST
6	Upasna	550	Geography	45	THIRD

(i)   To list the names of those students, who have obtained Division as FIRST in the ascending order of NAME.   1

Ans: SELECT Name FROM Result

WHERE Division = 'FIRST'

ORDER BY Name;

(mark for SELECT with WHERE clause)

(mark for ORDER BY)

Note: LIKE operator is also acceptable

(ii)   To display a report listing NAME, SUBJECT and Annual stipend received
        assuming that the stipend column has monthly stipend.   1

Ans: SELECT Name, Subject, Stipend * 12 FROM Result;

        (mark for selecting columns)

        (mark for computing annual stipend)

(iii) To count the number of students, who have either Accounts or Informatics as
        Subject.   1

Ans: SELECT COUNT(*) FROM Result WHERE Subject = 'Accounts' OR
        Subject = 'Informatics';

        OR

        SELECT COUNT (*) FROM Result WHERE Subject

        IN ('Accounts', 'Informatics');

        (' mark for using count( ))

        (mark for WHERE Clause)

        Note: LIKE operator is also acceptable

        Note:

        **For parts (iv) to (vii) full 4 marks to be awarded if Non existence of
        table Exam is identified.**

        Or

        **Exam table is considered as a new table consisting of only 1 tuple and
        answers provided are correct.**

(iv)   To insert a new row in the table EXAM:

        6, "Mohan", 500, "English", 73, "Second"

Ans: INSERT INTO Result

        VALUES (6,'Mohan' , 500, 'English' , 73, 'Second');

        OR

        INSERT INTO Result (<column list>)

        VALUES(6, 'Mohan', 500, 'English', 73, 'Second') ;

        (½ mark for INSERT INTO)

        (½ mark for writing VALUES in correct order)

(v)   SELECT AVG (Stipend) FROM EXAM WHERE DIVISION = "THIRD" ;

Ans: 475

(1 mark for correct answer)

(vi) SELECT COUNT(DISTINCT Subject) FROM EXAM;

Ans: 6

(1 mark for correct answer)

(vii) SELECT MIN(Average) FROM EXAM WHERE Subject = "English";

Ans: 38

(1 mark for correct answer)

Q6   a)   Write a MySQL command for creating a table "PAYMENT" whose structure
          is given below: 2

Table: PAYMENT

Field Name	Datatype	Size	Constraint
Loan_number	Integer	4	Primary key
Payment_number	Varchar	3	
Payment_date	Date		
Payment_amount	Integer	8	Not Null

Ans: CREATE TABLE PAYMENT

      (

            Loan_number INTEGER(4) PRIMARY KEY ,

            Payment_number VARCHAR(3) ,

            Payment_date DATE ,

            Payment_amount INTEGER (8) NOT NULL

) ;

(1/2 mark for CREATE TABLE)

(1/2 mark for fields with data types)

(1/2 mark for PRIMARY KEY constraint)

(1/2 mark for NOT NULL constraint)

b) In a database there are two tables "Product" and "Client" as shown below: 2

Table: PRODUCT

P_ID	ProductName	Manufacture	Price
P001	Moisturiser	XYZ	40
P002	Sanitizer	LAC	35
P003	Bath Soap	COP	25
P004	Shampoo	TAP	95
P005	Lens Solution	COP	350

Table: Client

C_ID	ClientName	City	P_ID
01	Dreamz Disney	New Delhi	P002
05	Life Line Inc	Mumbai	P005
12	98.4	New Delhi	P001
15	Appolo	Banglore	P003

Write the commands in SQL queries for the following:

(i) To display the details of Product whose Price is in the range of 40 and 120 (Both values included) 1

Ans SELECT * FROM Product WHERE Price BETWEEN 40 AND 120;

OR

SELECT * FROM Product WHERE Price >= 40 AND Price <= 120;

(*mark for SELECT)*

(*mark for BETWEEN/WHERE Clause)*

(ii) To display the ClientName, City from table Client and ProductName and Price from table Product, with their corresponding matching P_ID

Ans: SELECT Clientname, City, Productname, price, P_ID

FROM Product, Client

WHERE Client.P_ID = Product.P_ID;

(iii)　To increase the Price of all the Products by 20.

Ans:　UPDATE Product

　　　SET Price = Price + 20;

(c)　In a Database School there are two tables Member and Division as show below.

Table: Member

Empld	Name	Pay	Divno
1001	Shankhya	34000	10
1003	Ridhima	32000	50
1002	Sunish	45000	20

Table: Division

Divno	**Divname**	**Location**
10	Media	TF02
20	Dance	FF02
30	Production	SF01

(i)　Identify the foreign key in the table Member.　　　　　　　　　　1

Ans:　Divno

(ii)　What output, you will get, when an equal-join query is executed to get the Name from Member Table and corresponding from Division table?

Name	Divname
Shankhya	Media
Sunish	Dance

OR

Name	Location
Shankhya	TF02
Sunish	FF02

OR

Name	Di vname	Location
Shankhya	Media	TF02
Sunish	Dance	FF02

(1 mark for providing any of the above outputs)

OR

(1 Mark for providing any output from the tables mentioned above OR writing that the corresponding join column not available)

OR

(1 mark if Q6(i) is correct)

Q7   a)   What is the impact of e-Learning sites on students learning process?   1

Ans: •   Students can learn at their own pace.

      •   A lesson can be revised any number of times at students' convenience.

      •   Students can learn lessons at their homes at their convenient time.

      (1 mark for anyone correct point)

      b)   Write two advantages of e-Business sites.   1

Ans: •   Goods sold through e-business are generally cheaper as cost incurred in e-business is less compared to setting up a traditional business.

      •   Customers can receive highly customizable service.

      •   Even Remote area customers are reached in e-business.

      •   Sellers have better understanding of their customers' needs as customers communicate through e-mails.

      (mark each for any two correct points)

c) Write three important features of e-Governance? Give URL of one of the commonly used e-Governance portal. 2

Ans: • Provides citizens access to information about the processes and services

• Facilitates a speedy, transparent, accountable and efficient process for performing government administrative activities.

• Uses modern information and telecommunication technologies such as internet, Local area networks to enhance efficiency

• A lot of productive time of government servants and general public is saved.

e-Governance portal :

• www.incometaxindia.gov.in

• supremecourtofindia.nic.in

• passport.gov.in

• https://www.irctc.co.in

(mark each for any three correct features)

(mark for anyone correct e-Governance portal)

d) Jaina is creating a form for her practical file. Help her to choose most appropriate controls from List Box, Combo Box, TextField, TextArea, Radio Button, Check box, Label and Command button for the following entries from user. 2

(i) A message "Enter Name" in front of a Text Field.

Ans Label

(ii) An input to choose more than one subjects from a set of given choices.

Ans. ListBox/Check Box .

(iii) An input for entering comments of user.

Ans. TextArea (Most Appropriate answer]

TextField [Also acceptable]

(iv) An input for accepting the residential area out of Rural and Urban as options.

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Ans. RadioButton/ComboBox [Most Appropriate answer]

TextField [Also acceptable]

(mark each for correct answers)

QUESTION PAPER CODE 90
EXPECTED ANSWERS

1. (a) Mr. Kant Sengupta wants to prevent unauthorized access to/from his company's local area network. Write the name of a system (software/ hardware), which he should install to do the same.   1

Ans Firewall or Intrusion Detection System

(1 mark for correct answer)

(b) Seven Brothers Fashion Inc. is a fashion company with design unit and market unit 130 meters away from each other. The company recently connected their LANs using ethernet cable to share the stock related information, But after joining their LANs they are not able to share the information due to loss of signal in between. Which device out of the following should you suggest to be installed for a smooth communication?   1

(i) Modem

(ii) Repeater

(iii) UPS

Ans Repeater

(1 mark for correct answer)

(c) Which of the following is not a feature of Networking?   1

(i) Resource Sharing

(ii) Reliability

(iii) Uninterrupted Power Supply

(iv) Reduced cost

Ans Uninterrupted Power Supply

(1 mark for correct answer)

(d)   Name any two Indian scripts included in Unicode.   1

Ans   Devnagari, Bengali, Gurmukhi, Gujarati, Kannada, Malayalam, Oriya, Tamil, Arabic, Telugu

(mark each for naming any two correct Indian scripts)

(e)   Ms. Vidya Chauhan is confused between Proprietary Software and Open Source Software. Mention at least two points of difference to help her understand the same.   2

Ans
Proprietary software	**Open Source software**
● Has to be paid for	● Free and therefore need not be paid for
● Source code not available	● Source code available for change
● Cannot be copied / distributed	● Can be copied and distributed

(1 mark each for any two correct points)

(f)   Identify the type of Topology from the following   2

(i)   In it, each node is connected with the help of a single co-axial cable.

(ii)   In it. each node is connected with the help of independent cable with the help of a central switching (communication controller).

Ans.   i)   Bus Topology

        ii)   Star Topology   .

(1 mark for each correct answer)

(g)   Define the following with reference to Threats of Network Security: 2

(i)   Worm.

(ii)   Trojan Horse   .

Ans.   **Worm**

● Self-replicating malware without user intervention

● Consumes high volume of bandwidth leading to Denial of service (DoS)

Trojan Horse

● Appears to perform a desirable function for the user

- Steals information through a 'backdoor' /Records browsing activities without the knowledge of the user

- Causes system crash or freeze

(1 mark for any 1 point under each definition)

Note: Any relevant explanation with regards to **Threats to Network Security** also to be considered as **the correct answer.**

2.   (a)   While working in Netbeans, Mr. Khorana wants to display 'Pass' or 'Needs to Reappear' message depending on the marks entered in jTextField. Help her to choose the more appropriate statement out of 'If statement' and 'Switch statement'.   1

Ans. IF statement

(1 mark for identifying IF as the correct statement)

(b)   How one can make a Text Field un-editable on a Frame?   1

Ans   <JTextField>.setEditable (false)

(1 mark for the correct answer)

(c)   Which HTML tags are used for making a table and adding rows in HTML document?   1

Ans   <TABLE></TABLE> tags are used for making a table.

    <TR></TR> are used for adding rows in a HTML document.

(mark each for naming both tags)

Note: Mentioning only <TABLE> and <TR> also acceptable

(d)   How IS <OL> tag different from <UL> tag of HTML?   1

Ans. <OL> stands for ordered list OR This tag is used to display an ordered/ numbered list.

<UL> stands for unordered list OR This tag is used to display a bulleted list.

(1 mark for anyone correct difference)

(e)   What will be the value of P and Q after execution of the following code?   2

int P, Q=100;

```
for (P=10; P<=12; P++)

{

    Q + P ;

}
```

JOptionPane.showMessageDiaog (this, "P:"+P+" Q:"+Q+"");

Ans. P:13 Q:133

(1 mark each for correct value of P and Q)

(f) Differentiate between XML and HTML.   2

Ans

XML	HTML
Defines, stores and retrieves the data	Defines how webpage is displayed
XML tags are not predefined.	HTML tags are predefined
New tags can be created as per need	New tags cannot be defined
XML tags must have a closing tag.	HTML tags may not have closing tag
XML tags are case-sensitive.	HTML tags are not case-sensitive.

(1 mark each for any 2 correct differences)

(g) Write Java code that takes the cost of a pencil from jTextField1 and number
of pencils from jTextField2 and calculates total amount as cost*number to be
displayed in jTextField3 and 20% service tax out of total amount in jTextField4.   2

Ans   double cost = Double.parseDouble(jTextField1.getText( ));

int n = Integer.parselnt (jTextField2.getText( ));

double amount = cost * n;

jTextField3.setText(amount + "");

jTextFitlld4.setText (amount * 0.20+ " ");

(mark for anyone correct conversion statement)
(mark for calculation of total amount)
(mark for calculation of service tax)
(mark for anyone correct setText( ) statement)

Note: The data type for cost as float/int is also acceptable

3. (a) Write MySql command that will be used to open an already existing database "CONTACTS.

1

Ans USE CONTACTS;

(1 mark for correct answer)

Note: Mentioning only USE command is also acceptable.

(b) The Doc_name Column of a table Hospital is given below:

2

Doc name
Avinash
Hariharan
Vinayak
Deepak
Sanjeev

Based on the information, find the output of the following queries:

(i) SELECT doc_name FROM Hospital WHERE doc_name like "%v";

(ii) SELECT doc_name FROM Hospital WHERE doc_name like '%e%';

Ans (i) Sanjeev

(ii) Deepak

Sanjeev

(1 mark for each correct output)

(c) A table "Transport" in a database has degree 3 and cardinality 8.

2

What is the number of rows and columns in it?

Ans 8
3

(1 mark for each correct answer)

(d) Differentiate between Alternate key and Candidate key.

1

Ans

Alternate Key	Candidate Key
A key that can act as a primary key but is not selected as primary key	A key that can be set as Primary key is called a candidate key.

(1 mark for any correct difference/definition)

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OR

(1 mark for illustrating with example)

(e)   Define a class with reference to object Oriented Programming.   1

Ans   A class is a logical unit – a user defined data type. lt encapsulates and binds the data members and the methods

(1 mark for any correct definition)

(f)   An employee_ld consisting of 5 digits is stored in a string variable strEmpld. Now Mr.Deb wants to store this Id in Integer type of variable InteEmpld. Write Java statement to do this.   1

Ans   int IntEmpId = Integer.parseInt (strEmpId) ;

(1 mark for correct answer)

(Declaration of IntEmpld as ëint' is optional)

(g)   Sarthak, 'a students of class XII, created a table "Class". Grade is one of the columns of this table. To find the details of students whose Grades have not been entered, he wrote the following MySql query, which did not give the desired result: 2

SELECT * FROM Class WHERE Grade ="Null";

Help Sarthak to run the query by removing the errors from the query and write the correct query.

Ans   SELECT * FROM Class WHERE Grade IS NULL;

(2 marks for correct answer)

4   (a)   What will be displayed in of jTextField1 after executing the following code?   2

int m = 16 ;

m = m+l ;   .

if (m<15)

       jTextField.setText (Integer. toString (m)) ;

else

       jTextField.setText (Integer. toString (m+15)) ;

Ans   32

(b)   Rewrite the following program code using a Switch statement: 2

if (code ==1)

        Month = "January";

else if (code ==2)

        Month = "February";

else if (code==3)

        Month = "March";

else if (code==4)

        Month = "April";

else

        Month = "No Match";

Ans   switch (code)

{

case 1 : Month = "January";

        break;

case 2 : Month = "February";

        break; .

case 3 : Month = "March";

        break;

case 4 : Month = "April";

        break;

default : Month = "No Match";

}

(mark for switch)

(mark for Case labels)

(mark for break)

(mark for default label)

(c) What will be displayed in jTextArea1 after executing the following statement? 1
jTextAreal.setText ("cbse\nFinal_Exam \ tIp") ; .

Ans Cbse

Final_Exam<tab>IP

OR

Cbse

Final_Exam   IP

(1 mark for correct output)

(mark if '\n' and/or' \t' not taken into account)

(d) The following code has some errors(s). Rewrite the correct code underlining
all the corrections made: 2

Int k=2 ;Sum = 0; //Declaring k and sum as Integer

{

    sum = k ;

    k + = 2 ;

}

While (k=<20) ;

jTextFieldl (Integer.tostring(sum)) ;

Ans. <u>int</u> k = 2 _<u>:</u>_ sum = 0; // <u>int</u> k = 2; <u>int</u> sum = 0 ;

do

{

    sum = k; // could also be written as sum = <u>sum</u> + k ;

    k + = 2 ;

}   while (k <u><=</u> 20) ;

jTextFieldl.<u>setText</u> (Integer.<u>toString</u> (sum)) ;

(mark each for correcting any four errors)

OR

*(1 mark for only identifying any four errors - without making any
correction)*

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(e)   Given a String object namely 'subject' having value as "123" stored in it. What will be result of the following? 1

JOptionPane.showMessageDialoge (null, " " +
(subject.length ( ) + Integer.parselnt (subject))) ;

Ans. 126

(1 mark for correct answer)

(f)   The following code has some error(s). Rewrite the correct code underlining all the corrections made:

int Sum=0, Step=5 ;

int I ;

for (i = 0, i =<5, i++)

{

Step+=5,

Sum+=Step ;

}

jTextAreal.showText{" "+Sum) ;

Ans. int Sum = 0, Step = 5;

int i ;

for (i=0 ; i <= 5 ; i++)

{

Step + = 5;

Sum + = Step;

}

jTextAreal.setText ("" + Sum);

(mark each for identifying and correcting 4 errors)

OR

(1 mark for only identifying 4 errors- without making any correction)

(g) Mr. Radhey Shyam Bansal the owner of the Kiddi Land Enterprises has asked his programmer Ekta to develop the following GUI in Netbeans:

Mr. Bansal accepts payment through three types of credit cards The discount is given according to the following scheme:

Type of Card	Discount
Platinum	20% of amount
Gold	15% of amount
Silver	10% of amount

If the Bill amount is more than Rs, 25,000, then the customer gets an additional discount of 5%. Write Java code for' the following:

(i) To assign Additional Discount as 0 (jTextField4) and Net Amount as 0 (jTextField5). Also set them as un-editable.

(ii) [When "Calculate Discount" (jButton1) is clicked]

To calculate discount as per the given criteria and display the same in jTextField3

To assign Additional Discount (jTextField4) as 5% of amount (jTextField2) as per the above condition.

To enable "Calculate Net Amount" (jButton2) button

(iii) [When "Calculate Net Amount" (jButton2) button is clicked]

To calculate Net Amount as [TotalCost (jTextField2) - Discount (jTextField3) - Additional Discount (jTextField4)]

To display the Net Amount in jTextField5

g(i)   jTextField4.setText ("0") ;

jTextField5.setText ("0") ;

jTextField4.setEditable(false) ;

jTextField5. setEditable(false) ;

(mark for assigning 0 to anyone of the textfields)

(mark for setting anyone as un-editable)

g(ii)   double discount = 0.0 ;

double billAmount = Double.parseDouble(jTextField2.getText());

if (jRadioButton1.isSelected()) discount = 0.20;

if (jRadioButton2.isSelected()) discount = 0.15;

(jRadioButton3.isSelected()) discount = 0 .10;

jTextField3.setText(billAmount * discount + "") ;

if (billAmount > 25000)jTextField4.setText (billAmount*0.05+"");

jButton2.setEnabled(true) ;

(1 mark for calculating discount correctly)

(mark for additional discount)

(mark for enabling the button)

(Any Object names are acceptable for JRadioButton objects)

Note: Use of wrapper class like Integer etc. for converting to string is acceptable

g(iii)   doube netAmount = Double.parseDouble(jTextField2.getText()) -   2

Double.parseDouble(jTextField3.getText()) -

Double.parseDouble(jTextField4.getText()) ;

jTextField5.setText(netAmount + " ") ;

(mark for getting the value from textfield)

(1 mark for calculating the net amount)

(mark for displaying the net amount)

Note: Use of wrapper class like Integer etc. for converting to string is acceptable

5   (a)   What is the purpose of ALTER TABLE command in MySql? How is it different from UPDATE command?   2

Ans   ALTER TABLE command is used to modify the structure of a table.

ALTER TABLE	UPDATE
- It is a DDL command - Changes the underlying table structure - Cannot be rolled back	- It is a DML command - Changes values of tuples in a table - Can be rolled back

(1 mark for purpose of ALTER TABLE command)

(1 mark for anyone difference between ALTER TABLE and UPDATE commands)

(b)   Table Employee has 4 records and Table Dept has 3 records in it. Mr. Jain wants display all information stored in both of these related tables. He forgot to specify equi-join condition in the query, How many rows will get displayed on execution of this query?   1

Ans.   12

(1 mark for correct answer)

(c)   Consider the EXAM given below. Write commands in MySql for (i) to (iv) and output for (v) to (vii).

Table: EXAM

No	Name	Stipend	Subjet	Average	Division
1	Karan	400	English	68	FIRST
2	Aman	680	Mathematics	72	FIRST
3	Javed	500	Accounts	67	FIRST
4	Bishakh	200	Informatics	55	SECOND
5	Sugandha	400	History	35	THIRD
6	Suparna	550	Geography	45	THIRD

(i) To list the names of those students. who have obtained Division as FIRST in the ascending order of NAME. 1

Ans. SELECT Name FROM Exam

WHERE Division = 'FIRST'

ORDER BY Name;

(mark for SELECT with WHERE clause)

(mark for ORDER BY)

Note: Like operator also acceptable

(ii) To display a report listing NAME, SUBJECT and Annual stipend received assuming that the stipend column has monthly stipend. 1

Ans. SELECT NAME, SUBJECT, STIPEND * 12

FROM EXAM;

(mark for selecting columns)

(mark for computing annual stipend)

(iii) To count the number of students, who have either Account or Informatics as Subject. 1

Ans. SELECT COUNT(*)

FROM EXAM

WHERE SUBJECT IN ('Accounts', 'Informatics') ;

OR

SELECT COUNT(*)

FROM EXAM WHERE SUBJECT = 'Accounts' OR SUBJECT = ' Informatics' ;

(mark for using count( ))

(mark for WHERE Clause)

Note: Like operator also acceptable

(iv) To insert a new row in the table EXAM:

6 "Mohan", 500, "English", 73, "SECOND";

Ans. INSERT INTO EXAM VALUES (6, "Mohan", 500, "English", 73, "SECOND");

OR

INSERT INTO EXAM (NO, NAME, STIPEND, SUBJECT, AVERAGE, DIVISION)

VALUES (6, "Mohan", 500, "English", 73, "SECOND");

(mark for INSERT INTO)

(mark for writing VALUES in correct order)

(v)   SELECT AVG (Stipend) FROM EXAM   1

       WHERE DIVISION="THIRD";

Ans. 475

(1 mark for correct answer)

(vi)   SELECT COUNT (DISTINCT Subject) FROM EXAM..   1

Ans. 6

(1 mark for correct answer)

(vii)   SELECT MIN (Average) FROM EXAM

       WHERE Subject = "English";

Ans. 68

(1 mark for correct answer)

6   (a)   Write a MySql command for creating a table "BANK" whose structure is given below: 2

Table: BANK

Field Name	Datatype	Size	Constraint
Acct_number	Integer	4	Primary key
Name	Varchar	3	
BirthDate	Date		
Balance	Integer	8	Not Null

Ans CREATE TABLE BANK

    (

Acct_number INTEGER (4) PRIMARY KEY,

Name VARCHAR(3) ,

BirthDate DATE,

Balance INTEGER (8) NOT NULL

) ;

(1/2 mark for CREATE TABLE)

(1/2 mark for fields with appropriate data types)

(1/2 mark for PRIMARY KEY constraint)

(1/2 mark for NOT NULL constraint)

(b)   In a database there are two tables "ITEM" and "CUSTOMER" as shown below:

Table: ITEM

ID	ItemName	Company	Price
1001	Moisturiser	XYZ	40
1002	Sanitizer	LAC	35
1003	Bath Soap	COP	25
1004	Shampoo	TAP	95
1005	Lens Solutions	COP	350

Table: CUSTOMER

C_ID	CustomerName	City	ID
01	Samridhh Ltd	New Delhi	1002
05	Big Line Inc	Mumbai	1005
12	97,8	New Delhi	1001
15	Tom N Jerrv	Bangalore	1003

Write the commands in SQL queries for the following:

(i)   To display the details of Item, whose Price is in the range of 40 and 95 (Both values included).   1

Ans   SELECT * FROM ITEM WHERE PRICE BETWEEN; 40 AND 95;

OR

SELECT * FROM ITEM WHERE PRICE >= 40 AND PRICE <= 95;

(mark for SELECT)

(mark for BETWEEN/WHERE Clause)

(ii)   To display the CustomerName. City from table Customer, and ItemName and Price from table item, with their corresponding matching 10.   2

Ans.   SELECT CUSTOMERNAME, CITY, ITEMNAME, PRICE

FROM CUSTOMER CUST, ITEM

WHERE CUST.ID = ITEM.ID;

(1 mark for correct use of SELECT and FROM)

(1 mark for correct use of WHERE clause)

Note: Use of table aliases is acceptable

(iii)   To increase the Price of al the Products by 50.   2

Ans   UPDATE ITEM SET PRICE = PRICE + 50 ;

(1 mark for UPDATE)

(1 mark for SET)

(c)   In a Database School there are two tables Employee and Dept as shown below:

Table: Employee

Empld	Name	Sal	Deptno
T001	Vishakha	34000	10
T001	Mridul	32000	50
T001	Manish	45000	20

Table: Dept

Deptno	DName	Locaionld
10	Lights	HH02
20	Dance	FF02
30	Production	AB01

(i)   Identify the foreign key in the table Employee.   1

Ans.   Deptno

(1 mark for correct answer)

(ii)   What output, will you get, when an equi-Join query is executed to get the NAME from Employee table and corresponding DNAME from Dept table?   1

Ans.   Vishakha   Lights

      Manish   Dance

(mark for each correct line)

7.   (a)   Give one social impact of e-Business.   1

Ans   Brings rapid change in

- the social fabric characterized by globalization of markets
- business and government policies

(1 mark for anyone correct point)

(b)   Write two advantages of e-Learning sites.   1

Ans   •   Self paced learning

- Unlimited revisions
- Facilitates electronic delivery of customized learning objects
- Facilitates teacher-student interaction
- Facilitates peer-peer interaction

(mark each for any two correct points)

(c)   Write three important features of e-Governance. Give URL of one of the commonly used - eGovernance portals.   2

Ans   •   Provides citizens access to information about the processes and services.

