

Science
Design of Sample Question Paper
Class IX
SA-I (2010-2011)

Total : 80
MCQ : 16
Theory : 64

I Term

S.No.	Content	Marks Theory	MCQ	Total
1.	Food	9	2	11
2.	Matter-Its nature & behaviour	16	10	26
3.	Organization in living world	12	4	16
4.	Motion, Force & Work (Motion, Force, Gravitation)	27	-	27
Total		64	16	80

I) Weightage to form of questions

S.No.	Content	Marks for each question	No. of questions	Total Marks
1.	VSA	1	4	4
2.	SA I	2	9	18
3.	SA II	3	9	27
4.	LA	5	3	15
				64
MCQ Pract. Based				16
				80

II) Scheme of options

There will be no overall choice. However there is an internal choice in every question of 5 marks category.

III) Weightage to difficulty level of questions:

Easy 15%
Average 70%
Difficult 15%

Typology of Questions:

In order to assess different abilities related to the subject, the question paper includes open ended questions, drawing/illustrations based questions, communication skill based questions and activity based questions.

About 20% weightage has been assigned to questions testing higher order thinking skills of learners.

Form of Questions Unit	VSA	SA(I)	SA(II)	LA	MCQ	Total
Food	1(1)	2(1)	6(2)	-	2(2)	11(6)
Matter-Its Nature & Behaviour					10(10)	
(a) Matter in our Surroundings	-	2(1)	6(2)			26(16)
(b) Is matter around us pure?	1(1)	2(1)	-	5(1)		
Motion, force and work						
a) Motion	1(1)	4(2)	3(1)	-	-	8(4)
b) Force and laws of motion	-	2(1)	3(1)	5(1)	-	10(3)
c) Gravitation	1(1)	2(1)	6(2)	-		9(4)
						} 27(11)
Organisation in living World						
Fundamental Unit of Life	-	2(1)		5(1)	4(4)	11(6)
Tissues	-	2(1)	3(1)			5(2)
						} 16(8)
Total	4(4)	16(8)	27(9)	15(3)	16(16)	80(41)

Sample Question Paper
Science (Theory)
First Term (SA-I)
Class IX
2010-2011

Time: 3 to 3½ hours

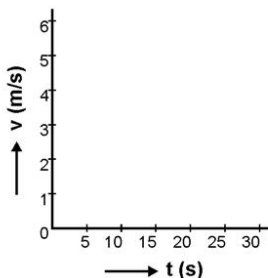
M.M.: 80

General Instructions

- i) The question paper comprises of two sections, A and B, you are to attempt both the sections.
- ii) All questions are compulsory.
- iii) There is no overall choice. However, internal choice has been provided in all the three questions of five marks category. Only one option in such questions is to be attempted.
- iv) All questions to section A and all questions of section B are to be attempted separately.
- v) Question numbers 1 to 4 in section A are one mark question. These are to be answered in one word or one sentence.
- vi) Question numbers 5 to 13 are two mark questions, to be answered in about 30 words.
- vii) Question numbers 14 to 22 are three mark questions, to be answered in about 50 words.
- viii) Question numbers 23 to 25 are five mark questions, to be answered in about 70 words.
- ix) Question numbers 26 to 41 in section B are multiple choice questions based on practical skills. Each question is a one mark question. You are to choose one most appropriate response out of the four provided to you.

Section-A

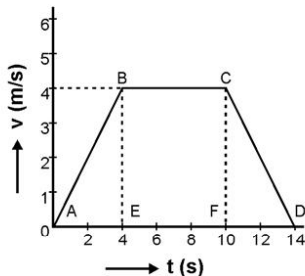
1. Choose a homogeneous mixture out of the following:
a) Ink b) milk c) brass d) muddy water.
2. Velocity time graph of a body is given in the following diagram



What conclusion can be drawn about the velocity of the body from this graph?

3. The value of 'G' on the surface of earth is $6.67 \times 10^{-11} \text{ Nm}^2/\text{kg}^2$. What will be its value on the surface of moon?
4. How do checkdams help in increasing ground water level?
5. a) Name the state of matter in which -
 - i) Layers of particles can slip and slide over each other.
 - ii) Particles just move around randomly, because of very weak force of attraction.b) List two ways by which a gas can be converted into a liquid.
6. Name the process or the separation technique you would follow to separate the following mixtures:
 - a) muddy water
 - b) kerosene and water
 - c) iron filings and sand
 - d) sulphur and charcoal
7. Can an object be accelerated if it is moving with constant speed? Justify your answer with an example.
8. The minute hand of a clock is 7 cm long. Find the displacement and the distance covered by it from 9.00 a.m. to 9.30 a.m.
9. Why is a person hit harder when he falls on a concrete floor than when he falls on a heap of sand from the same height?
10. The weight of an object on the surface of moon is 1.67N and its mass on its surface is 1 kg. Calculate its weight and mass on the surface of earth. (g on earth = 10 m/s^2).
11. (a) Name the plant tissues found in the husk of a coconut and also identify the chemical which is responsible for its stiffness.
(b) Give one way in which it differs from parenchymatous cells.
12. Give one example of an Indian and a foreign poultry breed when crossed, produce an improved variety. List any one desirable trait expected from such crossed breeding.
13. What happens to an animal cell when it is placed in a very dilute external medium? Why?
14. With the help of a labeled diagram, describe an activity to show that the particles of matter are very small. Use the following material that has been provided to you:
4 beakers, spatula, 4 test tubes, distilled water and few crystals of potassium permanganate.
15. Account for the following:
 - a) The temperature of water remains constant during boiling.
 - b) Evaporation is a surface phenomenon.
 - c) The spaces between the constituent particles are maximum in gases.
16. (a) What are the two ways of obtaining fish?
(b) What is the major problem faced in fish farming? How can it be overcome?