- Facilitates a speedy, transparent, accountable and efficient process for performing government administrative activities.
- Uses modern information and telecommunication technologies such as internet, Local area networks to enhance efficiency
- A lot of productive time of government servants and general public is saved.

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e.Governance portal:

- www.incometaxindia.gov.in

- supremecourtofindia. nic.in

- passport.gov. in

- https://www.irctc.co.in

(mark each for any three correct features)

(mark for anyone correct e-Governance portal)

(d)   Anuja is creating a form for her practical file. Help her to choose most appropriate controls from List Box, Combo Box, TextField, TextArea, Radio Button, Check box, Label and Command button for the following entries from user: 2

(i)   A message "Enter Marks" in front of a Text Field.

Ans   Label

(ii)   An input to choose more than one subject from a set of choices.

Ans. ListBox/Check Box

(iii) An input for entering remarks

Ans. TextArea [Most Appropriate answer]

      TextField [Also acceptable]

(iv)   An input for accepting Gender.

Ans. RadioButton/ComboBox [Most Appropriate answer]

      TextField [Also acceptable]

      (mark each for correct answer)

COMPUTER SCIENCE

Time allowed : 3 hours   *Maximum Marks : 70*

> *Instructions:*
>
> (i) **All** *questions are compulsory.*
>
> (ii) *Programming Language: C++*

QUESTION PAPER CODE 91/1

1. (a) What is the difference between Local Variable and Global Variable?
         Also, give a suitable C++ code to illustrate both.   2

    (b) Write the names of the header files, which is/are essentially required to run/
         execute the following C++ code:

         void main ( )

         {

                 char C, String [ ] = "Excellence Overload";

                 for (int I=0; String [I] ! = '\ 0'; I ++)

                 if (String [I] ==' ')

                         cout<<end1;

                 else

                 {

                         C=toupper(String[I]);

                         cout<<C ;

                 }

         }

    (c) Rewrite the following program after removing the syntactical errors (if any).
         Underline each correction.   2

         #include[iostream.h]

```
typedef char Text(80) ;

void main ( )

{

    Text T= "Indian";

    int Count=strlen(T) ;

    cout<<T<<'has'<<Count<< 'characters' <<end1;

}
```

(d)   Find the output of the following program: 3

```
#inc1ude<iostream.h>

void ChangeArray(int Number, int ARR[ ], int Size)

{

    for (int L =0; L<Size; L++)

    if (L<Number)

        ARR [L] +=L;

    e1se

        ARR [L] *=L;

}

void Show (int ARR [ ], int Size)

{

    for (int L=0; L<Size; L++)

        (L%2!=0) ?cout<<ARR[L] <<"#": cout<<ARR[L]<<end1 ;

}

void main ( )

{

    int Array [ ] = {30, 20, 40, 10, 60, 50};

    ChangeArray (3, Array, 6) ;

    Show (Array, 6) ;

}
```

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(e) Find the output of the following program: 2

```
#include<iostream.h>

void main ( )
{
        int Track [ ] = {10, 20, 30, 40}, *Striker ;

        Stxiker=Track :

        Track [1] += 30 ;

        cout<<"Striker>"<<*Striker<<end1 ;

        Striker – =10 ;

        Striker++ ;

        cout<<"Next@"<<*Striker<<end1 ;

        Striker+=2 ;

        cout<<"Last@"<<*Striker<<end1 ;

        cout<< "Reset To" <<Track[0] <<end1 ;

}
```

(f) Go through the C++ code shown below, and find out the possible output or outputs from the suggested Output Options (i) to (iv). Also, write the least value and highest value, which can be assigned to the variable Guess. 2

```
#include <iostream.h>
#include <stdlib.h>
void main ( )
{
        randomize ( );
        int Guess, High=4;
        Guess=random{High)+ 50 ;
        for{int C=Guess ; C<=55 ; C++)
        cout<<C<<"#" ;
```

}

(i)   50 # 51 # 52 # 53 # 54 # 55 #

(ii)   52 # 53 # 54 # 55

(iii) 53 # 54 #

(iv)   51 # 52 # 53 # 54 # 55

2. (a) Differentiate between members, which are present within the private visibility mode with those which are present within the public visibility modes.   2

    (b) Write the output of the following C++ code. Also. write the name of feature of Object Oriented Programming used in the following program jointly illustrated by the function [I] to [IV].   2

```
#include<iostream.h>

void Print ( )            // Function [I]

{
        for (int K=1 ; K<=60 ; K++) cout<< "-" ;

            cout<<end1 ;

}

void Print (int N)        // Function [II]

{
        for (int K=1 ; K<=N ; L++) cout<<"*" ;

            cout<<end1 ;

}

void Print (int A, int.B)    // Function [III]

{
        for (int K=1. ;K<=B ;K++) cout <<A*K ;

            cout<<end1 ;

}

void Print (char T, int N)   // Function [IV]
```

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```
{
        for (int K=1 ; K<=N ; K++) cout<<T ;

                cout<<end1;

}

void main ( )

{

                int U=9, V=4, W=3;

                char C='@' ;

                Print (C,V) ;

                Print (U,W) ;

}
```

(c)   Define a class Candidate in C++ with following description: 4

Private Members

- A data member RNo (Registration Number) of type long

- A data member Name of type string

- A data member Score of type float

- A data member Remarks of type string

- A member function AssignRem( ) to assign Remarks as per the Score obtained by a candidate. Score range and the respective Remarks are shown as follows:

Score	Remarks
>=50	Selected
less than 50	Not selected

Public Members

- A function ENTER ( ) to allow user to enter values for RNo, Name, Score & call function AssignRem( ) to assign the remarks.

- A function DISPLAY ( ) to allow user to view the content of all the data members.

(d)   Answer the questions (i) to (iv) based on the following: 4

class Strident

(

        int Rno;

        char Name [20] ;

        float Marks;

protected:

        void Result( ) ;

public:

        Student( ) ;

        void Register( ); void Display( ) ;

} ;

class Faculty

{

        long FCode;

        char FName[20];

protected:

        float Pay;

public :

        Faculty ( ) ;

        void Enter ( ) ;

        void Show ( ) ;

} ;

class Course : public Student, private Faculty

{

        long CCode [10]; char CourseName [50] ;

        char StartDate[8], EndDate[8] ;

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public :

> Course ( ) ;
>
> void Commence ( ) ;
>
> void CDetail ( ) ;

} ;

(i)   Which type of inheritance is illustrated in the above C++ code?

(ii)   Write the names of the all data members, which is/are accessible from member function Commence of class Course.

(iii) Write the names of member functions, which are accessible from objects of class Course.

(iv)   Write the name of all the members, which are accessible from objects of class Faculty.

3   (a)   Write a Get1From2 ( ) function in C++ to transfer the content from two arrays FIRST[ ] and SECOND[ ] to array ALL[ ]. The even places (0, 2, 4, ...) of array ALL[ ] should get the content from the array FIRST[ ] and odd places (1, 3, 5,   ) of the array ALL[] should get the content from the array SECOND[ ].   3

Example:

If the FIRST[ ] array contains

30, 60, 90

And the SECOND[ ] array contains

10, 50, 80

The ALL[ ] array should contain

30, 10, 60, 50, 90, 80

(b)   An array P[20] [50] is stored in the memory along the column with each of its element occupying 4 bytes, find out the location of P[15][10], if P[0][0] is stored at 5200.   3

(c)   Write a function in C++ to perform Insert: operation on a dynamically allocated Queue containing Passenger details as given in the following definition of NODE.   4

struct NODE

{

     long Pno;   //passenger Number

     char Pname[20] ; //passenger Name

     NODE *Link.;

} ;

(d)   Write a COLSUM( ) function in C++ to find sum of each column of a NxM Matrix.   2

(e)   Evaluate the following postfix notation of expression: 2

50, 60, + , 20, 10, -, *

4.   (a)   Observe the program segment given below carefully and fill the blanks marked as Statement 1 and Statement 2 using seekg( ), seekp( ), tellp( ) and tellg( ) functions for performing the required task.   1

#include<fstream.h>

class PRODUCT

{

     int Pno; char Pname[20]); int Qty;

public :

     void ModifyQty( ) ;

     // The function is to modify quantity of a PRODUCT

} ;

void PRODUCT: :ModifyQty ( )

{

     fstream File ;

     Fil.open ("PRODUCT.DAT", ios::binary |ios : : in| ios: :out) ;

     int MPno;

```
        cout<<"Product No to modify quantity : "; cin>>MPNo;

        While (Fil.read ((char*) this, sizeof (PRODUCT))

        {

                if (MPno == Pno)

                {

                Cout<<"Present Quantity:"<<Qty<<end1 ;

                cout<<"Changed Quantity:";cin>>Qty ;

                int Position = _____;  //Statement 1

                _____; // Statement 2

                Fil.write ((char*) this, sizeof (PRODUCT)) ;

                                        //Re-writing the record

                }

        }

        Fil.close ( ) ;

}
```

(b) Write a function in C++ to count the no. of "Me" or "My" words present in a text file "DIARY. TXT".   2

If the file "DIARY.TXT" content is as follows:
My first book was Me and My
family. It gave me chance to be
known to the world.

The output of the function should be
Count of Me/My in file : 4

(c) Write a function in C++ to search for a laptop from a binary file "LAPTOP.DAT" containing the objects of class LAPTOP (as defined below). The user should enter the Model No and the function should search and
display the details of the laptop.   3

class LAPTOP

{

long ModelNo ;

float RAM, HDD ;

char Details [120] ;

public:

void StockEnter ( )

{cin>>ModelNo>>RAM>>HDD; gets (Details);}

void StockDisplay ( )

{cout<<ModelNo<<RAM<<HDD<<Details<<endl;}

long ReturnModelNo ( ) {return ModelNo ;}

} ;

5   (a)   What do you understand by Union & Cartesian Product operations in relational algebra?   2

Consider the following tables WORKER and PAYYLEVEL and answer (b) and (c) parts of this question: 4

Table: WORKER

ECODE	NAME	DESIG	PLEVEL	DOJ	DOB
11	Radhe Shyam	Supervisor	P001	13- Sep- 2004	23-Aug-1981
12	Chander Nath	Operator	P003	22-Feb-2010	12-Jul-1987
13	Fizza	Operator	P003	14-Jun-2009	14-0ct-1983
15	Ameen Ahmed	Mechanic	P002	21-Aug-2006	13-Mar-1984
18	Sanya	Clerk	P002	19-Dec-2005	09-Jun-1983

Table: PAYLEVEL

PLEVEL	PAY	ALLOWANCE
P001	26000	12000
P002	22000	10000
P003	12000	6000

(b)	Write SQL commands for the following statements:

    (i)	To display the details of all WORKERs in descending order of DOB.

    (ii)	To display NAME and DE;SIG of those WORKERs, whose PLEVEL is either P001 or P002.

    (iii)	To display the content of all the WORKERs table, whose DOB is in between '19-JAN-1984' and '18-JAN-1987'.

    (iv)	To add a new row with the following:

    19, 'Daya Kishore', 'Operator', 'P003', '19-Jun-2008', '11-Jun-1984'

(c)	Give the output of the following SQL queries:	2

    (i)	SELECT COUNT (PLEVEL), PLEVEL FROM WORKER GROUP BY PLEVEL;

    (ii)	SELECT MAX (DOB), MIN (DOJ) FROM WORKER;

    (iii)	SELECT Name, Pay FROM WORKER W, PAYLEVEL P

    WHERE W. PLEVEL = S. PLEVEL AND P.ECODE<13 ;

    (iv)	SELECT PLEVEL, PAY+ALLOWANCE FROM PAYLEVEL

    WHERE PLEVEL= 'P003' ;

6	(a)	Verify the following using Truth Table.	2

    U. (U' +V) = (U + V)

(b)	Write the equivalent Boolean Expression for the following logic Circuit.	2

(c)	Write the POS form of a Boolean function F, which is represented in a truth table as follows:	1

A	B	C	F
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1

(d) Reduce the following Boolean Expression using K-Map: 3

F(P, Q, R, S) = Σ (0,1,2,4,5,6,8, 12)

7. (a) Differentiate between packet switching and message switching technique in network communication.   1

(b) Differentiate between BUS and STAR topology of networks.   1

(c) What is VoIP?   1

(d) Out of the following, identify client side script (s) and server side script(s).   1

    (a)   ASP   (b)   Javascript

    (c)   VBScript   (d)   JSP

(e) Quick learn University is setting up its Academic blocks at Prayag Nagar and planning to set up a network. The university has 3 academic blocks and one Human Resource Center as shown in the diagram below.   4

Center to center distance between various block/center is as follows:

Law Block to Business Block	40m
Law Block to Technology Block	80m
Law Block to HR Center	105m
Business Block to Technology Block	30m
Business Block to HR Center	35m
Technology Block to HR Center	15m

Number of Computers in each of the Blocks/Centre is follows:

Law Block	15
Technology Block	40
HR Center	115
Business Block	25

(e1) Suggest the most suitable place (i.e. Block/Center) to install the server of this university with a suitable reason.

(e2) Suggest an ideal layout for connecting these blocks/centers for a wired connectivity.

(e3) Which device you will suggest to be placed/installed in each of these blocks/ center to efficiently connect all the computers with in these blocks/center.

(e4) The university is planning to connect its admission office in the closest big city, which is more than 250 km from university, which type of network out of LAN, MAN or WAN will be formed? Justify your answer.

(f)   Which of the following will come under Cyber Crime?   1

   (i)   Theft of a brand new sealed pack Laptop

   (ii)   Access to a bank account for getting unauthorized Money Transaction

   (iii)   Modification in a company data with unauthorized access

   (iv)   Photocopying a printed report

(g)   Compare open source software and proprietary software.   1

1. (a) What is the difference between Type Casting and Automatic Type conversion? Also, give a suitable C++ code to illustrate both.   2

    (b) Write the names of the header files, which is/are essentially required to run/execute the following c++ code: 1

    void main ( )

    {

           char CH,Text[ ]="+ve Attitude";

           for (int I=0 ; Text[I] ! ='\0' ;I++)

                if (Text[I]==' ')

                       cout<<end1;

                else

                {

                       CH=toupper (Text [I]) ;

                       cout<<CH;

                }

    }

    (c) Rewrite the following program after removing the syntactical errors (if any). Underline each correction.   2

    include<iostream.h>

    typedef char [80] String;

    void main ( )

    {

           String S= "Peace";

           int L=strlen(S) ;

           cout<<S<< 'has'<<L<< 'characters'<<end1;

    }

(d) Find the output of the following program: 3

```
#include <iostream.h>
void SwitchOver(int A [ ], int N, int Split)
{
    for (int K=0 ; K<N; K++)
        if (K<Split)
            A(K]+ =K;
        else
            A [K]*=K;
}
void Display (int A [ ], int N)
{
    for (int K=0 ; K<N ; K++)
        (K%2==0)? cout<<A[K]<<"%":cout<<A(K]<<end1;
}
void main ( )
{
    int H[ ]= {30,40,50,20,10,5};
    SwitchOver (H, 6, 3);
    Display (H, 6);
}
```

(e) Find the output of the following program: 2

```
#include<iostream.h>
void main ( )
{
    int *Queen, Moves [ ] = {11, 22, 33, 44};
```

```
Queen = Moves;

Moves [2] + = 22;

Cout<< "Queen @"<<*Queen<<end1;

*Queen - = 11;

Queen + = 2;

cout<< "Now @"<<*Queen<<end1;

Queen++;

cout<< "Finally@"<<*Queen«end1;

cout<< "New Origin @"<<Moves[0]<<end1;

}
```

(f)   Go through the C++ code shown below, and find out the possible output or outputs from the suggested Output Options (i) to (iv). Also, write the minimum and maximum values, which can be assigned to the variable MyNum.   2

```
#include<iostream.h>

#include <stdlib.h>

void main ( )

{

randomize ( ) ;

int MyNum, Max=5;

MyNum = 20 + random (Max) ;

for (int N=MyNum; N<=25;N++)

cout<N<"*";

}
```

(i)   20*21*22*23*24*25

(ii)   22*23*24*25*

(iii)   23*24*

(iv)   21*22*23*24*25

2. (a) Differentiate between Constructor and Destructor function with respect to Object Oriented Programming. 2

(b) Write the output of the following C++ code. Also, write the .name of feature of Object Oriented Programming used in the following program jointly illustrated by the function [I] to [IV] 2

```cpp
#include<iostream.h>
void Line ( )                                    //Function [I]
{
    for (int L=1;L<=80;L++)    cout<<"-";
    cout<<end1;
}
void Line (int N)                                //Function[II]
{
    for (int L=l;L<=N;L++)    Cout<<"*";
    cout<<endl;
}
void Line (char C, int N)                        //Function [III]
{
    for (int L=l;L<=N;L++)    cout<<C;
    cout<<end1;
}
void Line (int M, int, N)                        //Function [IV]
{
    for (int L=1;L<=N;L++)    cout<<M*L;
    cout<<end1;
}
void main ( )
```

```
{
        int A=9, B=4, C=3;

        char K= '#' ;

        Line (K,B);

        Line (A,C);

}
```

(c) Define a class Applicant in C++ with following description: 4

Private Members

●   A data member ANo (Admission Number) of type long

●   A data member Name of type string

●   A data member Agg (Aggregate Marks) of type float

●   A data member Grade of type char

●   A member function GradeMe() to find the Grade as per the Aggregate
     Marks obtained by a student. Equivalent Aggregate Marks range and
     the respective Grades are shown as follows:

Aggregate Marks	Grade
>=80	A
less than 80 and >=65	B
less than 65 and >=50	C
less than 50	D

Public Members

●   A function ENTER() to allow user to enter values for ANo, Name, Agg
     & call function GradeMe() to find the Grade.

●   A function_RESULT( ) to allow user to view the content of all the data
     members.

(d) Answer the questions (i) to (iv) based on the following: 4

class Student

{

```cpp
        int Rollno:

        char SName[20];

        float Marksl;

protected:

        void Result ( ) ;

public:

        Student ( ) ;

        void Enroll ( ) ;void Display ( ) ;

} ;

class Teacher

{

        long TCode;

        char TName [20];

protected:

        float Salary;

public:

        Teacher ( );

        void Enter ( ) ;

        void Show ( ) ;

} ;

class Course: public Student, private Teacher

}

        long CCode [10]; char CourseName [50];

        char StartDate [8] , EndDate [8];

public:

        Course ( ) ;

        void Commence ( );

        void CDetail ( ) ;

} ;
```

(i)   Write the names of member functions, which are accessible from objects of class Course

(ii)   Write the names of all the data members, which is/are accessible from member function Commence of class Course

(iii)   Write the names of all the-members, which are accessible from objects of class Teacher.

(iv)   Which type of Inheritance is illustrated in the above C++ code?

3.   (a)   Write a Get2From1() function in C++ to transfer the content from one array ALL[] to two different arrays Odd[] and Even[]. The Odd[] array should contain the values from odd positions (1,3,5,...) of ALL[] and Even [] array should contain the values from even positions (0, 2, 4,…..) of ALL [].   3

Example

If the ALL[] array contains

12, 34, 56, 67, 89, 90

The Odd[] array should contain

34, 67, 90

And the Even [] array should contain

12, 56, 89

(b)   An array G[50][20] is stored in the memory along the row with each of its elements occupying 8 bytes. Find out the location of G[10][15], if G[0][0] is stored at 4200.   3

(c)   Write a function in C++ to perform Delete operation on a dynamically allocated Queue containing Members details as given in the following definition of NODE: 4

struct NODE

{

    long Mno   //Member Number

    char Mname[20];   //Member Name

    NODE *Link;

};

(d) Write a DSUMO function in C++ to find sum of Diagonal Elements from a NxN Matrix. 2

(Assuming that the N is a odd number)

(e) Evaluate the following postfix notation of expression: 2

True, False, NOT, AND, True, True, AND,OR

4. (a) Observe the program segment given below carefully and fill the blanks marked as Statement 1 and Statement 2 using seekg( ), seekp( ) tellp( ) and tellg( ) functions for performing the required task. 1

```
#include <fstream.h>

class ITEM
{
        int Ino;char Iname[20]; float Price;
        public:
        void ModifyPrice() ;//The function is to modify
                price of a particular ITEM
} ;
void item: :ModiyPrice()
{
        fstream File;
        File.open ("ITEM.DAT", ios::binary|ios::in|ios: :out)|| ;
        int CIno;
        cout<<"Item No to modify price:";cin>>CIno;
        while (file.read ((char*) this, sizeof (ITEM)))
        {
                if (CIno==Ino)
                {
                        cout<<"Present Price:"<<Price<<end1;
                        cout<<"Changed price:"; cin>>Price;
```

```
                    int FilePos = _____ ; //Statement 1,

                    _____; //Statement 2

               File.write((char*)this,sizeof(ITEM)) ;

                                        // Re-writing the record

          }

     }

     File.close ( ) ;

}
```

(b) Write a function in C++ to count the no. of "He" or "She" words present in a text file "STORY. TXT".   2

If the file "STORY. TXT" content is as follows:

He is playing in the ground. She is

Playing with her dolls.

The output of the function should be
Count of He/She in file: 2

(c) Write a function in C++ to search for a camera from a binary file "CAMERA.DAT" containing the objects of class" CAMERA (as defined below). The user should enter the Model No and the function should search display the details of the camera.   3

```
class CAMERA

     {

          long ModelNo;

          float MegaPixel;

          int Zoom;

          char Details[120];

public:

     void Enter ( ) {cin>>ModelNo>>MegaPixel>>Zoom;gets(Details);}

     void Display ( )

          {cout<<ModelNo<<MegaPixel<<Zoom<<Details<<endl;}

     long GetModelNo ( ) {return ModelNo;}

};
```

5. (a) What do you understand by Selection & Projection operations in relational algebra? 2

Consider the following tables EMPLOYEE and SALGRADE and answer (b) and (c) parts of this question:

Table: EMPLOYEE

ECODE	NAME	DESIG	SGRADE	DOJ	DOB
101	Abdul Ahmad	EXECUTIVE	S03	23-Mar-2003	13-Jan-1980
102	Rav:i. Chander	HEAD-IT	S02	12-Feb-2010	22-Jul-1987
103	John Ken	RECEPTIONIST	S03	24-June-2009	24-Feb-1983
105	Nazar Ameen	GM	S02	11-Aug-2006	03-Mar-1984
108	Priyam Sen	CEO	S01	29-Dec-2004	19-Jan-1982

Table: SALGRADE

SGRADE	SALARY	HRA
S0l	56000	18000
S02	32000	12000
S03	24000	8000

(b) Write SQL commands for the following statements: 4

(i) To display the details of all EMPLOYEEs, in descending order of DOJ

(ii) To display NAME and DE51G of those EMPLOYEEs, whose SALGRADE is either 502 or 503

(iii) To display the content of all the EMPLOYEEs table, whose DOJ is in between '09-Feb-2006' and '08-Aug-2009'.

(iv) To add a new row with the following:

109, 'Harish Roy', 'HEAD-IT', 'S02', '09-Sep-2007, '21-Apr-1983'

(c) Give :the output of the following SQL queries: 2

(i) SELECT COUNT (SGRADE), SGRADE FROM EMPLOYEE GROUP BY SGRADE;

(ii) SELECT MIN(DOB), MAX (DOJ) FROM EMPLOYEE;

（iii）　SELECT NAME , SALARY FROM EMPLOYEE E, SALGRADE
S WHERE E.SGRADE= S.SGRADE AND E.ECODE<103;

（iv）　SELECT SGRADE, SALARY+HRA ET:)M SALGRADE WHERE
SGRADE='S02';

6　（a）　Yerify the following using Truth Table:　　　　　　　　　　　　　　　2

X+Y. Z=(X+Y).(X+Z)

（b）　Write the equivalent Boolean Expression for the following Logic Circuit:　　2

（c）　Write the SOP form of a Boolean function F, which is represented in a truth
table as follows:　　　　　　　　　　　　　　　　　　　　　　　　　1

U	V	W	F
0	0	0	1
0	0	1	0
0	1	1	1
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	1

（d）　Reduce the following Boolean Expression using K-Map:　　　　　　　　3

$F(A, B,C, D) = \Sigma (0,1, 2, 4, 5, 6, 7, 8, 10)$

7.　（a）　In networking, what-is WAN? How is it different from LAN?　　　　　1

（b）　Differentiate between XML and HTML.　　　　　　　　　　　　　　1

（c）　What is WEB2.0?　　　　　　　　　　　　　　　　　　　　　　1

(d) Out of the following, identify client side script (s) and server side script (s). 1

    (i)   Javascript

    (ii)   ASP

    (iii)   vbscript

    (iv)   JSP

(e) Great Studies University is setting up its Academic schools at Sunder Nagar and planning to set up a network. The university has 3 academic schools and one administration center as shown in the diagram below: 4

Center to center distances between various buildings is as follows :

Law School to Business School	60m
Law School to Technology School	90m
Law School to Admin Center	115m
Business School to Technology School	40m
Business School to. Admin Center	45m
Technology School to Admin Center	25m

Number of Computers in each of the Schools/Center is follows:

Law School	25
Technology School	50
Admin Center	125
Business School	35

(i) Suggest the most suitable place (i.e. School/Center) to install the server of this university with a suitable reason.

(ii) Suggest an ideal layout for connecting these schools/ center for a wired connectivity.

(iii) Which device will you suggest to be placed/installed in each of these schools / center to efficiently connect all the computers within these schools / center?

(iv) The university is planning to connect its admission office in the closest big city, which is more than 350 km from the university. Which type of network out of LAN, MAN or WAN will be formed? Justify your answer.

(f) Compare Open Source Software and Proprietary Software.   1

(g) What are cookies?   1

Marking Scheme – Computer Science

QUESTION PAPER CODE 91/1

EXPECTED ANSWERS

1. (a) What is the difference between Local Variable and Global Variable?

    Also, give a suitable C++ code to illustrate both.   2

    Ans **Local Variables:** Local variables are those variables which are declared within a function or a compound statement and these variables can only be used within that function/scope.

    Global Variables: Global variables are those variables which are not declared within any function or scope. So, these variables can be accessed by any function of the program.

    Example

    #include<iostream.h>

    #include<conio.h.>

    int G;   // Global variable declared

```
void Fun ( )

{
        int  L = 25;  // Local variable of function Fun ( ) assigned value 25

        G=5;        // Global Variable is accessed and assigned value 5

        Cout<<G<<endl;   // Value of global variable is displayed as 5

        Cout<<L<<endl;    // Value of local variable is displayed as 25

}

void main ( )

{
        Fun ( ) ;              // Function call

        G = G + 5;          // Global variable is incremented by 5

        cout<<G<<endl;   // Global variable is displayed as 10

}
```

(½ Mark for each correct explanation of Local Variable and Global Variable)

(½ Mark for each correct example of Local variable and Global Variable)

OR

(Full 2 Maries for correct example(s) demonstrating the meaning of / difference between Local Variable and Global Variable)

OR

(Only 1 Mark to be awarded if Explanation without supporting examples)

(b)   Write the names of the header files, which is/are essentially required to run/ execute the following C++ code:

```
void main ( )

{
        char C, String [ ] = "Excellence Overload";

        for (int I=0; String [ I ] ! = '\ 0'; I ++ )

        if (String [I] ==' ')
```

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```
                cout<<end1;

        else

        {

                C=toupper(String[I]);

                cout<<C ;

        }

}
```

Ans   iostream.h

ctype.h

(½ Mark for writing each correct header file)

(c)   Rewrite the following program after removing the syntactical errors (if any).
Underline each correction.   2

```
#include[iostream.h]

typedef char Text(80) ;

void main ( )

{

        Text T= "Indian";

        int Count=strlen(T) ;

        cout<<T<<'has'<<Count<< 'characters' <<end1;

}
```

Ans   #include<u>iostream.h</u>>

<u>#include<string.h></u>

typedef char Text [80];

void main ( )

{

        Text T= "Indian";

        int Count=str1en(T);

        cout<<T<< "<u>has</u>" <<Count<< "<u>cbaracters</u>"<<end1 ;

}

(d)   Find the output of the following program: 3

```
#inc1ude<iostream.h>

void ChangeArray(int Number, int ARR[ ], int Size)

{

        for (int L =0; L<Size; L++)

        if (L<Number)

              ARR [L] +=L;

        e1se

              ARR [L] *=L;

}

void Show (int ARR [ ], int Size)

{

        for (int L=0; L<Size; L++)

              (L%2!=0) ?cout<<ARR[L] <<"#": cout<<ARR[L]<<end1 ;

}

void main ( )

{

        int Array [ ] = {30, 20, 40, 10, 60, 50};

        ChangeArray (3, Array, 6) ;

        Show (Array, 6) ;

}
```

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Ans 30

21#42

30#240

250#

(½ Mark for each correct value)

Note:

Deduct ½ Mark for not writing # at proper places

Deduct ½ Mark for not considering endl at proaer places

(e) Find the output of the following program: 2

```
#include<iostream.h>

void main ( )

{
        int Track [ ] = {10, 20, 30, 40}, *Striker ;

        Stxiker=Track :

        Track [1] += 30 ;

        cout<<"Striker>"<<*Striker<<end1 ;

        Striker – =10 ;

        Striker++ ;

        cout<<"Next@"<<*Striker<<end1 ;

        Striker+=2 ;

        cout<<"Last@"<<*Striker<<end1 ;

        cout<< "Reset To" <<Track[0] <<end1 ;

}
```

Ans Striker>10

Next@50

Last@40

Reset to 0

(½ for writing each line of output correctly)

Note:

Deduct ½ Mark if any/all special characters are missing

Deduct ½ Mark if endl is not considered at the right positions

(f) Go through the C++ code shown below, and find out the possible output or outputs from the suggested Output Options (i) to (iv). Also, write the least value and highest value, which can be assigned to the variable Guess.　　2

```
#include <iostream.h>
#include <stdlib.h>
void main ( )
{
        randomize ( ) ;
        int Guess, High=4;
        Guess=random{High)+ 50 ;
        for{int C=Guess ; C<=55 ; C++)
        cout<<C<<"#" ;
}
```

(i)   50 # 51 # 52 # 53 # 54 # 55 #

(ii) 52 # 53 # 54 # 55

(iii) 53 # 54 #

(iv) 51 # 52 # 53 # 54 # 55

Ans (i)   50 # 51 # 52 # 53 # 54 # 55 #

Least value 50

Highest value 53

(1 Mark for mentioning correct option (i))

(½ Mark for mentioning correct Least value of Guess)

(½ Mark for mentioning correct Highest value of Guess)

2. (a) Differentiate between members, which are present within the private visibility mode with those which are present within the public visibility modes.   2

Ans Private members of a class are accessible only to the member functions of the same class.

Public members of a class are accessible to the member functions of the same class as well as member functions of its derived class(es) and also to an object of the class.

Example:

```
class Base
{
        int N;
public:
        void Assign ()
        {
                N=10;
        }
};
class Derived: public Base
{
        int X;
public:
        void DisplayBase()
        {
                cout<<N;    //Not Accessible
                Assign ( ) ;  //Accessible
        }
} ;
void main ( )
```

```
{
        Base B;

        B.Assign( ) ;        //Accessible
}
```

(1 Mark for correct explanation OR example illustrating non accessibility of Private Members inside Derived class)

(1 Marie for correct explanation OR example illustrating accessibility of Public Members inside Derived Class and to object of the class)

(b)   Write the output of the following C++ code. Also. write the name of feature of Object Oriented Programming used in the following program jointly illustrated by the function [I] to [IV].   2

```
#include<iostream.h>

void Print ( )              // Function [I]

{
        for (int K=1 ; K<=60 ; K++) cout<< "-" ;
                cout<<end1 ;
}
void Print (int N)          // Function [II]

{
        for (int K=1 ; K<=N ; L++) cout<<"*" ;
                cout<<end1 ;
}
void Print (int A, int.B)

{
        for (int K=1. ;K<=B ;K++) cout <<A*K ;
                cout<<end1 ;
}
void Print (char T, int N)   // Function [IV]
```

```
{
        for (int K=1 ; K<=N ; K++) cout<<T ;

                cout<<end1;

}

void main ( )

{

                int U=9, V=4, W=3;

                char C='@' ;

                Print (C,V) ;

                Print (U,W) ;

}
```

Ans. @ @ @ @

91827

OR

No Output as L is not declared in void Print (int N)

Polymorphism

OR

Function Overloading

(½ Mark for writing each correct line of output)

(1 Mark for writing the feature name correctly)

(c)   Define a class Candidate in C++ with following description: 4

Private Members

● A data member RNo (Registration Number) of type long

● A data member Name of type string

● A data member Score of type float

● A data member Remarks of type string

- A member function AssignRem( ) to assign Remarks as per the Score obtained by a candidate. Score range and the respective Remarks are shown as follows:

Score | Remarks

>=50 | Selected

less than 50 | Not selected

Public Members

- A function ENTER ( ) to allow user to enter values for RNo, Name, Score & call function AssignRem( ) to assign the remarks.

- A function DISPLAY ( ) to allow user to view the content of all the data members.

Ans class Candidate

```
{
    long RNo;
    char Name[20];
    float Score;
    char Remarks[20];
    void AssignRem( ) ;
public:
    void Enter( );
    void Display( );
} ;
void Candidate: :AssignRem( )
    {
        if (Score>=50)
            strcpy (Remarks,"Selected") ;
        else
            strcpy(Remarks,"Not Selected") ;
    }
```

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```
void Candidate: : Enter ( )

{

        cin>>RNo ;

        gets (Name) ; cin>>Score;

        AssignRem( ) ;

}

void Candidate: :Display()

{

        cout<<RNo<<Name<<Score<<Remarks<<end1;

}
```

(½ Mark for correct syntax for class header)

(½ Mark for correct declaration of data members)

(1 Mark for correct definition of AssignRem())

(1 Mark for correct definition of Enter() with proper invocation of AssignRem() function)

(1 Mark for correct definition of Display())

NOTE:

- *Deduct ½ Mark to be deducted if Assignrem() is not invoked properly inside Enter( ) function*

- *No marks to be deducted if member function definitions are written inside the class*

(d)   Answer the questions (i) to (iv) based on the following:

class Strident

(

        int Rno;

        char Name [20] ;

        float Marks;

```
protected:

        void Result( ) ;

public:

        Student( ) ;

        void Register( ); void Display( ) ;

} ;

class Faculty

{

        long FCode;

        char FName[20];

protected:

        float Pay;

public :

        Faculty ( ) ;

        void Enter ( ) ;

        void Show ( ) ;

} ;

class Course : public Student, private Faculty

{

        long CCode [10]; char CourseName [50] ;

        char StartDate[8], EndDate[8] ;

public :

        Course ( ) ;

        void Commence ( ) ;

        void CDetail ( ) ;

} ;
```

(i)   Which type of inheritance is illustrated in the above C++ code?

Ans   Multiple Inheritance

(1 Mark for correct answer)

(ii)   Write the names of the all data members, which is/are accessible from member function Commence of class Course.

Ans   CCode, CourseName, StartDate, EndDate, Pay

(1 Mark for correct answer)

Note:

No marks to be awarded for any other alternative answer

(iii)   Write the names of member functions, which are accessible from objects of class Course.

Ans   Commence( ), CDetail( ), Register( ), Display( )

(1 Mark for correct answer)

Note:

- *No marks to be awarded for any other alternative answer*

- *Constructor functions to be ignored*

(iv)   Write the name of all the members, which are accessible from objects of class Faculty.

Ans   Enter( ), Show( )

(1 Mark for correct answer)

Note:

- *No marks to be awarded for any other alternative answer*

- *Constructor functions to be iqnored*

3   (a)   Write a Get1From2 ( ) function in C++ to transfer the content from two arrays FIRST[ ] and SECOND[ ] to array ALL[ ]. The even places (0, 2, 4, ...) of array ALL[ ] should get the content from the array FIRST[ ] and odd places (1, 3, 5,   ) of the array ALL[] should get the content from the array SECOND[ ].

Example:

If the FIRST[ ] array contains

30, 60, 90

And the SECOND[ ] array contains

10, 50, 80

The ALL[ ] array should contain

30, 10, 60, 50, 90, 80

Ans   void Get1From2 (int ALL[],int FIRST[],int SECOND[],

int N,int M)

```
{
       for(int I=0,J=0,K=0;i<N+M; I++)
              if (I%2==0)
                     ALL[I]=FIRST[J++];
              else
                     ALL[I]=SECOND[K++];
}
```

OR

void Get1From2(int ALL[],int FIRST[],int SECOND[],

int N, int M)

```
{
      int J=0,K=0;
      for(int I=0;i<N+M; I++)
      {
             if (I%2==0)
             {
                    ALL [I] =FIRST [J] ;
                    J++;
             }
```

else

{

ALL[I]=SECOND[K];

K++;

}

}

}

(1 Mark for correct loop)

(½ Mark for checking even locations)

(½ Mark for checking even locations or writing else for odd locations)

(1 Mark for incrementing FIRST and SECOND Array Locations)

(b) An array P[20] [50] is stored in the memory along the column with each of its element occupying 4 bytes, find out the location of P[15][10], if P[0][0] is stored at 5200.   3

Ans Assuming LBR=LBC=0

B=5200

W=4 bytes

Number of Rows(N)=20

Number of Columns(M)=50

LOC(Arr[I] [J])   = B +(I + J*N)*W

LOC(Arr[15][10]) = 5200+(15+10*20)*4

= 5200 + (215*4)

= 5200 + 860

= 6060

(1 Mark for writing correct formula (for row major) OR substituting formula with correct values for calculating Address)

(2 marks for calculating correct address)

Note:

1 Mark to be awarded for writing only the correct answer (i.e. 6060)

(c)   Write a function in C++ to perform Insert: operation on a dynamically allocated Queue containing Passenger details as given in the following definition of NODE.   4

struct NODE

{

    long Pno;   //passenger Number

    char Pname[20] ; //passenger Name

    NODE *Link.;

} ;

Ans class Queue

{

    NODE *Front, *Rear;

public:

    Queue ( ) {Front = NULL; Rear = NULL; }

    void QueInsert ( ) ;

    void QueDel ( ) ;

    void QueDis ( ) ;

    ~Queue ( ) ;

} ;

void Queue: : QueInsert ( )

{

    NODE*Temp=new NODE;

    cin>>Temp->Pno; gets (Temp->Pname) ;

    Temp->Link = NULL;

    Rear->Li.nk = Temp;

    Rear = Temp ;

}

(1 Mark for creating a new NODE dynamically)

(1 Mark for assigning NULL to Link of new NODE)

(1 Mark for linking the Rearmost NODE to the new NODE)

(1 Mark for making the new NODE as the Rearmost NODE)

(d)   Write a COLSUM( ) function in C++ to find sum of each column of a NxM Matrix.   2

Ans   void COLSUM(int A[] [100], int N, int M)

   {

        int SUMC;

        for (int j=0; j<M; j++)

        {

             SUMC = 0;

             for (int i=0; i<N; i++)

                  SUMC = SUMC + A[i] [j] ;

             Cout<< "Sum of Column "<<j<<" = "<<SUMC ;

        }

   }

(½ Mark for writing correct outer loop)

(½ Mark for initializing SUMC with 0 for each column)

(½ Mark tor writing correct inner loop)

(½ Mark for finding sum of each column)

(e)   Evaluate the following postfix notation of expression: 2

   50, 60, + , 20, 10, -, *

Ans	Element Scanned	STACK
	50	50
	60	50, 60
	+	110

20	110, 20
10	110, 20, 10
–	110, 10
*	1100

(2 Mark for evaluating 1100 as the final answer)

Note:

(½ Mark for writing only the final answer as 1100 without showing the operations or Stack)

4. (a) Observe the program segment given below carefully and fill the blanks marked as Statement 1 and Statement 2 using seekg( ), seekp( ), tellp( ) and tellg( ) functions for performing the required task. 1

#include<fstream.h>

class PRODUCT

{

    int Pno; char Pname[20); int Qty;

public :

    :

    void ModifyQty( ) ;

    // The function is to modify quantity of a PRODUCT

} ;

void PRODUCT: :ModifyQty ( )

{

    fstream File ;

    Fil.open ("PRODUCT.DAT", ios::binary |ios : : in| ios: :out) ;

    int MPno;

    cout<<"Product No to modify quantity : "; cin>>MPNo;

    While (Fil.read ((char*) this, sizeof (PRODUCT))

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```
        {
                if (MPno == Pno)
                {
                Cout<<"Present Quantity:"<<Qty<<end1 ;
                cout<<"Changed Quantity:";cin>>Qty ;
                int Position = _____;  //Statement 1
                _____; // Statement 2
                Fil.write ((char*) this, sizeof (PRODUCT)) ;
                                             //Re-writing the record
                }
        }
        Fil.close ( ) ;
}
```

Ans   Option 1

Statement 1:   File. tellp ( ) ;

OR   File.tellg ( ) ;

Statement 2:   File.seekp (FilePos - sizeof (PRODUCT)) ;

OR   File.seekp (-sizeof (PRODUCT), ios: :cur));

OR   File.seekg (FilePos - sizeof (PRODUCT));

OR   File.seekg (-sizeof (PRODUCT), ios: :cur));

Option 2

Statement 1:   File.tellp ( ) - sizeof (PRODUCT) ;

OR   File.tellg ( ) - sizeof (PRODUCT) ;

Statement 2:   File. seekp (FilePos) ;

OR   File.seekg (FilePos) ;

(½ Mark for writing Statement 1 correctly)

(½ Mark for writing Statement 2 correctly)

Note:

File / Fil both are acceptable as the name of the File object

(b) Write a function in C++ to count the no. of "Me" or "My" words present in a text file "DIARY. TXT".   2

If the file "DIARY.TXT" content is as follows:

My first book was Me and My

family. It gave me chance to be

known to the world.

The output of the function should be

Count of Me/My in file : 4

Ans   void COUNT ( )

{

```
ifstream Fil ("DIARY. TXT") ;

char STR [10] ;

int count = 0 ;

while (!Fil.eof ( ))

{

    Fil>>STR;

    if (strcmp (STR, "Me")==0 || strcmp (STR, "My") ==0)

        count++;

}

Cout<<"Count of Me/My in file : "<<count<<end1;

Fil.close( ) ; //Ignore
```

}

OR

Any other correct function definition performing the desired operation

(½ Mark for opening DIARY. TXT correctly)

(½ Mark for reading each word (Whichever method adopted) from, the file)

(½ Mark for comparing the word with 'Me' and 'My' and incrementing counter)

(½ Mark for displaying the number of 'Me/My' with/without the Text Message)

NOTE:

Ignore case sensitivity check for Me/My

(c)   Write a function in C++ to search for a laptop from a binary file "LAPTOP.DAT" containing the objects of class LAPTOP (as defined below). The user should enter the Model No and the function should search and display the details of the laptop.   3

class LAPTOP

{

       long ModelNo ;

       float RAM, HDD ;

       char Details [120] ;

public:

       void StockEnter ( )

       {cin>>ModelNo>>RAM>>HDD; gets (Details);}

       void StockDisplay ( )

       {cout<<ModelNo<<RAM<<HDD<<Details<<endl;}

       long ReturnModelNo ( ) {return ModelNo ;}

} ;

Ans   void Search( )

{

       LAPTOP L;

       long modelnum;

       cin>>modelnum;

       ifstream fin;

       fin.open ("LAPTOP.DAT", ios: :binary|ios: :in);

       while(fin.read ((char*) &L,sizeof (L)))

       {

           if (L.ReturnModelNo ( ) == modelnum)

              L.StockDisplay ( ) ;

360

}

        Fin.close() ; //Ignore

}

OR

void Search (long modelnum)

{

        LAPTOP L;

        ifstream fin;

        fin.open ("LAPTOP.DAT", ios: :binary|ios: :in) ;

        while (fin.read ((char*) &L,sizeof (L)))

        {

                if (L.ReturnModelNo ( ) == modelnum)

                        L.StockDisplay ( ) ;

        }

        fin.close ( ) ; //Ignore

}

(½ Mark for declaring and entering a model number for a LAPTOP to search OR passing it as a parameter to the function)

(½ Mark for opening LAPTOP.DA T correctly)

(½ Mark for reading each record from LAPTOP.DA T)

(½ Mark for correct loop / checking end of file)

(½ Mark for comparing value returned by ReturnModelNo( ) with model number entered)

(½ Mark for displaying the matching record)

5   (a)   What do you understand by Union & Cartesian Product operations in relational algebra?   2

    Ans   Cartesian Product (binary operator): It operates on two relations and is denoted by X. For example Cartesian product of two relations R1 and R2 is

represented by R = R1 X R2. The degree of R is equal to sum of degrees of R1 and R2. The cardinality of R is product of cardinality of R1 and cardinality of R2.

Example:

Relation: R1

Roll No	Student Name	Class
1	Akash	XII
4	Debakar	X
10	Rishi	XI

Relation: R2

Teacher Code	Teacher Name
102	Ms Rinee
309	Mr Tanmoy

Resultant: R = R1 × R2

Col1	Col2	Col3	Col4	Col5
1	Akash	XII	102	Ms Rinee
1	Akash	XII	309	Mr Tanmoy
4	Debakar	X	102	Ms Rinee
4	Debakar	X	309	Mr Tanmoy
10	Rishi	XI	102	Ms Rinee
10	Rishi	XI	309	Mr Tanmoy

Union (binary operator): It operates on two relations and is indicated by U. For example, R=R1 U R2 represents union operation between two relations R1 and R2. The degree of R is equal to degree of R1. The cardinality of R is sum of cardinality of R1 and cardinality of R2.

Following have to be considered for the operation R1 U R2.

●   Degree of R1 = Degree of R2

●   jth attribute of R1 and jth attribute of R2 must have a common domain.

Example:

Relation: R1

Student_ID	Name
R490	Fatima
R876	Faraz
R342	Gauri

Relation: R2

Student_Code	Student_Name
S123	Rekha
S456	Tushi

Resultant Relation: R = R1 U R2

Column 1	Column2
R490	Fatima
R876	Faraz
R342	Gauri
S123	Rekha
S456	Tushi

(1 Marie for explaining Union correctly)

(1 Marie for explaining Cartesian Product correctly)

Consider the following tables WORKER and PAYYLEVEL and answer
(b) and (c) parts of this question: 4

Table: WORKER

ECODE	NAME	DESIG	PLEVEL	DOJ	DOB
11	Radhe Shyam	Supervisor	P001	13- Sep- 2004	23-Aug-1981
12	Chander Nath	Operator	P003	22-Feb-2010	12-Jul-1987
13	Fizza	Operator	P003	14-Jun-2009	14-0ct-1983
15	Ameen Ahmed	Mechanic	P002	21-Aug-2006	13-Mar-1984
18	Sanya	Clerk	P002	19-Dec-2005	09-Jun-1983

Table: PAYLEVEL

PLEVEL	PAY	ALLOWANCE
P001	26000	12000
P002	22000	10000
P003	12000	6000

(b)   Write SQL commands for the following statements:

(i)   To display the details of all WORKERs in descending order of DOB.

SELECT FROM WORKER ORDER BY DOB DESC;

(1 Mark for correct query)

(½ Mark for partially correct answer)

(ii)   To display NAME and DE;SIG of those WORKERs, whose PLEVEL is either P001 or P002.

SELECT NAME, DESIG FROM WORKER

WHERE PLEVEL IN ('P001', 'P002') ;

OR

SELECT NAME, DESIG FROM WORKER

WHERE PLEVEL = 'P001' OR PLEVEL= 'P002';

(1 Marie for correct query)

(½ Marie for partially correct answer)

(iii) To display the content of all the WORKERs table, whose DOB is in between '19-JAN-1984' and '18-JAN-1987'.

SELECT * FROM WORKER

WHERE DOB BETWEEN '19-JAN-1984' AND '18-JAN-1987' ;

OR

SELECT * FROM WORKER

WHERE DOB >= '19-JAN-1984' AND DOB<='18-JAN-1987';

OR

SELECT * FROM WORKER

WHERE DOB > '19-JAN-1984' AND DOB<'18-JAN-1987' ;

(1 Mark for correct query)

(½ Mark for partially correct answer)

(iv)   To add a new row with the following:

19, 'Daya Kishore', 'Operator', 'P003', '19-Jun-2008', '11-Jun-1984'

INSERT INTO WORKER

VALUES (19, 'Daya Kishore', 'Operator' , 'P003' , '11-Jun-1984');

(1 Mark for correct query)

(½ Mark for partially correct answer)

(c)   Give the output of the following SQL queries: 2

(i)   SELECT COUNT (PLEVEL), PLEVEL FROM WORKER GROUP
      BY PLEVEL;

Ans.

COUNT (PLEVEL)	PLEVEL
1	P001
2	P002
2	P003

(½ Mark for correct output)

(ii)   SELECT MAX (DOB), MIN (DOJ) FROM WORKER;

MAX (DOB)	MIN (DOJ)
12-Jul-1987	13-Sep-2004

(Mark for correct output)

(iii)   SELECT Name, Pay FROM WORKER W, PAYLEVEL P

WHERE W. PLEVEL = S. PLEVEL AND P.ECODE<13 ;

Name	Pay
Radhe Shyam	26000
Chander Nath	12000

OR

P.ECode does not exist

(½ Mark for correct output)

OR

(Mark for writing No Output)

(iv)   SELECT PLEVEL, PAY+ALLOWANCE FROM PAYLEVEL

      WHERE PLEVEL= 'P003' ;

PLEVEL	PAY+ALLOWANCE
P003	118000

(½ Mark for correct output)

6   (a)   Verify the following using Truth Table.   2

$U \cdot (U' + V) = (U + V)$

Ans

U	V	U'	U'+V	U.(U'+V)	U+V
0	0	1	1	0	0
0	1	1	1	0	1
1	0	0	0	0	1
1	1	0	1	1	1

VERIFIED FALSE

(2 Marks to be awarded if Truth Table is made OR any equivalent term
conveying the same meaning)

(b)   Write the equivalent Boolean Expression for the following logic Circuit.   2

Ans   F=(X+Y').(X+Z')

(2 Marks for the final expression (X+Y').(X+Z')

OR

(1 Mark for anyone of the correct terms out of (X+Y') or (X+ Z')

(c)   Write the POS form of a Boolean function F, which is represented in a truth table as follows: 1

A	B	C	F
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1

Ans   F(A,B,C) = (A+B+C).(A+B'+C').(A'+B+C').(A'+B'+C)

(1 Mark for the correct POS form)

Note: Deduct ½ mark if wrong variable names are used

(d)   Reduce the following Boolean Expression using K-Map: 3

F(P, Q, R, S) = E (0,1,2,4,5,6,8, 12)

	P' Q'	P' Q	P Q	P Q'
R' S'	1	1	1	1
R' S	1	1		
R S				
R S'	1	1		

OR

	R' S'	R' S	R S	R S'
P' Q'	1	1		1
P' Q	1	1		1
P Q	1			
P Q'	1			

Ans F(P,Q,R,S) = P'R' + R'S' + P'S'

(½ Mark for placing all 1s at correct positions in K-Map)

(½ Mark for each grouping)

(1 Mark for writing final expression in reduced/minimal form)

Note: Deduct ½ mark if wrong variable names are used

7. (a) Differentiate between packet switching and message switching technique in network communication.   1

Ans Packet switching: In packet switching, a fixed size of data packet that can be transmitted across the network is specified and then the data packets are sent through switching stations to the final destination. All the packets are stored in the main memory instead of disk. As a result accessing time of packets is reduced.

Message switching: The source computer sends data (message) to the switching station, which stores data in a buffer. It then looks for a free link to another switching station and sends data to that station. This process continues until data is delivered to the destination computer. This type of switching technique is also known as "store and forward" switching.

(½ Marks for written OR diagrammatic explanation of correct Packet Switching)

(½ Marks for written OR diagrammatic explanation of correct Message Switching)

(b) Differentiate between BUS and STAR topology of networks.   1

Bus Topology	Star Topology
● Slower as compared to star topologies of network	● Expensive as compared to Bus topology

Ans (to the left of the table above)

- Breakage of wire at any point disturbs the entire network
- Long wire length

(½ Marks for written or diagrammatic explanation of correct Bus Topology)

(½ Marks for written or diagrammatic explanation of correct Star Topology)

(c) What is VoIP?   1

Ans Voice over Internet Protocol (Voice over IP, VoIP) is communication protocols and transmission technologies for delivery of voice communications and multimedia sessions over Internet Protocol (IP) networks, such as the Internet. Also, we can say, VoIP are IP telephony, Internet telephony and broadband telephony.

(1 Mark for explaining VoIP)

Note: 1 Mark for writing full form of VoIP

(d) Out of the following, identify client side script (s) and server side script(s).   1

    (a) ASP   (b) Javascript

    (c) VBScript   (d) JSP

Ans Java script & VB script are client side scripts

JSP & ASP are server side scripts

(½ Mark for writing correct Client Side Scripts)

(½ Mark for writing correct Server Side Scripts)

(e) Quick learn University is setting up its Academic blocks at Prayag Nagar and planning to set up a network. The university has 3 academic blocks and one Human Resource Center as shown in the diagram below.   4

Center to center distance between various block/center is as follows"

Law Block to Business Block	40m
Law Block to Technology Block	80m
Law Block to HR Center	105m
Business Block to Technology Block	30m
Business Block to HR Center	35m
Technology Block to HR Center	15m

Number of Computers in each of the Blocks/Centre is follows:

Law Block	15
Technology Block	40
HR Center	115
Business Block	25

(e1) Suggest the most suitable place (i.e. Block/Center) to install the server of this university with a suitable reason.

Ans HR center:

Reason as it has the maximum number of computers

OR

Business Block

Reason as it is closest to all other Centers (minimum cable length required)

(½ Mark for mentioning any correct place)

(½ Mark for correct reason)

OR

(1 Mark for any other location with a valid reason)

(e2) Suggest an ideal layout for connecting these blocks/centers for a wired connectivity.

Ans. Option 1:

Option 2:

(1 Mark for mentioning any valid connectivity or topology or diagram connecting various compounds inside the campus)

(e3) Which device you will suggest to be placed/installed in each of these blocks/center to efficiently connect all the computers with in these blocks/center.

Ans Switch

(1 Mark for mentioning correct device)

Note:

(1 mark to be awarded if Switch / Hub is mentioned)

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(e4) The university is planning to connect its admission office in the closest big city, which is more than 250 km from university, which type of network out of LAN, MAN or WAN will be formed? Justify your answer.

Ans WAN as the given distance is more than the range of LAN and MAN.

(1 Mark for correct network type)

(f) Which of the following will come under Cyber Crime?   1

    (i)   Theft of a brand new sealed pack Laptop

    (ii)   Access to a bank account for getting unauthorized Money Transaction

    (iii) Modification in a company data with unauthorized access

    (iv) Photocopying a printed report

Ans. (ii)   and   (iii)

Note:

No marks to be awarded for any other alternative answer

(½ Mark for each correct option)

(g) Compare open source software and proprietary software.   1

Ans. Open source software refers to a program or software in which the source code (the form of the program when a programmer writes a program in a particular programming language) is available to the general public for use and/or modification from its original design free of charge.

Proprietary software is software that is owned by an individual or a company (usually the one that developed it). There are almost always major restrictions on its use, and its source code is almost always kept secret.

(½ Mark for each correct explanation/comparison)

MARKING SCHEME COMPUTER SCIENCE
QUESTION PAPER CODE 91
EXPECTED ANSWERS

1. (a)   What is the difference between Type Casting and Automatic Type conversion? Also, give a suitable C++ code to illustrate both.

Ans Automatic Type Conversion: It is an implicit process of conversion of a data from one type to another. For example:

int N = 65;

char C = N; // Automatic type conversion ; conversion

cout<<C;

Type Casting: It is an explicit process of conversion of a data from one type to another. For example

int A=1, B=2;

float C = (float) A/B; //Type Casting

cout<<C;

(½ Mark for each correct explanation of Automatic Type Conversion and Type Casting)

(½ Mark for each correct example of Automatic Type Conversion and Type Casting)

OR

(Full 2 Marks for correct example(s) demonstrating the meaning of / difference between Automatic Type Conversion and Type Casting)

OR

(Only 1 Mark to be awarded if Explanation is given without supporting example)

(b) Write the names of the header files, which is/are essentially required to run/ execute the following c++ code:

```
void main ( )
{
    char CH,Text[ ] ="+ve Attitude";
    for (int I=0 ; Text[I] ! ='\0' ;I++)
        if (Text[I]==' ')
            cout<<end1;
        else
        {
```

```
                    CH=toupper (Text [I]) ;

                    cout<<CH;

              }

      }
```

Ans   iostream.h

ctype.h

(½ Mark for writing each correct header file)

(c)   Rewrite the following program after removing the syntactical errors (if any).
Underline each correction.   2

```
include<iostream.h>

typedef char [80] String;

void main ( )

{
      String S= "Peace";

      int L=strlen(S) ;

      cout<<S<< 'has'<<L<< 'characters'<<end1;

}
```

Ans   <u>#</u>include<u><string.h></u>

<u>#</u>include<iostream.h>

typedef <u>char String [80];</u>

void main ( )

{
      String S = "Peace";

      int L= strlen(S) ;

      cout<<S<< <u>"has"</u> << L << <u>"characters"</u><<end1;

}

(d)   Find the output of the following program: 3

```
#include<iostream.h>
void SwitchOver(int A [ ], int N, int Split)
{
      for (int K=0 ; K<N; K++)
            if (K<Split)
                  A(K]+ =K;

            else
                  A [K]*=K;
}
void Display (int A [ ], int N)
{
      for (int K=0 ; K<N ; K++)
            (K%2==0)? cout<<A[K]<<"%":cout<<A(K]<<end1;
}
void main ( )
{
      int H[ ]= {30,40,50,20,10,5};
      SwitchOver (H, 6, 3);
      Display (H, 6);
}
```

Ans   30%41

52%60

40%25

(1 Mark for each line with correct values)

Note:

Deduct ½ Mark if any/all '% t missing

Deduct ½ Mark if endl is not considered at the right positions

(e)   Find the output of the following program: 2

```
#include<iostream.h>

void main ( )

{
        int *Queen, Moves [ ] = {11, 22, 33, 44};

        Queen = Moves;

        Moves [2] + = 22;

        Cout<< "Queen @"<<*Queen<<end1;

        *Queen - = 11;

        Queen + = 2;

        cout<< "Now @"<<*Queen<<end1;

        Queen++;

        cout<< "Finally@"<<*Queen«end1;

        cout<< "New Origin @"<<Moves[0]<<end1;

}
```

Ans   Queen @11

Now @55

Finally @44

New origin @0

(½ Mark for writing each line of output correctly)

Note:

Deduct ½ Mark if any/all '@' missing or/and endl is not considered at the right positions

(f) Go through the C++ code shown below, and find out the possible output or outputs from the suggested Output Options (i) to (iv). Also, write the minimum and maximum values, which can be assigned to the variable MyNum. 2

```cpp
#include<iostream.h>

#include <stdlib.h>

void main ( )

{

randomize ( ) ;

int MyNum, Max=5;

MyNum = 20 + random (Max) ;

for (int N=MyNum; N<=25;N++)

cout<N<"*";

}
```

(i) 20*21*22*23*24*25

(ii) 22*23*24*25*

(iii) 23*24*

(iv) 21*22*23*24*25

Ans ii) 22*23*24*25*

Minimum value 20

Maximum value 24

(1 Marie for mentioning correct option)

(½ Mark for mentioning correct minimum value of MyNum)

(½ Marie for mentioning correct maximum value of MyNum)

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2. (a) Differentiate between Constructor and Destructor function with respect to Object Oriented Programming. 2

Ans

Constructor	Destructor
It is a special member function of class with the following unique features:	It is a special member function of class with the following unique features:
● It has same name as the name of the class they belong to.	● It has same name as the name of the class preceded by a symbol ~ (tilde).
● It has no return type.	● It has no return type.
● It is defined in public visibility mode	● It is defined in public visibility mode
● It is automatically called and executed at the time of creation/declaration of the object	● It is automatically called and executed when scope of an object gets over
● Constructor can be overloaded.	● Moreover, destructor functions can NOT be overloaded.
class Trial	class Item
}	{
int a,b;	public:
public:	Item ( )
Trial ( ) {a=0;b=0;}//Constructor	{cout<<"Item Manufactured.."<<endl}
void Disp ( )	void Working ( )
{	{cout<<"Item is Working"<<endl;}
cout<<a<<b<<endl;	~Item( )//Destructor
}	{cout<<"Item destroyed..."«end1}
} ;	} ;
void main ( )	void main ( )
{	{
Trial T; //Constructor invoked	Item I;
T . Disp ( ) ;	I . Working ( ) ;

	for (int C=0; C<2; C++)
}	{
	Item J;
	J.Working ( ) ;
	}// Call of Destructor for J
	}// Call of Destructor for I

(1 Marie for correct explanation OR example illustrating a Constructor)

(1 Marie for correct explanation OR example illustrating a Destructor)

(b) Write the output of the following C++ code. Also, write the .name of feature of Object Oriented Programming used in the following program jointly illustrated by the function [I] to [IV]   2

```
#include<iostream.h>

void Line ( )                                              //Function [I]
{
    for (int L=1;L<=80;L++)      cout<<"-";
    cout<<end1;
}

void Line (int N)                                         //Function[II]
{
    for (int L=l;L<=N;L++)      Cout<<"*";
    cout<<endl;
}

void Line (char C, int N)                                //Function [III]
{
    for (int L=l;L<=N;L++)      cout<<C;
    cout<<end1;
}
```

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```
void Line (int M, int, N)                              //Function [IV]

{

        for (int L=1;L<=N;L++)        cout<<M*L;

        cout<<end1;

}

void main ( )

{

        int A=9, B=4, C=3;

        char K= '#' ;

        Line (K,B);

        Line (A,C);

}
```

Ans   ####

       91827

       Polymorphism OR Function Overloading

       (½ Mark for writing each correct line of output)

       (1 Mark for writing the feature. name correctly)

(c)   Define a class Applicant in C++ with following description: 4

       Private Members

       ●   A data member ANo (Admission Number) of type long

       ●   A data member Name of type string

       ●   A data member Agg (Aggregate Marks) of type float

       ●   A data member Grade of type char

       ●   A member function GradeMe() to find the Grade as per the Aggregate
       Marks obtained by a student. Equivalent Aggregate Marks range and
       the respective Grades are shown as follows:

Aggregate Marks	Grade
>=80	A
less than 80 and >=65	B
less than 65 and >=50	C
less than 50	D

Public Members

- A function ENTER() to allow user to enter values for ANo, Name, Agg & call function GradeMe() to find the Grade.

- A function_RESULT( ) to allow user to view the content of all the data members.

Ans   class Applicant

{

long ANo;

char Name [20] ;

float Agg;

char Grade;

void Grademe ( ) ;

public:

void Enter ( ) ;

void Result ( ) ;

} ;

void Applicant: :GradeMe( )

{

if (Agg>=80)

Grade=' A' ;

else if(Agg>=65)

Grade=' B' ;

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```
        else if(Agg>=50)

                Grade=' C' ;

        else

                Grade=' D' ;

}

void Applicant: :Enter ( )

{

        cin>>ANo;

        gets (Name) ;

        cin>>Agg;

        GradeMe() ;

}

void Applicant: :Result ( )

{

        cout<<ANo<<Name<<Agg<<Grade<<end1;

}
```

(½ Mark for correct syntax for class header)

(½ Mark for correct declaration of data members)

(1 Mark for correct definition of GradeMe( ))

(1 Mark for correct definition of Enter() with proper invocation of GradeMe( ) function)

(1 Mark for correct definition of Result())

NOTE:

½ mark to be deducted if Grademe() is not invoked within Enter()

No marks to be deducted if member function definitions are inside the Class

(d)   Answer the questions (i) to (iv) based on the following: 4

class Student

{

      int Rollno:

      char SName[20];

      float Marksl;

protected:

      void Result ( ) ;

public:

      Student ( ) ;

      void Enroll ( ) ;void Display ( ) ;

} ;

class Teacher

{

      long TCode;

      char TName [20];

protected:

      float Salary;

public:

      Teacher ( );

      void Enter ( ) ;

      void Show ( ) ;

} ;

class Course: public Student, private Teacher

}

      long CCode [10]; char CourseName [50];

      char StartDate [8] , EndDate [8];

public:

        Course ( ) ;

        void Commence ( );

        void CDetail ( ) ;

} ;

(i)   Write the names of member functions, which are accessible from objects of class Course

Ans   Commence( )

      CDetail( )

      Enroll( )

      Display( )

      (1 Mark for correct answer)

      Note:

      No marks to be awarded for a partially correct answer

      Constructor functions to be ignored

ii)   Write the names of all the data members, which is/are accessible from member function Commence of class Course

Ans   CCode

      CourseName

      StartDate

      EndDate

      Salary

      (1 Mark for correct answer)

      Note:

      No marks to be awarded for a partially correct answer

iii) Write the names of all the-members, which are accessible from objects of class Teacher.

Ans   Enter( ), Show( )

iv) Which type of Inheritance is illustrated in the above C++ code?

Ans   Multiple Inheritance

3.   (a)   Write a Get2From1() function in C++ to transfer the content from one array ALL[] to two different arrays Odd[] and Even[]. The Odd[] array should contain the values from odd positions (1,3,5,...) of ALL[] and Even [] array should contain the values from even positions (0, 2, 4,.….) of ALL [].   3

Example

If the ALL[] array contains

12, 34, 56, 67, 89, 90

The Odd[] array should contain

34, 67, 90

And the Even [] array should contain

12,56,89

Ans   voil Get2From1 (int All [],int Even [], int Odd [], int Size)

{

    int J=0,K=0;

    for (int I=0 ;I<Size; 1++)

    {

        if (I%2==0)

        {

```
                    Even [J]=All[I] ;

                    J++;

            }

        else

            {

                    Odd[K]=All[I];

                    K++;

            }

        }

    }
```

(1 Mark for correct loop)

(½ Mark for checking even locations)

(½ Mark for checking odd locations or writing else for even locations)

(½ Mark for assigning elements to the corresponding Even and Odd Array)

(½ Mark for incrementing Even and Odd Array Locations)

(b)   An array G[50][20] is stored in the memory along the row with each of its elements occupying 8 bytes. Find out the location of G[10][15], if G[0][0] is stored at 4200.   3

Ans   Assuming LBR=LBC=0

B=4200

W=8 bytes

Number of Rows(N)=50

Number of Columns (M)=20

LOC(Arr[I] [J])   = B +(I*M + J) *W

LOC (Arr [10] [15])   = 4200+ (10*20+15)*8

                        = 4200 + (215*8)

                        = 4200+1720

                        = 5920

(1 Mark for writing correct formula (for row major)

OR substituting formula with correct values for calculating Address)

(2 marks for calculating correct address)

Note:

1 mark to be awarded for writing only the correct answer i.e. 5920, without showing any formula/calculation.

(c)   Write a function in C++ to perform Delete operation on a dynamically allocated Queue containing Members details as given in the following definition of NODE: 4

struct NODE

{

      long Mno   //Member Number

      char Mname[20];   //Member Name

      NODE *Link;

};

Ans   class Queue

{

      NODE *Front, *Rear;

public:

      Queue ( ) {Front = NULL; Rear = NULL; }

      void QueAdd ( );

      void QueDel ( );

      void QueDis ( );

      ~Queue();

} ;

void Queue: :QueDel ( )

{

      if (Front!=NULL)

```
        {

                NODE *Temp=Front;

                cout<<Front->Mno<< " " ;

                cout<<Front->Mname<< "Deleted";

                Front=Front->Link;

                delete Temp;

                if (Front==NULL) Rear=NULL;

        }

        else

                cout<<"Underflow ! Queue is empty. .";

}
```

(1 Mark for checking Empty Queue)

(½ Mark for assigning Front to Temp)

(1 Mark for reassigning Front with Front->Link)

(1 Mark for deleting Temp)

(½ Mark for assigning Rear with NULL if Queue becomes Empty)

(d)   Write a DSUMO function in C++ to find sum of Diagonal Elements from a NxN Matrix.   2

(Assuming that the N is a odd number)

Ans   void DSUM (int A [ ] [100] ,int N)

```
{

        int SUMR =0, SUML=0;

        for (int i=0; i<N;i++}

        {

                SUMR=SUMR + A[i] [i] ;

                SUML = SUML + A[i] [N-1-i] ;

        }
```

```cpp
        cout<< " Sum of Diagonal Elements = "<<SUMR + SUML –

A[N/2] [N/2] ;

}

OR

void DSUM (int A[] [100], int N)

{

        int SUMR =0, SUML=0;

        for (int i=0; i<N; i++)

        {

                SUMR = SUMR + A[i] [i] ;

                SUML = SUML + A[i] [N-1-i] ;

        }

        cout<< "Sum of Right Diagonal Elements = "<<SUMR<<end1;

        cout<< "Sum of Left Diagonal Elements = "<<SUML<<end1;

}

OR

void DSUM (int A[] [100] , int N)

{

        int SUMR =0, SUML=0;

        for (int i = 0; i<N; i++)

        {

                for (int j = 0; j<N; j++)

                {

                        if (i==j)

                                SUMR=SUMR + A[i] [j] ;

                        else if (i+j == N-1)

                                SUML = SUML + A[i] [j];
```

```
                    }

                }

                cout<< "Sum of Diagonal Elements ="<< SUMR + SUML - A[N/2] [N/2];

        }
```

(½ Mark for writing correct Function Header)

(½ Mark for writing correct loop)

(1 Mark for finding sum of Right Diagonal Elements and/or Left Diagonal Elements)

(e)   Evaluate the following postfix notation of expression: 2

        True, False, NOT, AND, True, True, AND,OR

Ans   Element Scanned   STACK Status

        True   TRUE

        False   TRUE, FALSE

        NOT   TRUE, TRUE

        AND   TRUE

        True   TRUE, TRUE

        True   TRUE, TRUE, TRUE

        AND   TRUE, TRUE

        OR   TRUE

                                   Final Result: TRUE

(½ Mark for evaluating each operator correctly)

OR

(½ Mark only for writing TRUE as the final answer without showing any calculation/Stack)

4.   (a)   Observe the program segment given below carefully and fill the blanks marked
             as Statement 1 and Statement 2 using seekg( ), seekp( ) tellp( ) and tellg( )
             functions for performing the required task.   1

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```cpp
#include <fstream.h>
class ITEM
{
        int Ino;char Iname[20]; float Price;
        public:
        void ModifyPrice() ;//The function is to modify
                price of a particular ITEM
} ;
void item: :ModiyPrice()
{
        fstream File;
        File.open ("ITEM.DAT", ios::binary | ios::in | ios: :out) || ;
        int CIno;
        cout<<"Item No to modify price:";cin>>CIno;
        while (file.read ((char*) this, sizeof (ITEM)))
        {
                if (CIno==Ino)
                {
                        cout<<"Present Price:"<<Price<<end1;
                        cout<<"Changed price:"; cin>>Price;
                        int FilePos = _____ ;  //Statement 1,
                        _____;  //Statement 2
                        File.write((char*)this,sizeof(ITEM)) ;
                                        // Re-writing the record
                }
        }
        File.close( ) ;
}
```

Ans   Option 1

Statement 1: File.tellp ( ) ; OR File. tellg ( ) ;

Statement 2: File.seekp (FilePos - sizeof (ITEM)) ;

OR   File.seekp (-sizeof (ITEM), ios: :cur));

OR   File.seekg(FilePos - sizeof (ITEM));

OR.   File.seekg(-sizeof (ITEM), ios: :cur));

Ogtion 2

Statement 1: File. tellp ( ) – sizeof (ITEM) ;

OR   File.tellg()- sizeof (ITEM) ;

Statement 2: File.seekp (FilePos) ;

OR   File.seekg (FilePos) ;

(½ Mark for writing Statement 1 correctly)

(½ Mark for writing Statement 2 correctly)

(b)   Write a function in C++ to count the no. of "He" or "She" words present in a text file "STORY. TXT".   2

If the file "STORY. TXT" content is as follows:

He is playing in the ground. She is

Playing with her dolls.

The output of the function should be
Count of He/She in file: 2

Ans   void COUNT ( )

```
{
    ifstream Fil ("STORY.TXT");
    char STR [10];
    int count = 0;
    while (!Fil.eof ( ))
    {
```

Fil>>STR ;

if (strcmp (STR, "He") ==0 || strcmp (STR, "She") = =0)

count++;

}

Cout<<"Count of He/She in file : "<<count<<end1;

Fil.close( ); //Ignore

}

OR

Any other correct function definition performing the desired operation

(½ Mark for opening STORY. TXT correctly)

(½ Mark for reading each word (Whichever method adopted) from the file)

(½ Mark for comparing the word with 'He' and 'She' and incrementing counter)

(½ Mark for displaying the count of 'He/She' with/without the Text Message)

Note: Ignore case sensitivity for He/She

(c) Write a function in C++ to search for a camera from a binary file "CAMERA.DAT" containing the objects of class" CAMERA (as defined below). The user should enter the Model No and the function should search display the details of the camera.   3

class CAMERA

```
{
    long ModelNo;
    float MegaPixel;
    int Zoom;
    char Details[120];
public:
    void Enter ( ) {cin>>ModelNo>>MegaPixel>>Zoom;gets(Details);}
    void Display ( )
        {cout<<ModelNo<<MegaPixel<<Zoom<<Details<<endl;}
    long GetModelNo ( ) {return ModelNo;}
};
```

Ans void Search ( )

{

    CAMERA C;

    long modelnum;

    cin>>modelnum;

    ifstream fin;

    fin.open ("CAMERA.DAT", ios: :binary|ios: :in) ;

    while (fin.read((char*) &C,sizeof (C)))

    {

        if (C. GetModelNo ( )   modelnum)

            C.Display() ;

    }

    Fin.close( ) ; //Ignore

}

OR

void Search (long modelnum)

{

    CAMERA C;

    ifstream fin;

    fin.open ("CAMERA.DAT", ios: :binary|ios: :in);

    while(fin.read((char*)&C,sizeof(C)))

    {

        if (C.GetModelNo() == modelnum)

            C. Display ();

    }

    Fin.close( );//Ignore

}

(½ Mark for declaring and entering a model number for a camera to search

OR passing it as a parameter to the function)

(½ Marie for opening CAMERA.DAT in correct mode)

(½ Marie for reading each record from CAMERA.DAT)

(½ Marie for correct loop / checking end of file)

(½ Marie for comparing value returned by GetModelNo() with model number entered)

(½ Marie for displaying the matching record)

5.   (a)   What do you understand by Selection & Projection operations in relational algebra?   2

Ans   Projection for selecting the columns of table

Selection for selecting the rows of table

(1 Marie for correct explanation of Projection)

(1 Marie for correct explanation of Selection correctly)

OR

(Full 2 Marks for correct example(s) demonstrating the meaning of Projection & Selection)

Consider the following tables EMPLOYEE and SALGRADE and answer (b) and (c) parts of this question:

Table: EMPLOYEE

ECODE	NAME	DESIG	SGRADE	DOJ	DOB
101	Abdul Ahmad	EXECUTIVE	S03	23-Mar-2003	13-Jan-1980
102	Rav:i. Chander	HEAD-IT	S02	12-Feb-2010	22-Jul-1987
103	John Ken	RECEPTIONIST	S03	24-June-2009	24-Feb-1983
105	Nazar Ameen	GM	S02	11-Aug-2006	03-Mar-1984
108	Priyam Sen	CEO	S01	29-Dec-2004	19-Jan-1982

Table: SALGRADE

SGRADE	SALARY	HRA
S0l	56000	18000
S02	32000	12000
S03	24000	8000

(b)　Write SQL commands for the following statements:

(i)　To display the details of all EMPLOYEEs, in descending order of DOJ

Ans　SELECT * FROM EMPLOYEE ORDER BY DOJ DESC;

(1 Mark for correct query)

OR

(½ Mark for partially correct answer)

(ii)　To display NAME and DE51G of those EMPLOYEEs, whose 5ALGRADE is either 502 or 503

Ans　SELECT NAME, DESIG FROM EMPLOYEE

WHERE SGRADE = 'S02' OR SGRADE= 'S03';

OR

SELECT NAME, DESIG FROM EMPLOYEE

WHERE SALGRADE ='S02' OR SALGRADE='S03';

(1 Mark for correct query)

OR

(½ Mark for partially correct answer)

(iii)　To display the content of all the EMPLOYEEs table, whose DOJ is in between'09-Feb-2006' and '08-Aug-2009'.

Ans　SELECT * FROM EMPLOYEE

WHERE DOJ BETWEEN '09-Feb-2006'and '08-Aug-2009';

OR

SELECT * FROM EMPLOYEE

WHERE DOJ > = '09-Fab-2006' and DOJ <='08-Aug-2009';

OR

SELECT * FROM EMPLOYEE

WHERE DOJ > '09-Feb-2006' and DOJ <' 08-Aug-2009" ;

(1 Mark for correct query)

OR

(½ Mark for partially correct answer)

(iv) To add a new row with the following:

109, 'Harish Roy', 'HEAD-IT', 'S02', '09-Sep-2007, '21-Apr-1983'

Ans INSERT INTO EMPLOYEE

VALUES(109,'Harish Roy' ,'HEAD-IT' ,'S02' ,'09-Sep-2007' ,'21-Apr-1983') ;

(1 Mark for correct query)

OR

(½ Mark for partially correct answer)

(c) Give :the output of the following SQL queries: 2

(i) SELECT COUNT (SGRADE),SGRADE FROM EMPLOYEE GROUP BY SGRADE;

Ans

COUNT (SGRADE)	SGRADE
1	S01
2	S02
2	S03

(½ Mark. for correct output)

(ii) SELECT MIN(DOB), MAX (DOJ) FROM EMPLOYEE;

Ans

MIN (DOB)	MAX (DOJ)
13-Jan-1980	12-Feb-2010

(½ Mark for correct output)

(iii)   SELECT NAME , SALARYFROM EMPLOYEE E, SALGRADE S WHERE
        E.SGRADE= S.SGRADE AND E.ECODE<103;

Ans

Name	Salary
Abdul Ahmad	24000
Ravi Chander	32000

(½ Mark for correct output)

(iv)   SELECT SGRADE, SALARY+HRA ET:)M SALGRADE WHERE SGRADE=
        'S02';

Ans

SGRADE	SALARY+HRA
S02	44000

(½ Mark for correct output)

6   (a)   Yerify the following using Truth Table: 2

          X+Y. Z=(X+Y).(X+Z)

Ans

X	Y	Z	Y.Z	X+Y.Z	X+Y	X+Z	(X+Y).(X+Z)
0	0	0	0	0	0	0	0
0	0	1	0	0	0	1	0
0	1	0	0	0	1	0	0
0	1	1	1	1	1	1	1
1	0	0	0	1	1	1	1
1	0	1	0	1	1	1	1
1	1	0	0	1	1	1	1
1	1	1	1	1	1	1	1

VERIFIED

(2 Mark for correct verification using Truth Table)

NOTE: No marks are to be awarded if only algebraic proof is given.

(b)   Write the equivalent Boolean Expression for the following Logic Circuit: 2

Ans   F = P.Q' + P.R'

(2 Marks for the final expression P.Q'+P.R')

OR

(1 Mark for anyone of the correct terms out of P .Q' or P .R'

(c)   Write the SOP form of a Boolean function F, which is represented in a truth
       table as follows: 1

U	V	W	F
0	0	0	1
0	0	1	0
0	1	1	1
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	1

Ans   F(U, V, W) = U'.V'.W'+ U'.V.W + U.V.W'+ U.V.W

(1 Mark for the correct SOP form)

Note: Deduct ½ mark if wrong variable names are used

(d)   Reduce the following Boolean Expression using K-Map: 3

F(A, B,C, D) = Σ (0,1, 2, 4, 5, 6, 7, 8, 10)

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	A' B'	A' B	AB	AB'
C' D'	1	1		1
C' D	1	1		
C D				
C D'	1	1		1

OR

	C'D'	C'D	CD	CD'
A' B'	1	1		1
A' B	1	1		1
A B				
A B'	1			1

Ans   F (A,B,C,D) = A'C' + A'D' + B'D'

(½ Mark for placing all 1s at correct positions in K-Map)

(½ Mark for each grouping)

(1 Mark for writing final expression in reduced/minimal form)

Note : Deduct ½ mark if wrong variable names are used

7.   (a)   In networking, what-is WAN? How is it different from LAN?   1

Ans   A WAN (wide area network), is not restricted to a geographical location, although it might be confined within the bounds of a state or country. A WAN connects several LANs, and may be limited to an enterprise (a corporation or an organization) or accessible to the public. The technology is high speed and relatively expensive. The Internet is an example of a worldwide public WAN.

A LAN (local area network) is a group of computers and network devices connected together, usually within the same building or campus.

(½ Marks for writing WAN correctly)

(½ Marks for writing LAN correctly)

(b)　Differentiate between XML and HTML.　　　　　　　　　1

Ans　The Extensible Markup Language (XML) was initially visualized as a language for defining new document formats for the World Wide Web. XML is text-based formats that provide mechanisms for describing document structures with the help of user defined Tags.

HTML - short for Hypertext Markup Language is the predominant markup language for the creation of web pages. It provides a means to describe the structure of text-based information in a document by denoting certain text as headings, paragraphs, lists, and to supplement that text with interactive forms, embedded images, and other objects using predefined Tags.

(½ Marks for explaining XML correctly)

(½ Marks for explaining HTML correctly)

OR

(½ Mark Only if correct expansion of both the terms XML and HTML are given)

(c)　What is WEB2.0?　　　　　　　　　　　　　　　　1

Ans　The term Web 2.0 is associated with **web applications that facilitate participatory information sharing,** interoperability, **user-centered design, and collaboration on the World Wide Web.** Web 2.0 is also used for social networking. Example: **Social Networking Sites, Blogs, Facebook,** Video Sharing Sites, Video Conferencing Applications etc.

(1 Mark for correctly explaining Web 2.0 - anyone of the highlighted text to be consider appropriate)

Note: Only ½ Mark for mentioning an example or an improved Web Application of WWW

(d)　Out of the following, identify client side script (s) and server side script (s).　　1

　　(i)　　Javascript

　　(ii)　　ASP

　　(iii)　　vbscript

　　(iv)　　JSP

Ans   Javascript & vbscript are client side scripts

JSP & ASP are server side scripts

(½ Mark for writing correct 'Client Side Scripts)

(½ Mark for writing correct Server Side Scripts)

(e)   Great Studies University is setting up its Academic schools at Sunder Nagar
and planning to set up a network. The university has 3 academic schools and
one administration center as shown in the diagram below: 4

Center to center distances between various buildings is as follows :

Law School to Business School	60m
Law School to Technology School	90m
Law School to Admin Center	115m
Business School to Technology School	40m
Business School to. Admin Center	45m
Technology School to Admin Center	25m

Number of Computers in each of the Schools/Center is follows:

Law School	25
Technology School	50
Admin Center	125
Business School	35

(i) Suggest the most suitable place (i.e. School/Center) to install the server of this
university with a suitable reason. 1

Ans Option 1 :

Admin center as it has the most number of computers

Option 2.

Business School as it will require minimum cable length to connect other blocks

(½ Mark for mentioning the correct place)

(½ Mark for mentioning a valid reason)

OR

(1 Mark for any other location with a valid reason)

(ii) Suggest an ideal layout for connecting these schools/ center for a wired
connectivity. 1

Ans Option 1:

Option 2:

(1 Mark for mentioning any valid connectivity or topology or diagram connecting various compounds inside the campus)

(iii) Which device will you suggest to be placed/installed in each of these schools / center to efficiently connect all the computers within these schools / center?   1

Ans Switch

(1 Mark for mentioning correct device)

NOTE: Award 1 full mark if Hub/Switch is mentioned.

(iv) The university is planning to connect its admission office in the closest big city, which is more than 350 km from the university. Which type of network out of LAN, MAN or WAN will be formed? Justify your answer.   1

Ans WAN as the distance is more than the range of LAN or MAN.   1

(1 Mark for correct network type)

(f) Compare Open Source Software and Proprietary Software.   1

Ans Open source software refers to a program or software in which the source code (the form of the program when a programmer writes a program in a particular programming language) is available to the general public for use and/or modification from its original design free of charge.

Proprietary software is software that is owned by an individual or a company (usually the one that developed it). There are almost always major restrictions on its use, and its source code is almost always kept secret.

(1 Mark for correct/valid comparison)

OR

(Mark for defining each term correctly)

(g) What are cookies?   1

Ans A small piece of information that a server sends to a client. When a person visits a Web site with cookie capabilities, its server sends certain information about him/her to the browser, which is stored on his/her hard drive as a text file. At some later time (such as returning to the site the next day), the server retrieves the cookie.

(1 Mark for correct definition)

ENGINEERING GRAPHICS

Time allowed : 3 hours   *Maximum Marks : 70*

Note :

(i)   *Attempt **all** the questions.*

(ii)   *Use both sides of the drawing sheet, if necessary.*

(iii)   *All dimensions are in millimetres.*

(iv)   *Missing and mismatching dimensions, if any, may be suitably assumed.*

(v)   *Follow the SP : 46-1988 codes*

   (with First Angle method of projection).

(vi)   *In no view of Question 1 and in no sectioned view of question 3, are hidden edges / lines required.*

QUESTION PAPER CODE 68/1

1.   (a)   Construct an isometric scale, 110 mm long.   4

   (b)   Construct the isometric projection, to isometric scale, of a hemisphere (diameter = 70 mm), resting on H.P. with its circular face on it. The axis is parallel to V.P.

   Draw the axis, marking the centre of its circular base on H.P. Give dimensions.   7

   (c)   A pentagonal pyramid (base edge 30 mm and height 70 mm) is placed, centrally, on the top triangular face of a triangular prism (base side 90 mm and height 30 mm), with its pentagonal base on the prism. One base side of the pyramid, is parallel to V.P. and away from it. One side of the base of the prism, is parallel to V.P. and closer to the observer.

   Draw the isometric projection of the solids, placed together, to isometric scale. Draw their common vertical axis and indicate the direction of viewing. Give all dimensions.   14

2. (a) Draw to scale 1 : 1, the front view and top view of a Square Nut, for a nominal diameter d = 30 mm, keeping its axis perpendicular to H.P. and two sides of the square, parallel to V.P. Give all standard dimensions.   9

OR

Draw to scale 1 : 1, the front view and top view of a Hook Bolt, taking nominal diameter = 26 mm and keeping its axis perpendicular to H.P. Give standard dimensions.

(b) Sketch freehand the front view and the top view of a Stud with Collar, keeping the axis perpendicular to H.P. Take nominal diameter = 25 mm. Give standard dimensions.   6

OR

Sketch freehand the front view and the top view of a Pan Head Rivet (without tapered neck), keeping the axis vertical. Take diameter of the rivet as 25 mm. Give standard dimensions.

3. Figure 1 shows the details of the parts of a Flanged Pipe Joint. Assemble these parts, correctly, and draw, to scale 1 : 1, the following views:

(a) Front view, lower-half in section.   15

(b) Side view, as seen from the right.   9

Print,. title and scale used. Draw the projection symbol. Give 6 important dimensions.   6

Fig. 1

406

OR

Figure 2 shows the front view of a Footstep Bearing assembly. Dismantle the parts. and draw the following views, to scale 1 : 1. Keep the same position of the parts with respect to H.P. and V.P. :

(a) Front view of the Bush, showing the left half in section.   17

(b) Front view of the Pad, showing right half in section.   7

Print titles of both and scale used. Draw the projection symbol. Give 6 important dimensions.   6

Fig. 2

1.   (a)   Construct an isometric scale, 100 mm long.   4

     (b)   Construct the isometric projection, to isometric scale, of a hemisphere (diameter
           = 80 mm), resting on H.P. with its curved surface on it and top circular face,
           parallel to H.P. The axis is perpendicular to H.P. Draw the axis, marking the
           center of its circular face and its height from H.P. Give dimensions.   7

     (c)   A square prism (base edge 80 mm and height 30 mm) is resting on H.P., with
           its square base on it. One of the base edges of the prism, is parallel to V.P.

           A hexagonal pyramid (base edge = 30 mm and height = 70 mm) is placed,
           centrally, on its top square face, with its hexagonal base on it.

           One of the base edges of the pyramid, is parallel to V.P.

           Draw the isometric projection of the solids, placed together, to isometric
           scale. Draw the common axis and show the direction of viewing. Give all
           dimensions.   14

2.   (a)   Draw to scale 1 : 1, the full sectional front view of a single riveted lap joint.
           Take thickness of the plates as 16 mm. Give standard dimensions.   9

OR

           Draw to scale 1 : 1, the front view of a hexagonal headed bolt of size, M26 x
           4 x 120 mm long, fitted with a washer of 55 mm diameter and thickness 4 mm
           and a square nut. Keep the common axis parallel to H.P. and V.P. Give standard
           dimensions;

     (b)   Sketch free-hand the front view and top view of a 90° flat countersunk-head
           screw of size, M20. Keep the axis vertical. Give standard dimensions.   6

OR

           Keeping its axis vertical, sketch free-hand the front view and the top view of
           a flat head rivet of diameter 25 mm. Give standard dimensions.

3.   Figure 1 shows the details of the parts of a Turnbuckle. Inserting 50 mm length of
     each one of the threaded ends of the rods A and B, assemble these parts, correctly,
     and draw the following views, to a scale full size :

(a)   Sectional front view, bottom half in section.   15

(b)   Side view, as viewed from the right.   9

Print titles and scale used. Draw the projection symbol. Give 6 important dimensions.   6

TURNBUCKLE

OR

Figure 2 shows the front view of the assembly of the Knuckle Joint. Disassemble the parts and draw the following views to scale 1 : 1. Keep the same position of the parts with respect to H.P. and V.P. :

(a)   Front view of the Fork, full in section.   16

(b)   Front view of the Collar, full in section.   8

Print titles of both and scale used. Draw the projection symbol. Give 6 important dimensions.   6

FIG. 2

KNUCKLE JOINT

Marking Scheme – Engineering Graphics

All Questions are to be answered correctly and accurately.

Notes:

(i)   Marks are to be awarded in proportion to the work done.

(ii)   Mistakes in dimensioning up to ± 1.0 mm may be ignored.

(iii) In dimensioning, arrow–heads of various types, as per SP : 46-1988 codes, are usable. However, where space is too small for an arrowhead, oblique stroke or a dot may be employed.

(iv)   In no view of question 1 and in no sectioned view of question 3, are hidden edges/lines required.

(v)   Other standard methods of drawing/proportions for features like nuts, heads of bolts, screws etc., employed by examinees, may also be accepted.

QUESTION PAPER CODE 68/1

EXPECTED ANSWERS/VALUE POINTS

Q 1 (a): ISOMETRIC SCALE   **4**

(i)   Marking of divisions of 10 mm, 1 mm on true scale and marking angles of 30° & 45°.   1

(ii)   Projections from scale 1:1 to get points on isometric scale, Printing 'Scale 1:1' and 'Isometric Scale'.   1

(iii) Construction of isometric scale, 110 mm long, with main divisions of 10 mm each.   1

(iv)   Division of the first part of isometric scale into 10 subdivisions.   1

Q 1 (b): ISOMETRIC PROJECTION OF A HEMISPHERE   **7**

(i)   Drawing isometric ellipse on H.P. along with center lines.   3

(ii)   Drawing semicircular portion of hemisphere.   2

(iii) Marking the center, vertical axis and diameter of hemisphere   2

NOTE :

For incorrect position of the hemisphere, like placing the curved surface of the hemisphere on H.P. instead of its flat circular base, 1½ marks should be deducted.

Q 1 (c): ISOMETRIC PROJECTION OF PENTAGONAL PYRAMID, PLACED CENTRALLY, ON AN EQUILATERAL TRIANGULAR PRISM   **14**

<u>TRIANGULAR PRISM</u>   7

(i)   Drawing a helping figure of a triangle, base edge = 90 mm, with one base edge parallel to V.P. and closer to the observer.   1

(ii)   Drawing isometric triangles.   3

(iii)   Drawing face edges, parallel to the vertical axis / V.P.   2

(iv)   Dimensioning edge of base of prism and its axis, i.e. height.   1

<u>PENTAGONAL PYRAMID</u>   7

(i)   Helping figure (using either isometric scale or 1:1 scale) of a pentagon with one side parallel to V.P. and away from it.   1

(ii)   Drawing isometric pentagon on the top triangular face of the triangular prism, centrally placed, with one side parallel to V.P. and away from it.   2

(iii)   Drawing slant edges.   2

(iv)   Marking the common vertical axis and direction of viewing.   1

(v)   Printing dimensions.   1

NOTE :

For incorrectly placed solids, like the common axis being drawn perpendicular to V.P. instead of drawing perpendicular to HP, as asked, 1½ marks should be deducted. Also, in the helping figures, if a side of triangle, or pentagon is not taken parallel to VP and away from it, 1 mark (1/2+1/2) should be deducted. Deductions will have to be changed proportionately, if mistakes are committed in both cases.

Q 2 (a): SQUARE NUT   **9**

<u>FRONT VIEW</u> :   3

(i)   Front view of square nut of nominal diameter 30 mm with six vertical lines and two horizontal lines, with a height of 0.8d to d.   2

| (ii) | Drawing arc with radius R. | 1 |
| | | |

TOP VIEW :   4

(i)	Draw A/F = chamfer diameter of 1.5d + 3 mm, or 1.5d.	1
(ii)	Indication of outer thin and broken circle of diameter 30 mm.	1
(iii)	Indication of inner thick full circle of diameter 30 X 0.85 mm.	1
(iv)	Square, circumscribing chamfer circle.	1

DETAILS :

Dimensioning (1) and line work (1).   2

<p style="text-align:center">[OR]</p>

HOOK BOLT   **9**

FRONT VIEW :   4

| (i) | Threaded and unthreaded portions of cylindrical shank, square neck and center line, including curve of radius R. | 3 |
| (ii) | Head of bolt. | 1 |

TOP VIEW :   3

| (i) | Thick circle of diameter d and thin broken circle of 0.85d. | 1 |
| (ii) | Square neck and rest of the portion. | 2 |

DETAILS :

Dimensioning (1) and line work (1).   2

NOTE :

3 marks may be deducted, in all, if sketched freehand, instead of drawing to scale 1:1.

Q 2 (b): STUD WITH COLLAR   **6**

(i)	Front view with its axis perpendicular to HP.	3
(ii)	Top view.	2
(iii)	Dimensions.	1

<p style="text-align:center">[OR]</p>

PAN HEAD RIVET (without tapered neck)   **6**

<u>FRONT VIEW</u> :   4

(i)   Sketching the head with correct proportions.   2

(ii)   Sketching cylindrical portion, broken end and hatching.   2

<u>TOP VIEW</u> :   1

Two circles.   1

<u>DIMENSIONING</u> :   1

NOTE :

2 marks may be deducted, if these components are drawn with instruments, instead of being sketched freehand.

Q 3: FLANGED PIPE JOINT(Assembly)   **30**

(a)   <u>FRONT VIEW</u> (Lower Half in Section) :   15

     (i)   Drawing both flanges and pipes in top half portion (without section), including curves of R3 and hatching lines in broken end of pipe.   4

     (ii)   Drawing both flanges and pipes in bottom half portion, including curves of R3 and hatching lines in broken end of pipe.   4

     (iii)   Drawing a hole of ø12 mm on a p.c.d. of 96 mm and hatching lines in pipes and flanges.   2

     (iv)   Drawing bolts and nuts of M10 correctly, (Minimum at one location).   4

     (v)   Indicating packing material (gasket) of outer diameter 80 mm and thickness 4 mm with a line in the upper half and with shading or cross-hatching in the bottom half.   1

(b)   <u>SIDE VIEW</u> :   9

     (i)   Drawing six circles, including pitch circle for bolts.   5

     (ii)   Drawing hatching lines to indicate the pipe thickness.   1

     (iii)   Drawing chamfer circle, hexagon, M10 circle and 0.85d broken circle for four nuts, bolts and hole dia. on p.c.d. (Minimum at one location)   2

     (iv)   Drawing cutting plane with the direction of viewing.   1

DETAILS : 6

Printing title (1), scale used (1), drawing projection symbol (1) and six dimensions (3).

[OR]

FOOTSTEP BEARING (Dis-assembly) **30**

(a) FRONT VIEW OF BUSH (Left Half in Section) : 17

    (i) Drawing the complete boundary of bush along with curves of proper radius. 9

    (ii) 4 horizontal lines upto the vertical center line (on the right side) 4

    (iii) Indicating the vertical line for hole of ø40 mm, including fillet of proper radius. 2

    (iv) Hatching lines in the thickness of bush on the left side. 2

(b) FRONT VIEW OF PAD (Right Half in Section) : 7

    (i) Drawing two vertical lines of 15 mm height, one horizontal base line of pad and the center line. 2

    (ii) Drawing the top curve of the pad after locating its center on the center line & a horizontal line up to the center line, at a height of 15 mm. 2

    (iii) Plotting the center line of the hole, hole with conical top and hatching lines. 3

DETAILS : 6

Printing titles of both (1), scale used (1), drawing projection symbol (1) and six dimensions (3).

CODE: 68/1

SCALE: 1:1

ISOMETRIC SCALE

Q.1(b)

ISOMETRIC PROJECTION

Code: 68/1
Q.1(c)

Helping Figure

Helping Figure

Code: 68/1

Q.2(a):

FRONT VIEW

TOP VIEW

SQUARE NUT

d	H	A/F	R
30	0·8d=d	1·5d to 1·5d+3	1·5d to 2·0d

Code: 68/1

Q.2(a)

φd=26

0·85d

2d+6=58

4d

0·7d

R₁

FRONT VIEW

TOP VIEW

HOOK BOLT

d	R	R₁	0·7d
26	26	0·9 d	18·2

Code: 68/1

Q.2(b)

φd

0·85d

2d+6

1·5d

0·25d or 0·4d

45°

FRONT VIEW

1·5d

TOP VIEW

COLLAR STUD

d	2d+6	1·5d	0·25d/0·4d
25	56	37·5	6·25/10·0

Code: 68/1

Q.2(b)

0·7d

FRONT VIEW

1·6d

d

TOP VIEW

PAN HEAD RIVET

d	0·7d	1·6d
25	17·5	40

416

Code: 68|1

3.(FIG 1)

φ120

φ80

20

7 10 4 10 8

M10

A

φ64

φ55

φ70

A'

(All fillets
and rounds: R3)

15

15

RIGHT HAND SIDE VIEW

FRONT VIEW (Lower Half in Section)
Section at AA'

FLANGED PIPE JOINT
(SCALE 1:1)

Code: 68|1   [OR]

Q.3 (FIG 2)

φ80

φ66

φ52

4

φ40

φ48

φ52

LEFT HALF SECTIONAL FRONT VIEW
BUSH

φ40

Drilled Hole (30°)

φ4

10

RIGHT HALF SECTIONAL FRONT VIEW

PAD

DIS-ASSEMBLY OF FOOTSTEP BEARING

417

EXPECTED ANSWERS/VALUE POINTS

Q 1 (a): ISOMETRIC SCALE   **4**

(i)   Marking of divisions of 10 mm, 1 mm on true scale and marking angles
        of 30° & 45°.   1

(ii)   Projections from scale 1:1 to get points on isometric scale, Printing
        'Scale 1:1' and 'Isometric Scale'.   1

(iii)   Construction of isometric scale, 110 mm long, with main divisions of
        10 mm each.   1

(iv)   Division of the first part of isometric scale into 10 subdivisions.   1

Q 1 (b): ISOMETRIC PROJECTION OF A HEMISPHERE   **7**

(i)   Drawing isometric ellipse with center lines.   3

(ii)   Drawing semicircular portion of hemisphere.   2

(iii)   Marking the center, vertical axis and diameter of hemisphere   2

NOTE :

*For incorrect position of the hemisphere, like placing the flat circular base of
the hemisphere on H.P. instead of its curved surface, 1½ marks should be
deducted.*

**Q 1 (c): ISOMETRIC PROJECTION OF HEXAGONAL PYRAMID, PLACED
            CENTRALLY, ON A SQUARE PRISM**   **14**

SQUARE PRISM   6

(i)   Drawing isometric squares, with an edge parallel to V.P.   3

(ii)   Drawing face edges, parallel to the vertical axis / V.P.   2

(iii)   Dimensioning edge of base of prism and its axis, i.e. height.   1

HEXAGONAL PYRAMID   8

(i)   Helping figure (using either isometric scale or 1:1 scale) of a hexagon
        with one side parallel to V.P.   1

(ii)   Drawing isometric hexagon on the top square face of the square prism,
        centrally placed, with one side parallel to V.P.   3

	(iii)	Drawing slant edges.	2
	(iv)	Marking the common vertical axis and direction of viewing.	1
	(v)	Printing dimensions.	1

NOTE :

For incorrectly placed solids, like the common axis being drawn perpendicular to V.P. instead of drawing perpendicular to HP, as asked, 1½ marks should be deducted. Also, in the helping figure, if a side of hexagon is not taken parallel to VP, 1mark should be deducted. Deductions will have to be changed proportionately, if mistakes are committed in both cases.

Q 2 **(a):** <u>SINGLE RIVETED LAP JOINT</u>   **9**

	(i)	Drawing rivet with both heads.	2
	(ii)	Drawing both the plates, including taper.	3
	(iii)	Drawing hatching lines.	1
	(iv)	Dimensioning	2
	(v)	Line work and neatness	1

<div align="center">

[OR]

</div>

<u>HEX. BOLT, WASHER AND SQ. NUT</u>   9

	(i)	Hex. Head of the bolt with curves and chamfering.	2
	(ii)	Length of the bolt, threaded length and curve of R = d at the end, or the other type of end.	2
	(iii)	Square nut drawn correctly.	2
	(iv)	Washer drawn correctly.	1
	(v)	Dimensioning	1
	(vi)	Neatness and Line work	1

NOTE :

3 marks may be deducted, in all, if sketched freehand, instead of drawing to scale 1:1.

Q 2 (b): <u>**90º FLAT COUNTER SUNK-HEAD SCREW**</u>   **6**

      (i)   Sketching front view with its axis perpendicular to HP.   3

      (ii)   Sketching top view.   2

      (iii)   Dimensioning.   1

<p align="center">[OR]</p>

    <u>**FLAT HEAD RIVET**</u>   **6**

      (i)   Sketching front view with its axis perpendicular to HP.   3

      (ii)   Sketching top view.   2

      (iii)   Dimensioning.   1

    NOTE :

2 marks may be deducted if these components are drawn with instruments, instead of being sketched freehand.

Q 3 : <u>**TURNBUCKLE (Assembly)**</u>   **30**

    (a)   <u>FRONT VIEW</u> (Lower Half in Section) :   15

      (i)   Drawing upper half portion of the body.   4

      (ii)   Drawing lower half portion of the body, with hatching lines.   5

      (iii)   Drawing both rods with 50 mm inserted portion of each, showing threads and hatching lines at the rod ends.   6

    (b)   <u>SIDE VIEW</u> (viewed from right) :   9

      (i)   Drawing three circles of ø20, ø30 and ø60 mm along with hatching lines.   5

      (ii)   Drawing dotted lines to indicate hidden portion.   3

      (iii)   Drawing cutting plane line with the direction of viewing.   1

    <u>DETAILS</u> :   6

Printing title (1), scale used (1), drawing projection symbol (1) Neatness and line work (1) and printing six dimensions (2).

<p align="center">[OR]</p>

KNUCKLE JOINT (Dis-assembly)   **30**

(a)   FORK (Front view full in Section) :   16

    (i)   4 horizontal lines (45 mm each) and 2 vertical lines of 12 mm each.   3

    (ii)   Ø 22 mm holes (properly located)   1

    (iii) Plotting vertical center lines at 20 mm and 45 mm from the extreme left
of the fork, and the horizontal center line in the middle.   2

    (iv) Semi-circle of R 13.   1

    (v)   Radii of R 25 mm on both sides & radii of R 15 mm on both sides.   2

    (vi) Drawing horizontal lines, vertical line, fillets and rounds for the octagonal
portion.   3

    (vii) Rod of 22 mm diameter along with hatching lines for showing broken
end.   2

    (viii) Hatching lines in fork, indicating full sectional view.   2

(b)   COLLAR (Front view full in Section) :   8

    (i)   Circular portion of Ø 30 and height 12 mm along with vertical center
line.   4

    (ii)   Horizontal center line for inserting pin.   1

    (iii) Showing tapered hole in collar along with hatching lines.   3

    DETAILS :   6

Printing titles of both (1), scale used (1), drawing projection symbol (1) and
six dimensions (3).

Q.1(a):
SCALE 1:1
ISOMETRIC SCALE

Q.1(b):
Code: 68
Φ80

30° 30°

ISOMETRIC PROJECTION

Helping View

Q.1(c):
Code: 68

70

30

30

80

30° 30°

ISOMETRIC PROJECTION

Q.2(a):
R = 0.8d
0.7d
t
t = 16
0.7d
Φd
18°
1.5d   1.5d

| d = 6√E = 24 |
| 0.7d = 16.8 |
| 0.8d = 19.2 |
| 1.5d = 36.0 |

FULL SECTIONAL FRONT VIEW

SINGLE RIVETED LAP JOINT
[OR]

Q.2(a):
120
2d+6 = 58
30°
60°
2d
Φd
Φ 0.85d
R = 22
R90d
M26×4
4.5d+3
55
4   d
0.8d

HEX. HEADED BOLT, WASHER AND SQ. NUT

Q.2(b):
Code: 68
d/6 = 2.5
1.8d = 36
0.2d = 4
0.25d = 5
0.85d = 17
2d+6 = 46
45°
M20

FRONT VIEW

TOP VIEW

90° CSK HEAD SCREW

[OR]

Q.2(b):
Code: 68
0.25d = 6.25
Φd = 25

FRONT VIEW

2d = 50

TOP VIEW

FLAT HEAD RIVET

Q.3 (FIG1)

18 18 φ60

A

φ30

A'

R.H. SIDE VIEW

40 50 50 40

24

40 15 15 40

180

SEC. FRONT VIEW (Sec. at AA')

TURN BUCKLE
(SCALE : 1:1)

[OR]

Code: 68

Q.3 (FIG2)

φ22

R15

12

26

φ12

φ8.25

12

20 25 40 25

FULL SECTIONAL FRONT VIEW

FORK

φ22

φ5 φ2 12

φ30

FULL SEC. FRONT VIEW

COLLAR

DIS-ASSEMBLY OF KNUCKLE JOINT
(SCALE: 1:1)

423

MULTIMEDIA AND WEB TECHNOLOGY

Time allowed : 3 hours   *Maximum Marks : 70*

QUESTION PAPER CODE 89/1

1. (a) Identify the following views used to create a database in Access.   1

    (1)

Field Name	Data Type	Description
BID	Text	Book Identification Number
BNAME	Text	Book Name
BPurDate	Date/Time	Date on which the Book was purchased
BPublish	Text	Publisher of the book

    (2)

BID	BNAME	BPurDate	BPublish
B03	Action Scripting	10-08-2009	Taxmall
B04	Flash for Dummies	11-08-2009	Penguire
B05	Access Made Easy	10-10-2010	Harping

    (b) Illustrate the usage of foreign key with the help of an example.   2

    (c) Study the table WEBSITES given below and answer the following questions:

Table: WEB SITES

SITE_ID	SITE_CAT	SITE_LAUNCH	SITE_VOTES
S100	Commerce	11/11/2005	2S000
S101	Government	10/06/2007	15000
S102	Education	07/02/2008	45000
S103	Organisation	11/10/2008	42000

    (1) Name the field which can act as the primary key in the table WEB-   1
         SITES.

    (2) Suggest the data types that should be used for each of the fields in the
         table WEBSITES.   2

(d) Expand the term MPEG. What kinds of files are stored using the MPEG format? 2

(e) Mention any two areas where virtual reality is being used. 2

2. Answer the following questions based on Macromedia Flash.

(a) What is the use of the onion skinning feature? 1

(b) Name any two types of tweening. 1

(c) Enumerate the benefits of vector graphics over bitmap graphics. 2

(d) What is the use of the Publish Preview option? 2

(e) Observe the image given below and do as directed: 4

- The image on the left hand side shows the position of the object at frame 1.

- The image on the right side shows the position of the object at frame 25.

- Assume that the image is stored in the library by the name robot. Also note that the colour and size of the image remains the same.

- The arrow shows the path followed by the robot to reach from position at frame 1 to the position at frame 25.

Write the procedure and property settings for animating the above scenario.

3. Answer the following questions based on HTML.

(a) Name the three structural tags of HTML page and explain the usage of anyone of them. 2

(b) Write the HTML code to generate the web page in the format as shown: 8

Consider the following points while writing the HTML code:

(1)   Title of the page should be "eGames",

(2)   Background colour of the page should be "Pink",

(3)   Text colour of main heading should be "red" and font should be "Arial Bold".

(4)   Image used in the page is "game 1. jpg".

(5) Use the concept of nested lists to create the given lists.

(6) The table should have a border of size 5 and color blue and the spacing between adjacent cells is 15 pixels.

(7) The bottom image (link.jpg) and the text "Details of the Games" are both links' to the page details.html.

4. Answer the following questions based on ASP.

(a) What do you understand by the term ASP engine?   1

(b) How do you retrieve information from a form that is submitted using the post method?   1

(c) How is the AddNew method of the Recordset object different from the Update method of Recordset object?   2

(d) Identify the following:

    (1) The ASP object which provides access to methods and properties on the server.   3

    (2) The ASP component used to display banner advertisements on a web page.

    (3) The method of the Recordset object that is used to move the cursor directly to the last record in the recordset.

(e) Give the output of the following statements: 3

    (1) Response.write (NOT TRUE AND (TRUE OR FALSE))

    (2) Response.write(RIGHT("Let's Learn and Experiment", LEN("LEARN")))

    (3) Response.write«5-3)*(4/2-3))

5. Answer the following questions based on ASP:

(a) Expand the term PWS.   1

(b) Differentiate between Counter and Page Counter components of ASP.   2

(c) Predict the output of the following code: 2

    <Script Language= "VB Script">

```
Dim A, B

A= 1

B = 10

Do While A < 5

Document. Write (A + B)

A=A+ 1

B=B-2

LOOP

</Script>
```

(d) Rewrite the following code after removing errors with each correction under-lined: 2

```
<BODY>

The login name entered by the user is :

<%

pass = RESPONSE.QUERYSTRING ("password") %>

The password is :

<%

if pass <> "enter" then

        REQUEST.WRITE (Invalid)

Otherwise

        RESPONSE.WRITE ("Valid")

end

%>

</BODY>
```

(e) Write the ASP code that will read the text file called multi.txt, and display the alternate lines contained in the file. 3

6. Answer the following questions based on VBscript :

(a) Name the event to be used in the following situations: 2

(1)   To perform an action when a button is clicked.

(2)   To perform an action as soon as the contents of a text box change.

(b)   Rewrite the following code using DO WHILE instead of FOR LOOP without affecting the output: 2

<HTML>

<BODY>

<SCRIPT LANGU AGE="VBSCRIPT">

DIM Num, Flag

Flag = 0

Num = 10

FORA = 2 TO Num/2

        Flag = Flag + 1

NEXT

</SCRIPT>

</BODY>

</HTML>

(c)   Point out the errors in the following code and rewrite the code with the corrections underlined: 2

<HTML>

<BODY>

<SCRIPT = "VB SCRIPT">

DIM A, B, C, Count

A = 0

B = 1

FOR Count = 3 TO 6 INCREASE 1

C = A+B

document. Write (C)

A = B

B = C

LOOP

</SCRIPT="VBSCRIPT">

</BODY>

</HTML>

(d)   Write the HTML code for creating the form shown below: 4

First Number	
Second Number	
Divisible	
	Check Divisibility

Write the embedded VBscript code for the click event of the 'Check Divisibility' button such that it displays 1 if the First Number (number input in the first text box) is divisible by the Second Number (number input in the second text box) and 0 otherwise in the third text box.

For example: if the user inputs 10 and 5 in the first two text boxes, then 1 should be displayed in the third text box, on the click of the "Check Divisibility" button.

7.   Answer the following questions based on the unit Web Technologies:

(a)   Define the term Firewall.   1

(b)   Expand the term FSF.   1

(c)   What are the following software used for?

    (1)   Open Office

    (2)   MySQL   2

(d)   Differentiate between Twisted pair cable and Optical fiber cable.   2

(e)   Radio City has set up its new center at Mumbai for its office and broadcasting activities. It has 4 blocks of buildings as shown in the diagram below. Answer questions (i) to (iv) in context of the following layout of the four blocks:

Center to Center distance between various blocks.

RadioCity A to RadioCity B	60 m
RadioCity B to RadioCity C	75 m
RadioCity C to RadioCity D	175 m
RadioCity A to RadioCity D	250 m
RadioCity B to RadioCity D	100 m
RadioCity A to RadioCitv C	75 m

Number of Computers in each wing

RadioCity A	50
RadioCity B	250
RadioCity C	50
RadioCity D	100

(1)   Suggest a suitable cable layout to connect all the offices and name the topology used.   1

(2)   Suggest the most suitable place to house the server with proper justification.

(3)   Where and why repeaters should be used?

(4)   If the organization needs to link this branch office to another office situated in a distant city (around 1050 Km) away where cable connection is not feasible, then suggest an economic way to connect it with reasonably high speed?   1

1. (a) What is the degree and the cardinality of the relation EMPLOYEE given below?   1

TABLE: EMPLOYEE

EID	EName	EJoinDate	EExper	EPhone
E01	Shayamli	10/08/07	10	22222101
E02	Kushambha	19/08/07	5	22222202

(b) Differentiate between design view and datasheet view with respect to a database.   2

(c) Latest Hit Station Video library stores data of all available DVDs on its server in a table named HitMovies in Access. Study the relation HitMovies given below and answer the following questions:

TABLE: HitMovies

MID	MName	Director	ReleaseDate	Releasing Company
MO1	London Dreams	Vipul Shah	10/08/09	Joshua
M02	Wake Up Sid	Ayaan Mukherjee	19/08/09	Trinayan
M03	What's Your Rashee	Ashutosh Gowariker	18/08/09	Harem
M04	Aladdin	Sujoy Ghosh	15/08/09	Chahata

(i) Name the field which can act as the primary key in the table HitMovies.   1

(ii) If the Release details of the movie have to be stored in a separate table (named RELEASE), then identify any two fields from the above table which should be included in the table RELEASE.   1

(iii) What type of relationship exists between the table HitMovies and the newly created table RELEASE?   1

(d) What are the advantages of Flash movie over animated GIF movie?   1

(e) Give the full form of BMP.   1

(f) Write a short note on SMS.   2

2.   Answer the following questions based on Macromedia Flash:

(a)   The normal layer lets you add content in a flash movie that moves along a straight path. Name any two types of layers which can help you to manipulate the content on a normal layer and improve the animation.   1

(b)   What is the use of dividing a movie into separate scenes?   1

(c)   Enumerate the benefits of frame by frame animation over tweening animation.   2

(d)   Differentiate between Exporting and Publishing a Flash movie.   2

(e)   Observe the image given below and do as directed:

●   The image on the left hand side shows the position and size for frame 1.

●   The image on the right side shows the position and size for frame 25.

●   Assume that the images of butterfly and flower are stored in the Flash library by the name butterfly and flower respectively and the colour and size of the image remains the same.

●   The curve shows the path followed by the butterfly to reach from frame 1 to frame 25.

Write the procedure and property settings for animating the above scenario.   4

3.   Answer the following questions based on HTML :

(a)   Differentiate between <HR> and <BR> tags.   2

(b)   Write the HTML code to generate the web page in the format shown: 8

eCards - Mozilla Firefox

File Edit View History Bookmarks Tools Help

ecards.html   → · G · Google

E-CARDS

e-Cards is a website offering new and trendy cards for all ages.

Categories of Cards Offered

1. General Cards
   - Thinking of You
   - Missing You
   - Friends Forever
2. Specific Cards
   - Happy Birthday
   - Happy Diwali
   - Happy Anniversary

You can also order flowers through our site

PRICE LIST

Bouquet Type	Price
Flower Galore	Rs. 200
Flower Shower	Rs. 300
Flower Power	Rs. 400

LINK

Personalize The Cards

Consider the following points while writing the HTML code:

(i)   Title of the page should be "eCards".

(ii)   Background colour should be "Purple".

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(iii) Text style of the main heading should be "Aria! Bold" and colour should be red.

(iv) Image used is "cards.jpg".

(v) Table should have a 5 pixel thick border of colour green and the spacing between cell content and border is 15 pixels.

(vi) Use the concept of nested lists for creating the specified lists.

(vii) The bottom image (link.jpg) and the text "Personalize the Cards" are links to the page "person.html".

4. Answer the following questions based on ASP:

(a) How is an ASP file different from a simple HTML file?   1

(b) Which method of the RecordSet Object will you use to move the cursor directly to the first record in the record set?   1

(c) How is the Connection object different from the RecordSet object?   2

(d) Identify the following: 3

    (i) The ASP object which stores information needs for a particular user session.

    (ii) The ASP component used to keep track of the number of visitors who have visited the web page.

    (iii) The Request object collection that will be used to retrieve information submitted by the user in a form using GET method.

(e) Give the output of the following statements: 3

    (i) Response.write(FALSE AND NOT TRUE OR TRUE)

    (ii) Response.write(LEFT("With Multimedia",5)
    & UCASE ("Life is Fun"»

    (iii) Response.write((4 - 3)*(6/2 – 3))

5. Answer the following questions based on ASP:

(a) Expand the term IIS.   1

(b) Differentiate between AdRotator and ContentRotator components of ASP.   2

(c)   Predict the output of the following code: 2

```
<Script Language="VBScript">

Dim A , B

A = 2

B = 20

Do While A < 6

        Document.Write(A+B)

        A = A + 1

        B = B-2

Loop

</Script>
```

(d)   Rewrite the following code after removing errors with each correction under-lined:

```
<BODY>

The login name entered by the user is :

<%

pass = RESPONSE.QUERYSTRING ("password")

%>

The password is :

<%

If pass <> "enter" then

        REQUEST.WRITE (Invalid)

Otherwise

        RESPONSE.WRITE ("Valid")

end

%>

</BODY>
```

(e)　Write the ASP code that will read the text file named friends.txt, count the number of lines in the file and then display the same.　3

6.　Answer the following questions based on VBScript :

(a)　Name the event to be used in the following situations:　2

(i)　To perform an action when the button gains focus.

(ii)　To perform an action when a button is clicked.

(b)　Rewrite the following code using DO WHILE instead of FOR loop without affecting the output:　2

```
<HTML>
<BODY>
<SCRIPT LANGUAGE = "VBScript" >
DIM A, B, C, Count
A = 0
B = 1
FOR Count = 3 TO 10 STEP 2
      C = A+B
      Document.Write (C & " ")
      A = B
      B = C
NEXT
</SCRIPT>
</BODY>
</HTML>
```

(c)　Give the output of the following code:　2

```
<HTML>
<BODY>
<SCRIPT LANGUAGE="VBSCRIPT" >
```

```
DIM Num, Flag

Flag = 0

Num = 10

FOR A = 2 TO Num/2

        IF Num MOD A = 0 THEN

                DOCUMENT.WRITE (Num+ 1)

ELSE

        DOCUMENT.WRITE (Num - 1)

END IF

NEXT

</SCRIPT>

</BODY>

</HTML>
```

(d)

Input Number	
Check Divisibility by	
	Divisibility Result

Write the HTML code for creating the above displayed form. Write the embedded VB Script code for the click event of the 'Divisibility Result' button such that it displays a message box based on whether the number input in the first textbox is divisible by the number input in the second textbox according to the following criteria:

- If number is divisible then message displayed is "Wow! I belong to your family"

- If number is not divisible then message displayed is "Let's look for my friends"   4

7.   Answer the following questions based on the unit Web Technologies:

(a)   Define the term Cyber Law.   1

(b)   Expand the term WLL.   1

(c) What are the following software used for? 2

  (i) Apache Tomcat

  (ii) MySQL

(d) Differentiate between Twisted pair cable and Co-axial cable. 2

(e) ProActor School of Acting in Mumbai is setting up the network between its different wings. There are 4 wings named as SENIOR(S), JUNIOR(J), ADMIN(A), and HOSTEL(H).

Distance between various wings are given below:

Wing A to Wing S	100m
Wing A to Wing J	200m
Wing A to Wing H	400m
Wing S to Wing J	300m
Wing S to Wing H	100m
Wing J to Wing H	450m

Number of computers in each wing is as given below:

Wing A	10
Wing S	200
Wing J	100
Wing H	50

(i)   Suggest the most suitable topology for connecting these wings.   1

(ii) Suggest the most suitable place to house the server. Justify your choice.   1

(iii) Where and why should repeaters be used ?   1

(iv) The second branch of the school situated in a hilly region is to be linked with
      its headquarters in Mumbai. Suggest the most economical way to connect it.
      The organization is ready to compromise on the speed of connectivity.   1

Marking Scheme — Multimedia and Web Technology

(SUB CODE -067)

General Instructions :

ǀ   The answers given in the marking scheme are SUGGESTIVE, Examiners are requested to award marks for all alternative correct Solutions / Answers conveying the similar meaning

ǀ   In VBScript and ASP, ignore case sensitivity for identifiers

QUESTION PAPER CODE 89/1

1.   (a)   Identify the following views used to create a database in Access.   1

(1)

Field Name	Data Type		Description
BID	Text	Book Identification Number	
BNAME	Text	Book Name	
BPurDate	Date/Time	Date on which the Book was purchased	
BPublish	Text	Publisher of the book	

(2)

BID	BNAME	BPurDate	BPublish
B03	Action Scripting	10-08-2009	Taxmall
B04	Flash for Dummies	11-08-2009	Penguire
B05	Access Made Easy	10-10-2010	Harping

Ans   i)   Design View

ii)   Datasheet View

(½ mark for naming each view correctly)

(b)   Illustrate the usage of foreign key with the help of an example.   2

Ans   Foreign key is an attribute of one relation whose values are required to match those of the primary key of some other relation. The foreign key is used to relate two or more tables. For example in the tables given below, Item code acts as a foreign key for the table Sales.

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Table.ITEM

Item Name	Price	Item Code
Iron	525.00	1002
Hand Mixie	675.50	1003

Values of this attribute match the values of the primary key of table ITEM

Table: SALES

Cust No	Bill No	Sale Date	Quantity	Item Code
1432	1022	7/12/2008	2	1002

(2 marks for correctly explaining the concept with the help of an example)

NOTE:

1. Full marks to be awarded in case the concept is explained only with the help of an example.

2. 1 mark to be awarded if only the definition is given

(c) Study the table WEBSITES given below and answer the following questions:

Table: WEB SITES

SITE_ID	SITE_CAT	SITE_LAUNCH	SITE_VOTES
S100	Commerce	11/11/2005	2S000
S101	Government	10/06/2007	15000
S102	Education	07/02/2008	45000
S103	Organisation	11/10/2008	42000

(1) Name the field which can act as the primary key in the table WEB-SITES. 1

(2) Suggest the data types that should be used for each of the fields in the table WEBSITES. 2

Ans (1) SITE_ID can act as the primary key

(1 mark for correctly naming the field)

(2) SITE_ID - Text

SITE_CAT - Text

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SITE_LAUNCH - Date/Time

SITE_VOTES - Numeric

(½ mark for correctly naming the data type for each field)

(d) Expand the term MPEG. What kinds of files are stored using the MPEG format? 2

Ans MPEG stands for Moving Picture Experts Group OR Motion Picture Experts Group. This format is used to save movie files which cannot be further edited.

(1 mark for the correct expansion)

+ (1 mark for mentioning the correct file usage)

(e) Mention any two areas where virtual reality is being used. 2

Ans Useful applications of VR include: ,

1. Training in a variety of areas (military, medical, equipment operation, etc.),

2. Education,

3. Design evaluation (virtual prototyping),

4. Architectural walk-through,

5. Simulation of assembly sequences and maintenance tasks,

6. Assistance for the handicapped,

7. Study and treatment of phobias (e.g., fear of height)

8. Entertainment

9. Gaming (or any other valid application)

(1 mark:each for mentioning any two areas correctly)

2. Answer the following questions based on Macromedia Flash.

(a) What is the use of the onion skinning feature? 1

Ans The onion-skinning feature allows the designer to see multiple frames and how their movements relate to the current frame. When creating an animation, this feature can be a great help to see what the objects in the preceding and succeeding frames look like.

(1 mark for explaining the correct usage)

(b)   Name any two types of tweening.   1

Ans   Motion Tweening, Shape Tweening, Tint Tweening

(½ mark each for correctly naming any two types of tweening)

(c)   Enumerate the benefits of vector graphics over bitmap graphics.   2

Ans

Vector Graphics	Bitmap Graphics
1. Vector graphics are made-up of mathematical expressions	1. Bitmap graphics are made up of colored pixels.
2. File sizes are usually very small.	2. File sizes are usually very large.
3. The quality of Vector graphics will not be affected on re:izing.	3. Bitmap graphics will suffer in quality if resized.

(2 marks for mentioning anyone benefit of vector graphics over bitmap graphics)

(d)   What is the use of the Publish Preview option?   2

Ans   The *Publish Preview* option allows one to preview the movie in a browser before publishing to see if the movie is appearing fine.

(2 marks for explaining the correct usage)

(e)   Observe the image given below and do as directed: 4

l   The image on the left hand side shows the position of the object at frame 1.

l   The image on the right side shows the position of the object at frame 25.

l   Assume that the image is stored in the library by the name robot. Also note that the colour and size of the image remains the same.

ı The arrow shows the path followed by the robot to reach from position at frame 1 to the position at frame 25.

Write the procedure and property settings for animating the above scenario.

Ans The following steps have to be followed to animate the given scenario:

ı Select frame 1 .from the timeline and drag the robot image on the stage from the library.

ı Using the arrow tool, select the image and place it on the left hand side.

ı Select frame 25 from the timeline and Select Insert – Keyframe

ı Using the arrow tool, select the image and position it on the right hand side of the stage at the desired location

ı Select all frames from 1 to 25.

ı Right click the mouse button and Select Create Motion Tween.

ı Select the layer containing the motion tween. Right click and select Add Motion Guide.

ı Using the pencil tool, draw the path of motton as shown in the image. OR Any other equivalent method.

(½ marks for each step)

3. Answer the following questions based on HTML.

(a) Name the three structural tags of HTML page and explain the usage of anyone of them.   2

Ans Three structural tags are: <HTML>, <HEAD> and <BODY>

Usage:

< HTML > - marks the beginning and the end of the html file

< HEAD > - contains, information about initial load parameters of the webpage like title, scripts, style definitions and document descriptions

<BODY> - contains the visible content of the webpage

*(½ mark each for naming the three structural tags)*

+(½ mark for correctly explaining the usage of anyone of them)

(b)   Write the HTML code to generate the web page in the format as shown: 8

Consider the following points while writing the HTML code:

(1)   Title of the page should be "eGames",

(2)   Background colour of the page should be "Pink",

(3)   Text colour of main heading should be "red" and font should be "Arial Bold".

(4)   Image used in the page is "game 1. jpg".

(5)   Use the concept of nested lists to create the given lists.

(6)   The table should have a border of size 5 and color blue and the spacing between adjacent cells is 15 pixels.

(7)   The bottom image (link.jpg) and the text "Details of the Games" are both links' to the page details.html.

Ans   <HTML>

<HEAD> <TITLE'>eGames</TITLE> </HEAD>

<BODY BGCOLOR="PINK">

<FONT FACE ="ARIAL" COLOR = "RED">

<H2 ALlGN = CENTER> E-GAMES </H2></FONT>

e-GAMES is a website offering new and trendy games for all ages.

<IMG SRC = "game.JPG" height =150 width = 150 ALlGN = "MIDDLE">

<OL><FONT FACE = "ARIAL" SIZE = +1><B> Games Offered </B>

<LI>Individual Games

<UL TYPE="square">

    <LI>Spelling Bee

    <LI>Zuma Deluxe

    <LI>Mario

    < / UL>

<LI>Group Games

    <UL TYPE="circle">

      <LI>Chess

      <LI>Billiards

      <LI>Snooker

    </Ul>

< /OL>

You can also buy CDs of following games through our site

<TABLE ALlGN=CENTER BORDER=5 BORDERCOLOR="Btue"

CELLSPACING=15>

<CAPTION> PRICE LIST </CAPTION>

<TR>

    <TH> Game Name </TH>

    <TH> Price < /TH>

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```
<TR>

    <TD> Spelling Bee

    <TD> Rs. 200

<TR>

    <TD> Billiards

    <TD> Rs. 300

<TR>

    <TD> Snooker

    <TD> Rs. 400

</TABLE>

<BR>

<CENTER>

<A HREF="details.html"> <IMG SRC="link.jpg" height=50 width=50> <BR>
DETAILS OF THE GAMES </A>

</FONT>

</BODY>

</HTML>
```
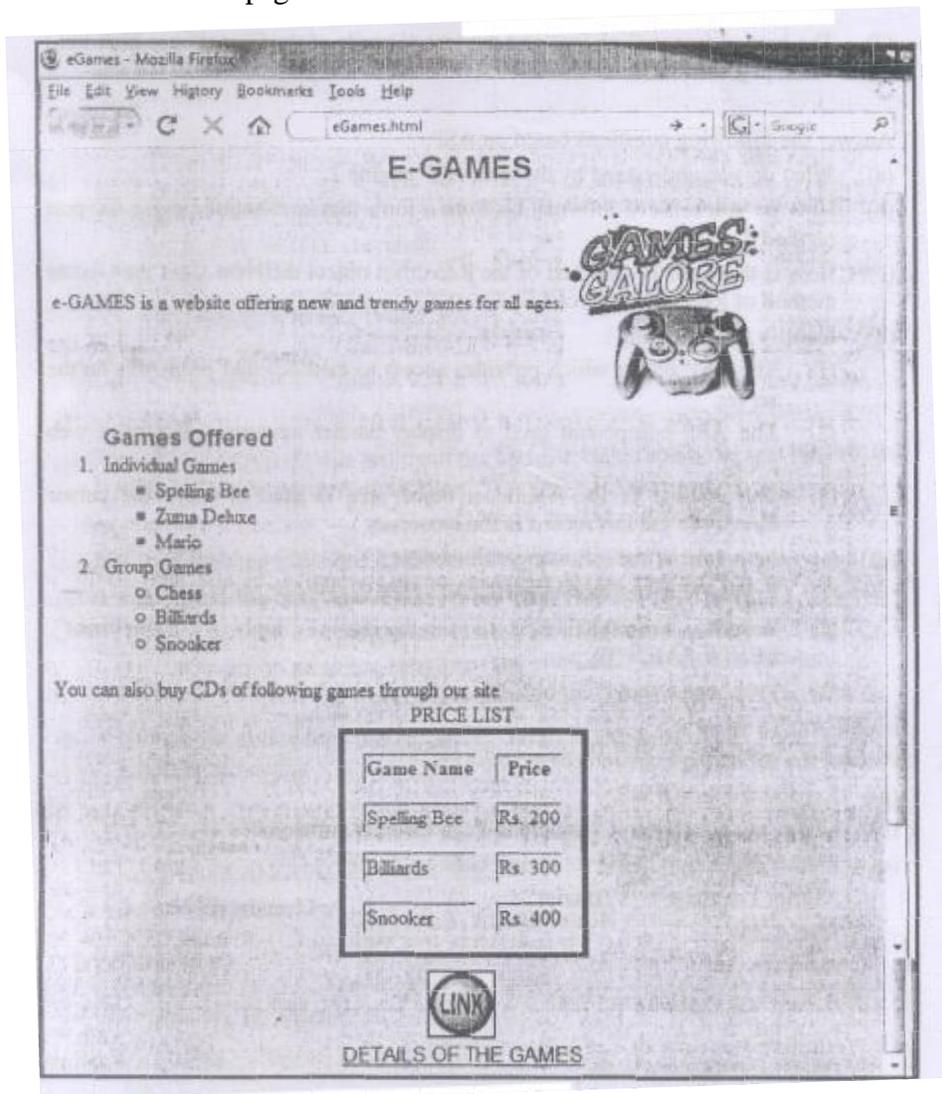
(½ mark for correct use of <HTML> and <BODY> tags)

+ (½ mark for correct use of <TITLE> tag)

+ (½ mark for body background colour)

+ (½ mark for mentioning the correct font type and color)

+ (½ mark for displaying the heading correctly in center)

+ (1½ mark for correctly creating the nested list (½ mark for each list))

+ (½ mark for making table border 5 pixel thick with border color blue)

+ (½ mark for making table cellspacing as 15 pixels)

+ (½ mark for giving table <CAPTION>)

+ (1 mark for correctly crea ting the table using < TR> and < TD> tags)

+ (½ mark for displaying the links in center)

+ (½ mark each for correctly creating the link on the image and the text)

4. Answer the following questions based on ASP.

    (a) What do you understand by the term ASP engine?   1

Ans The ASP engine is a special program named ASP.dll where all the server side scripts are executed and converted to HTML code.

(1 mark for correct explanation)

    (b) How do you retrieve information from a form that is submitted using the post method?   1

Ans We use the Form collection of the Request object to retrieve the information submitted using the post method.

(1 mark for the correct answer)

    (c) How is the AddNew method of the Recordset object different from the Update method of Recordset object?   2

Ans The AddNew method adds a new blank record in the database whereas the Update method saves the newly written record in the database permanently.

(2 marks for mentioning anyone correct difference between the two)

    (d) Identify the following:

        (1) The ASP object which provides access to methods and properties on the server.

        (2) The ASP component used to display banner advertisements on a web page.

        (3) The method of the Recordset object that is used to move the cursor directly to the last record in the recordset.   3

Ans 1. Server Object

    2. Ad Rotator 'Component

    3. MoveLast

(1 mark for each correct answer)

(e) Give the output of the following statements: 3

   (1) Response.write (NOT TRUE AND (TRUE OR FALSE))

   (2) Response.write(RIGHT("Let's Learn and Experiment", LEN("LEARN")))

   (3) Response.write«5-3)*(4/2-3))

Ans i) False

   ii) iment

   iii) -2

(1 mark for each correct answer)

Note: ½ mark to be awarded for each part if the steps showing the working are correct but the final output is wrong

5. Answer the following questions based on ASP:

(a) Expand the term PWS. 1

Ans Personal Web Server

(1 mark for the correct expansion)

(b) Differentiate between Counter and Page Counter components of ASP. 2

Ans

Counter	Page Counter
i. Counter component can be used for creating counters that can be used to count anything such as, the number of visitors to the Web site, the number of times an advertisement has been clicked etc.	i. Counts the number of times a page has been viewed.
ii. The Counters component is manually set using the Set method.	ii. Page Counter component is an automatic process.
iii. The HTML <OBJECT> tag is used to create an instance of the Counters component in the Global.asa file.	iii. An instance of the PageCounter object is created on a page by using the Server.CreateObject method.

iv. Only one instance of the Counter component can be created. This single Counters object can create any number of individual counters with different names.	iv. Any number of instances of the page counter object can be created.

(2 marks for anyone correct differentiation point)

(c)   Predict the output of the following code: 2

<Script Language= "VB Script">

Dim A, B

A= 1

B = 10

Do While A < 5

Document. Write (A + B)

A=A+ 1

B=B-2

LOOP

</Script>

Ans   111098

(½ mark for each correct number)

(d)   Rewrite the following code after removing errors with each correction under-
lined: 2

<BODY>

The login name entered by the user is :

<%

pass = RESPONSE.QUERYSTRING ("password") %>

The password is :

<%

if pass <> "enter" then

        REQUEST.WRITE (Invalid)

451

Otherwise

RESPONSE.WRITE ("Valid")

end

%>

</BODY>

Ans < BODY >

The login name entered by the user is :

<%

pass = <u>REQUEST</u>.QUERYSTRING("password") %>

The password is:

<%

if pass <> "enter" then

<u>RESPONSE</u>.WRITE(<u>"Invalid"</u>)

<u>ELSE</u>

RESPONSE.WRITE("Valid")

<u>End IF</u>

%>

</BODY>

(½ mark each for correcting any four errors)

(e)   Write the ASP code that will read the text file called multi.txt, and display the
        alternate lines contained in the file.   3

Ans   < %

Set Fobj=Server.createobject("Scripting.FilesystemObject")

Set mFile = Fobj.OpenTextFile("multi.txt")

Do while NOT mFile.AtEndOfStream

Response.Write(mFile.ReadLine}

Response.Write ("<BR>")

mFile.ReadLine

Loop

mFile.close

%>

(½ mark for correctly creating the file system object)

+(½ mark for opening the file)

+(½ mark for the loop)

+(½ mark for reading the line

+(¥.z mark for displaying the line)

+(Yz mark for closing the connection)

6. Answer the following questions based on VBscript :

    (a) Name the event to be used in the following situations: 2

        (1) To perform an action when a button is clicked.

        (2) To perform an action as soon as the contents of a text box change.

Ans i) OnClick

     ii) OnChange

(1 mark for each correct answer)

    (b) Rewrite the following code using DO WHILE instead of FOR LOOP without affecting the output: 2

        <HTML>

        <BODY>

        <SCRIPT LANGU AGE="VBSCRIPT">

        DIM Num, Flag

        Flag = 0

        Num = 10

        FORA = 2 TO Num/2

            Flag = Flag + 1

NEXT

</SCRIPT>

</BODY>

</HTML>

Ans   <HTML>

<BODY>

<SCRIPT LANGUAGE = "VBSCRIPT">

DIM Num, Flag

Flag = 0

Num = 10

<u>A = 2</u>

<u>DO WHILE A<=Num/2</u>

    Flag = Flag+1

    <u>A=A+1</u>

<u>LOOP</u>

</SCRIPT>

</BODY>

</HTML>

(½ mark each for writing the mentioned four underlined lines correctly)

(c)   Point out the errors in the following code and rewrite the code with the corrections underlined: 2

    <HTML>

    <BODY>

    <SCRIPT = "VB SCRIPT">

    DIM A, B, C, Count

    A = 0

    B = 1

FOR Count = 3 TO 6 INCREASE 1

C = A+B

document. Write (C)

A = B

B = C

LOOP

</SCRIPT="VBSCRIPT">

</BODY>

</HTML>

Ans   < HTML>

<BODY>

<SCRIPT <u>LANGUAGE</u>="VBSCRIPT'>

DIM A, B, C, Count

A = 0

B = 1

FOR Count = 3 TO 6 <u>STEP</u> 1

C = A + B

document.Write (C)

A = B

B = C

<u>NEXT</u>

<u></SCRIPT></u>

< 1 BODY>

</HTML>

(½ mark each for correcting the four errors)

(d)   Write the HTML code for creating the form shown below: 4

Write the embedded VBscript code for the click event of the 'Check Divisibility'

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button such that it displays 1 if the First Number (number input in the first text box) is divisible by the Second Number (number input in the second text box) and 0 otherwise in the third text box.

For example: if the user inputs 10 and 5 in the first two text boxes, then 1 should be displayed in the third text box, on the click of the "Check Divisibility" button.

First Number	
Second Number	
Divisible	
	Check Divisibility

Ans   <HTML>

<HEAD><TITLE>DIVISIBILTY CHECK</TITLE>

<SCRIPT LANGUAGE = "VBScript" >

SUB B1_OnClick

Dim A, B

A = FORM1.T1.VALUE

B = FORM1.T2.VALUE

IF A MOD B = 0 THEN OR IF FORM1.T1.VALUE MOD FORM1.T1.VALUE THEN

FORM1.T3.Value = 1

Else

FORM1.T3.Value = 0

END IF

END SUB

</SCRIPT>

</HEAD>

<BODY>

<FORM NAME = "FORM1">

<P>FIRST NUMBER <INPUT TYPE= "TEXT" NAME="TI">

<P>SECOND NUMBER <INPUT TYPE = "TEXT" NAME = "T2">

<P>DIVISIBLE <INPUT TYPE = "TEXT" NAME = "T3">

<P>

<INPUT TYPE."Button" VALUE = "Check Divisibility" NAME = "B1">

</FORM>

</BODY>

</HTML>

(½ mark for correct <FORM> tag)

+ (½ mark for creating textboxes using <INPUT> tags)

+ (½ mark for creating button using <INPUT> tag)

+ (½ mark for the correct <SCRIPT> tag)

+ (½ mark for associating subroutine with the button element)

+ (1 mark for correct conditional statement)

+ (½ mark for correctly displaying the output in the third textbox)

7. Answer the following questions based on the unit Web Technologies:

(a) Define the term Firewall. 1

Ans A computer network firewall is an electronic blocking mechanism that will not allow unauthorized intruders (people or messages) into a computer system.

(1 mark for the correct definition)

(b) Expand the term FSF. 1

Ans Free Software Foundation

(1 mark for the correct expansion)

(c) What are the following software used for?

(1) Open Office

(2) MySQL 2

Ans i) Office Tasks like word processing, Presentation Creations, Database management etc

ii) Relational Database Management System

*(1 mark each for mentioning the correct usage of each of the two)*

(d) Differentiate between Twisted pair cable and Optical fiber cable. 2

Ans

Twisted Pair cable	Optical Fiber cable
1. Relatively low data transfer rate (in mbps)	1. Very high data transfer rate (in gbps)
2. This type of cable is very susceptible to electromagnetic fields	2. This type of cable is not susceptible to electromagnetic interference
3. Transmission takes place through electromagnetic waves	3. Transmission takes place through light pulses
4. Most common application is the telephone system	4. Most suited for LANs where high quality of facilities is required

(2 marks for anyone correct differentiation point)

(e) Radio City has set up its new center at Mumbai for its office and broadcasting activities. It has 4 blocks of buildings as shown in the diagram below. Answer questions (i) to (iv) in context of the following layout of the four blocks:

Center to Center distance between various blocks.

| RadioCity A to RadioCity B	60 m
RadioCity B to RadioCity C	75 m
RadioCity C to RadioCity D	175 m
RadioCity A to RadioCity D	250 m
RadioCity B to RadioCity D	100 m
RadioCity A to RadioCitv C	75 m

Number of Computers in each wing
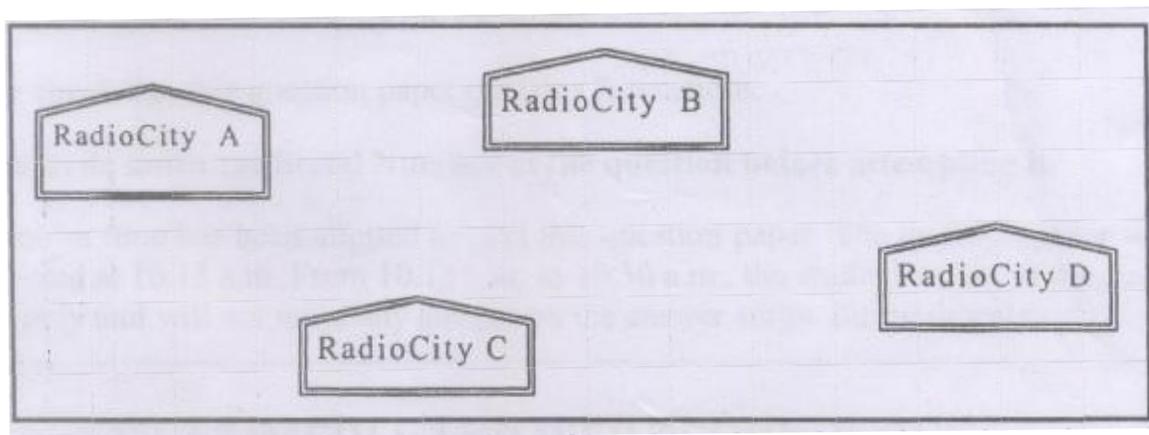
RadioCity A	50
RadioCity B	250
RadioCity C	50
RadioCity D	100

(i) Suggest a suitable cable layout to connect all the offices and name the topology
     used.   1

Ans Layout 1 : Star Topolgy
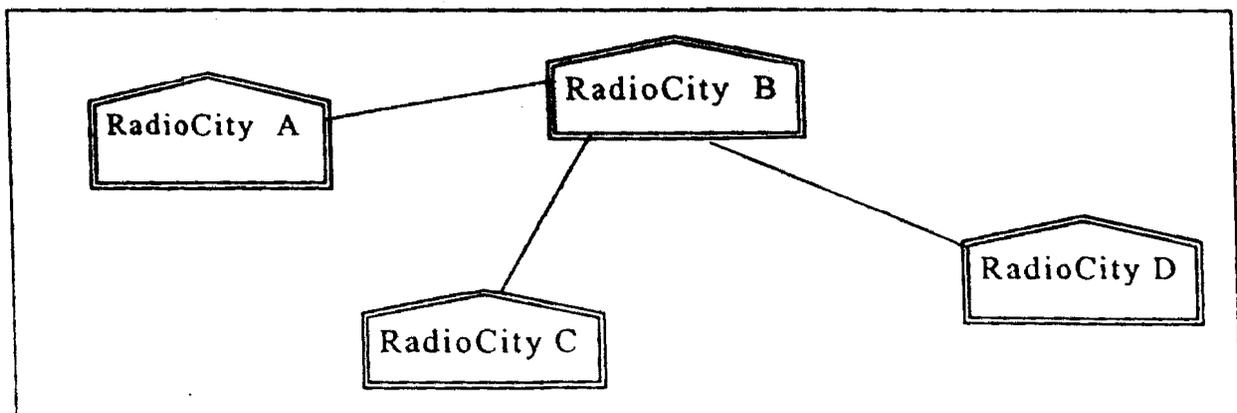
OR

Layout 2 : Bus Topology
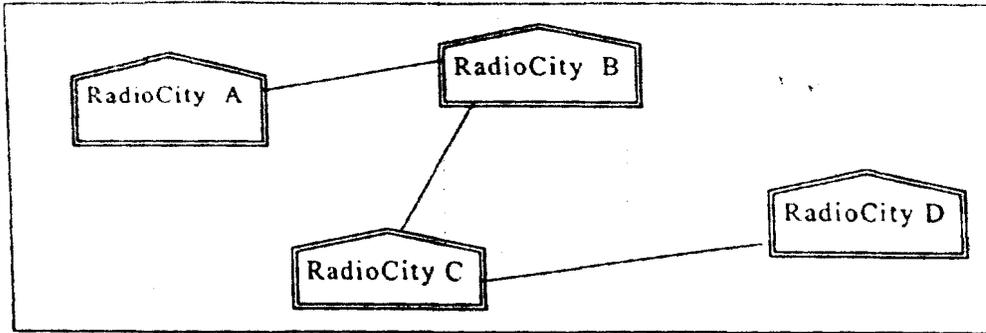
(½ mark for the correct cable layout and ½ mark for naming the correct topology)

    (ii)   Suggest the most suitable place to house the server with proper justification.   1

Ans   Radio City B should be the server as it has the most number of computers.

    (½ mark for naming the place and ½ mark for the correct justification)

    (iii)   Where and why repeaters should be used?   1

Ans   In case of Layout 1, repeater should be placed between building B and D as the distance is more than 75 Kms.

    OR

    In case of Layout 2, repeaters should be placed between building C and D as the distance is more than 75 Kms.

    (½ mark for naming the place and ½ mark for the correct justification)

    (iv)   If the organization needs to link this branch office to another office situated in a distant city (around 1050 Km) away where cable connection is not feasible, then suggest an economic way to connect it with reasonably high speed?   1

Ans   Radio Wave OR Microwave OR TCP / IP

    (1 mark for naming the correct technology)

<div align="center">

MULTIMEDIA & WEB TECHNOLOGY

QUESTION PAPER CODE 89

EXPECTED ANSWERS/VALUE POINTS

</div>

1.   (a)   What is the degree and the cardinality of the relation EMPLOYEE given below?   1

<div align="center">

TABLE: EMPLOYEE

EID	EName	EJoinDate	EExper	EPhone
E01	Shayamli	10/08/07	10	22222101
E02	Kushambha	19/08/07	5	22222202

</div>

<div align="center">

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</div>

Ans Degree - 5

Cardinality.- 2

(½ mark each for correctly mentioning the degree and cardinality)

(b)   Differentiate between design view and datasheet view with respect to a database.   2

Ans

Design View	Datasheet View
1. Allows the user to define each field, their data types, and descriptions in the table.	1. Allows the user to enter raw data in the table.
2. The user can create an entire new table or add, delete or customize the fields in an existing table.	2. The user can add, delete, edit, view or otherwise work with the data in an existing table.
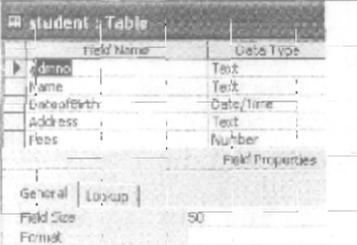
(2 marks for anyone correct differentiation point)

(c)   Latest Hit Station Video library stores data of all available DVDs on its server
in a table named HitMovies in Access. Study the relation HitMovies given
below and answer the following questions:

TABLE: HitMovies

MID	MName	Director	ReleaseDate	Releasing Company
M01	London Dreams	Vipul Shah	10/08/09	Joshua
M02	Wake Up Sid	Ayaan Mukherjee	19/08/09	Trinayan
M03	What's Your Rashee	Ashutosh Gowariker	18/08/09	Harem
M04	Aladdin	Sujoy Ghosh	15/08/09	Chahata

(1)   Name the field which can act as the primary key in the table HitMovies.   1

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Ans MID can att as the primary key.

(1 mark for naming the correct field)

(2) If the Release details of the movie have to be stored in a separate table (named RELEASE), then identify any two fields from the above table which should be included in the table RELEASE. 1

Ans The two fields to be included in the Table RELEASE are ReleaseDate and, Releasing Company

(½ mark each for naming the two fields correctly)

(3) What type of relationship exists between the table HitMovies and the newly created table RELEASE? 1

Ans One-to-One

(1 mark for the naming the correct relationship type)

(d) What are the advantages of Flash movie over animated GIF movie? 1

Ans Advantages of Flash over GIF are:

l A Flash movie can be stopped or restarted by the user while in GIF user interaction is not possible.

l It is very easy to edit a Flash movie, while editing of GIF animation is not possible.

(1 mark for anyone correct advantage)

(e) Give the full form of BMP. 1

Ans Bitmap Picture

(1 mark for the correct expansion)

(f) Write a short note on SMS. 2

Ans SMS stands for Short Message Service. This facility allows users to send and receive short alphanumeric messages(approx. 160 characters) to a mobile phone via a network operator's message center.

(2 marks for the correct explanation of SMS)

2. Answer the following questions based on Macromedia Flash:

(a) The normal layer lets you add content in a flash movie that moves along a straight path. Name any two types of layers which can help you to manipulate the content on a normal layer and improve the animation. 1

Ans Guide Layer, Motion Guide Layer, Mask Layer

(½ mark each for mentioning any two layer types)

(b) What is the use of dividing a movie into separate scenes? 1

Ans The advantage of breaking a movie into scenes is that every scene can be accessed individually and thus the sequence or order of the scenes can be changed.

(1 mark for the correct usage)

(c) Enumerate the benefits of frame by frame animation over tweening animation. 2

Ans

Frame by Frame Animation	**Tweening Animation**
1. This is a form of animation where an object's appearance or position is changed slightly from frame to frame to create the impression of movement.	1. This is a form of animation where the starting and finishing points for the object to be animated are given and Flash automatically fills the frames in between.
2. This type of animation allows greater control over changing content across the Flash Timeline	2. It allows less control over changing content due to automatic animation done by Flash

*(2 marks for correctly explaining anyone benefit)*

(d) Differentiate between Exporting and Publishing a Flash movie. 2

Ans

Publishing	**Exporting**
1. Publishing is preparing movie files and accompanying HTML codes for uploading movies on the Internet.	1. Exporting is saving a movie file in different formats to be played using a particular player.
2. Settings can be saved for reuse.	2. Settings cannot be saved.

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3. A movie is published only if the recipients are expected to play it on the internet using Flash player (Publishing in other formats is also possibe)	3. A movie is exported from Flash only if the recipients are expected to play it using software other than Flash.

(2 marks fpr anyone correct differentiation point)

(e)   Observe the image given below and do as directed:
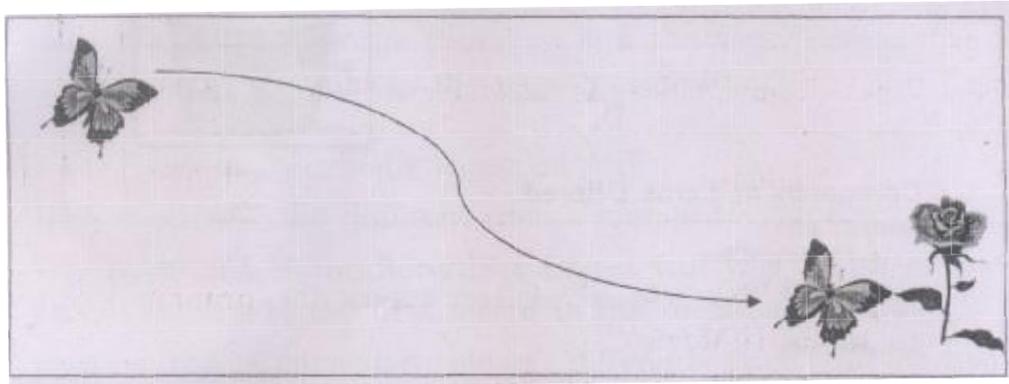
l   The image on the left hand side shows the position and size for frame 1.

l   The image on the right side shows the position and size for frame 25.

l   Assume that the images of butterfly and flower are stored in the Flash library by the name butterfly and flower respectively and the colour and size of the image remains the same.

l   The curve shows the path followed by the butterfly to reach from frame 1 to frame 25.

        Write the procedure and property settings for animating the above scenario.   4

Ans   The following steps have to be followed to animate the given scenario:

l   Select frame 1 from the timeline and insert the butterfly image from the library.

l   Select the image and place it on the left hand side.

l   Select frame 25 from the timeline and Select Insert – Keyframe

l   Select the image and position it on the right hand side of the stage at the desired location. Also insert the image of the rose.

l   Select any frame between 1 and 25.

l   Right click the mouse button and Select Create motion tween.

l   Select the layer containing the motion tween. Right click and select Add Motion Guide.

l   Select the pencil tool from the drawing toolbar and draw the path of motion.

OR

Any other equivalent method.

(½ marks for each step)

3. Answer the following questions based on HTML :

    (a) Differentiate between <HR> and <BR> tags. 2

Ans HR stands for horizontal rule and the <HR> tag allows the user to insert a section break by inserting a horizontal line. On the other hand, BR stands for break and the <BR> tag is used to insert a line break so that the subsequent text is displayed on a fresh line.

(2 marks for the correct differentiation point)
Note: Only 1 mark to be awarded if only the full forms of the tag are given

    (b) Write the HTML code to generate the web page in the format shown: 8

Consider the following points while writing the HTML code:

1. Title of the page should be "eCards".

2. Background colour should be "Purple".

3. Text style of the main heading should be "Aria! Bold" and colour should be red.

4. Image used is "cards.jpg".

5. Table should have a 5 pixel thick border of colour green and the spacing between cell content and border is 15 pixels.

6. Use the concept of nested lists for creating the specified lists.

7. The bottom image (link.jpg) and the text "Personalize the Cards" are links to the page "person.html".

Ans   < HTML>

<HEAD> <TITLE>eCards</TITLE> </HEAD>

<BODY BGCQLOR="Purple">

<FONT FACE = "ARIAL" COLOR = "RED">

<H2 ALlGN = CENTER> E-CARDS </H2>

e-Cards is a website offering new and trendy cards for all ages.

<IMG SRC= " cards.JPG" height = 200 width = 150 ALlGN="MIDDLE">

<OL><FONT SIZE = +1 ><B> Categories of Cards Offered </B></FONT>

<LI> General Cards

    <UL TYPE = "square">

        <LI>Thinking of You

        <LI>Missing You

        < LI > Frieds Forever

    </UL>

<LI>Specific Cards

    <UL TYPE = "ci rcle" >

        <LI>Happy Birthday

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<LI > Happy Diwali

<LI > Happy Anniversary

</UL>

</OL>

You can also order flowers through our site

<TABLE ALlGN = CENTER BORDER=5 BORDERCOLOR = "Blue" CELLPADDING=15>
<CAPTION> <FONT COLOR = "BLUE"> PRICE LIST </CAPTION>

<TR>

<TH> Bouquet Type </TH>

<TH> Price < /TH>

<TR>

<TD> Flower Galore

<TD> Rs. 200

<TR>

<TD> Flower Shower

<TD> Rs. 300

<TR>

<TD> Flower Power

<TD> Rs. 400

</TABLE>

<CENTER>

<A HREF = "person.html"> <lMG SRC="link.jpg" height=50 width=50>

Personalize The Cards <I A>

</BODY>

</HTML> .

(½ mark for correct use of <HTML> and <BODY> tags)

+ (½ mark for correct use of <TITLE> tag)

+ (½ mark for body background colour)

+ (½ mark for mentioning the correct font type and color)

+(½ mark for displaying the heading correctly in center)

+ (1½ mark for correctly creating the nested list)

+ (½ mark for making table border 5 pixel thick and bordercolor green)

+ (½ mark for making table cellspacing as 15 pixels)

+ (½ mark for giving table <CAPTION>)

+ (1 mark for correctly creating the table)

+ (½ mark for displaying the links in center)

+ (½ mark each for correctly creating the link on the image and the text)

4. Answer the following questions based on ASP:

(a) How is an ASP file different from a simple HTML file?   1

Ans The main differences between a HTML file and an ASP file are:

l   HTML files are static web pages while ASP are dynamic web pages.

l   HTML file has the extension. htm or . html while ASP files have the extension .asp.

l   When a user requests a HTML file, the web server sends the HTML file directly to the client without any processing while the ASP file is first executed by the ASP engine and converted into HTML code before sendi ng it to the client.

(1 mark for anyone correct differentiation point)

(b) Which method of the RecordSet Object will you use to move the cursor directly to the first record in the record set?   1

Ans MoveFi rst

(1 mark for naming the correct method)

(c) How is the Connection object different from the RecordSet object?   2

Ans The Connection Object is used to connect to a data source. Through the connectfon 'object, one can access and manipulate a database while the . Recordset object is

used to hold a set of records from a database table. A Recordset 'object consists of rows and columns in which the data is stored in an organized manner.

(2 marks for the correct differentiation point)

(d) Identify the following: 3

(i) The ASP object which stores information needs for a particular user session.

(ii) The ASP component used to keep track of the number of visitors who have visited the web page.

(iii) The Request object collection that will be used to retrieve information submitted by the user in a form using GET method.

Ans 1. Session Object

2. Page Counter

3. Querystring Collection

(1 mark for each correct answer)

(e) Give the output of the following statements: 3

(i) Response.write(FALSE AND NOT TRUE OR TRUE)

(ii) Response.write(LEFT("With Multimedia",5)
& UCASE ("Life is Fun"»

(iii) Response.write((4 - 3)*(6/2 – 3))

Ans i) True

ii) With LIFE IS FUN

iii) 0

(1 mark for each correct answer)

Note: ½ mark to be awarded for each part if the steps showing the working are correct but the final output is wrong

5. Answer the following questions based on ASP:

(a) Expand the term IIS. 1

Ans Internet Information Services

(1 mark for the correct expansion)

(b) Differentiate between AdRotator and ContentRotator components of ASP. 2

Ans The ASP AdRotator component which can be used to display a different advertisement in the form of an image each time a user enters or refreshes a page while the ASP Content Rotator which can be used to display different HTML content string each time a user enters or refreshes a page.

(2 marks for the correct differentiation)

(c) Predict the output of the following code: 2

```
<Script Language="VBScript" >

Dim A, B

A = 2

B = 20

Do While A < 6

        Document.Write(A+B)

        A = A + 1

        B = B-2

Loop

</Script>
```

Ans 22212019

(½ mark each for the four numbers in the output)

(d) Rewrite the following code after removing errors with each correction under-lined:

```
<BODY>

The login name entered by the user is :

<%

pass = RESPONSE.QUERYSTRING ("password")

%>

The password is :

<%
```

If pass <> "enter" then

     REQUEST.WRITE (Invalid)

Otherwise

     RESPONSE.WRITE ("Valid")

end

%>

</BODY>

Ans   <BODY>

The login name entered by the user is :

<%

pass = <u>REQUEST</u>.QUERYSTRING ("password")

%>

The password is:

<%

if pass <> "enter" then

     <u>RESPONSE.WRITE(</u>"Invalid")

ELSE

     RESPONSE.WRITE ("Valid")

<u>End IF</u>

%>

</BODY>

(½ mark each for correcting any four errors)

(e)   Write the ASP code that will read the text file named friends.txt, count the number of lines in the file and then display the same.   3

Ans   < %

count = 0

Set Fobj = Server.CreateObject ("Scripting.FileSystemObject")

Set mFile = Fobj.OpenTextFile ("multi.txt")

Do while NOT mFile.AtEndOfStream

      mFile.ReadLine

      count = count +1

Loop

Response.Write ("Total lines in the file are: & count")

mFile.close

%>

(½ mark for correctly creating the file system object)

+ (½ mark for opening the file)

+ (½ mark for the loop)

+ (½ mark for reading the line)

+ (½ mark for incrementing the counter)

+ (½ mark for displaying the number of lines)

6. Answer the following questions based on VBScript :

    (a) Name the event to be used in the following situations: 2

        (i) To perform an action when the button gains focus.

        (ii) To perform an action when a button is clicked.

Ans i) Onfocus

    ii) OnClick

(1 mark for each correct answer)

    (b) Rewrite the following code using DO WHILE instead of FOR loop without affecting the output: 2

      <HTML>

      <BODY>

      <SCRIPT LANGUAGE = "VBScript" >

      DIM A, B, C, Count

```
        A = 0

        B = 1

        FOR Count = 3 TO 10 STEP 2

            C = A+B

            Document.Write (C & " ")

            A = B

            B = C

        NEXT

        </SCRIPT>

        </BODY>

        </HTML>
```

Ans   `<HTML>`

`<BODY>`

`<SCTRIPT LANGUAGE = "VBScript">`

DIM A, B, C, Count

A = 0

B = 1

<u>Count = 3</u>

<u>DO WHILE Count < 10</u>

C=A+B

Document. Write (C &. " ")

A = B

B = C

<u>Count=Count+2</u>

<u>LOOP</u>

`< /SCRIPT>`

`< / BODY>`

`< / HTML>`

(½ mark each for writing the mentioned underlined lines correctly)

(c)   Give the output of the following code: 2

```
<HTML>
<BODY>
<SCRIPT LANGUAGE="VBSCRIPT" >
DIM Num, Flag
Flag = 0
Num = 10
FOR A = 2 TO Num/2
      IF Num MOD A = 0 THEN
            DOCUMENT.WRITE (Num+ 1)
ELSE
      DOCUMENT.WRITE (Num - 1)
END IF
NEXT
</SCRIPT>
</BODY>
</HTML>
```

Ans   119911

(½ mark for each correct number in the output)

(d)

Input Number	
Check Divisibility by	

Divisibility Result

Write the HTML code for creating the above displayed form. Write the embedded VB Script code for the click event of the 'Divisibility Result' button such that it displays a message box based on whether the number input in the first textbox is divisible by the number input in the second textbox according to the following criteria:

- If number is divisible then message displayed is "Wow! I belong to your family"
- If number is not divisible then message displayed is "Let's look for my friends"   4

Ans   <HTML>

<HEAD><TITLE>DIVISIBILTY CHECK</TITLE>

<SCRIPT LANGUAGE="VBScript">

SUB B1_OnClick

Dim A, B

A = FORM1.T1.VALUE

B = FORM1.T2.VALUE

IF A MOD B = 0 THEN OR IF FORM1.T1.VALUE MOD FORM1.T1.VALUE THEN

    MSGBOX ("Wow ! I belong to your family")

Else

    MSGBOX ("Let's look for my friends")

END IF

END SUB

</SCRIPT>

</HEAD>

<BODY>

<FORM NAME = "FORM1">

<P>INPUT NUMBER <INPUT TYPE = "TEXT" NAME = "T1">

<P>CHECK DIVISIBILITY BY <INPUT TYPE = "TEXT" NAME = "T2">

<P>

<INPUT TYPE = "Button" VALUE = "Divisibility Result" NAME="B1">

</FORM>

</BODY>

</HTML>

(½ mark for correct <FORM> tag)

(½ mark for creating textboxes using <INPUT> tags)

(½ mark for creating button using <INPUT> tag)

(½ mark for correct <SCRIPT> tag)

(½ mark for associating subroutine with the button element)

(1 mark for correct conditional statement)

(½ mark for correctly displaying the output in the message box)

7.   Answer the following questions based on the unit Web Technologies:

(a)   Define the term Cyber Law.   1

Ans   It refers to the set of laws governing the usage of cyberspace / Internet. It encompasses a wide variety of political and legal issues related to the Internet.

(1 mark for the correct definition)

(b)   Expand the term WLL.   1

Ans   Wireless Local Loop

(1 mark for the correct expansion)

(c)   What are the following software used for?   2

     (i)   Apache Tomcat

     (ii)   MySQL

Ans   i)   Web Server

    ii)   Relational Database Management System

(1 mark each for mentioning the correct usage of each of the two)

(d)   Differentiate between Twisted pair cable and Co-axial cable.   2

Ans

Twisted Pair cable	**Co-axial cable**
1. Relatively low data transfer rate	1. Comparatively higher data transfer rate
2. This type of cable is very susceptible to electromagnetic fields	2. This type of cable is less susceptible to interference

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3.	Most common application is the telephone system	3.	Widely used for cable television

(2 marks for anyone correct differentiation point)

(e) ProActor School of Acting in Mumbai is setting up the network between its different wings. There are 4 wings named as SENIOR(S), JUNIOR(J), ADMIN(A), and HOSTEL(H).
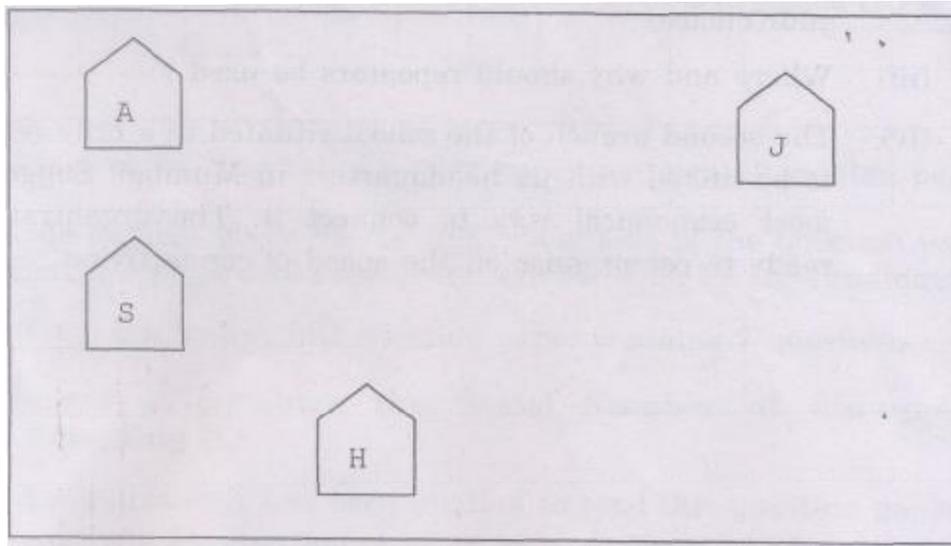
Distance between various wings are given below:

Wing A to Wing S	100m
Wing A to Wing J	200m
Wing A to Wing H	400m
Wing S to Wing J	300m
Wing S to Wing H	100m
Wing J to Wing H	450m

Number of computers in each wing is as given below:

Wing A	10
Wing S	200
Wing J	100
Wing H	50

(i)   Suggest the most suitable topology for connecting these wings.   1

Ans   Star Topology
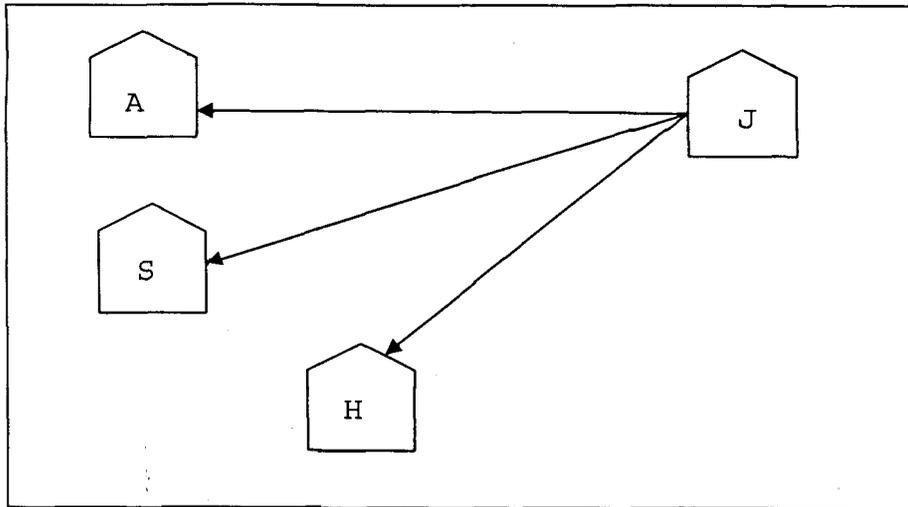
(1 mark for the correct topology)

(ii)   Suggest the most suitable place to house the server. Justify your choice.   1

Ans   Wing S as it has the maximum number of computers

(½ mark for the correct name and ½ mark for the justification)

(iii)   Where and why should repeaters be used ?   1

Ans   Between S and A, Sand J, S and H as all the distances are greater than 75 m

(½ mark for the correct placement and ½ mark for the justification)

(iv)   The second branch of the school situated in a hilly region is to be linked with
        its headquarters in Mumbai. Suggest the most economical way to connect it.
        The organization is ready to compromise on the speed of connectivity.   1

Ans   Radio Waves OR TCP/IP

(1 mark for the correct transmission medium)