17. (a) Discuss two ways of incorporating desirable characteristics in crop varieties.
 (b) What is inter cropping? How are crops selected for intercropping?
18. (a) Name the living component common to both the complex permanent tissues found in plants. What is its function.
 (b) Give any two ways in which these tissues differ functionally from each other.
19. Study the given graph and answer the following questions from it -



- i) Which part of the graph shows accelerated motion? Calculate the acceleration.
 ii) Which part of the graph shows retarded motion? Calculate the retardation.
 iii) Calculate the distance travelled by the body in first 4 seconds of journey, graphically.
20. i) When a horse suddenly starts running, a careless rider falls backwards. Explain why?
 ii) State the action and reaction in the swimming action of a swimmer.
21. A stone is thrown vertically upwards with a velocity of 40 m/s and is caught back. Taking $g=10 \text{ m/s}^2$, calculate the maximum height reached by the stone.

What is the net displacement and the total distance covered by the stone?

22. State the universal law of Gravitation.

The mass of the sun is $2 \times 10^{30} \text{ kg}$ and that of the earth is $6 \times 10^{24} \text{ kg}$. If the average distance between the sun and the earth is $1.5 \times 10^{11} \text{ m}$, calculate the force exerted by the sun on the earth and also by the earth on the sun.

23. Rama tested the solubility of four substances at different temperatures and found in grams, of each substance dissolved in 100 g of water to form a saturated solution.

S.No.	Substance Dissolved (in grams)	Temperature (K)		
		293 K	313 K	333 K
(i)	Ammonium chloride	37g	41g	55g
(ii)	Potassium chloride	35g	40g	46g
(iii)	Sodium chloride	36g	36g	37g
(iv)	Potassium Nitrate	32g	62g	106g

- i) Which substance is least soluble in water at 293K?
 ii) Which substance shows maximum change in its solubility when temperature is raised from 293K to 313K?

- iii) Find the amount of ammonium chloride that will separate out when 155g of its solution at 333K is cooled to 293K?
- iv) What is the effect of change of temperature on the solubility of a salt?
- v) What mass of sodium chloride would be needed to make a saturated solution in 10g of water at 293K?

OR

With the help of labeled diagram, describe an activity to separate a mixture containing ammonium chloride, sodium chloride and sand.

24. State Newton's second law of motion.

How does the second law of motion give us a method to measure force?

A man pushes a box of mass 50 kg with a force of 80N. What will be the acceleration of the box due to this force?

What would be the acceleration if the mass were halved?

Or

Define momentum of a body. Prove with the help of III law of motion that the total momentum of two bodies is conserved during collision provided no external force acts. A car 'A' of mass 1500kg, travelling at 25m/s collides with another car 'B' of mass 1000 kg travelling at 15m/s in the same direction. After collision, the velocity of car A becomes 20 m/s. Calculate the velocity of car B after collision.

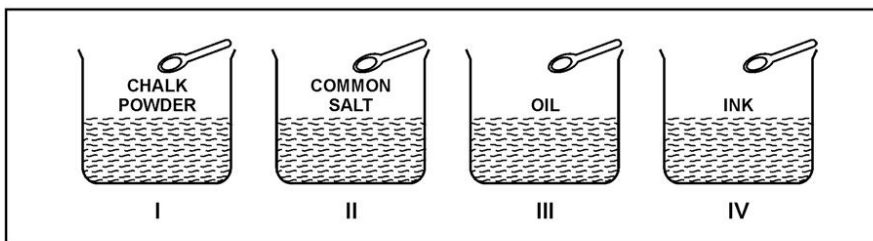
25. (a) Draw a plant cell and label seven important organelles found in it.
(b) Name one organelle that can make some of its protein in a plant cell and mention one function of it in a cell.

Or

- (a) Name and draw a cell which does not have well defined nuclear region. Label any four parts.
(b) Mention two ways by which a photosynthesizing cell belonging to this group differs from a cell of your body.

SECTION B

26. The following substances were added to water in a beaker as shown below. The mixture was stirred well. A suspension was observed in the beaker:

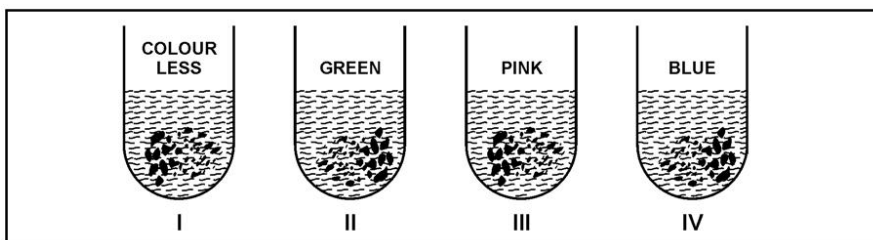


- a. I
- b. II
- c. III
- d. IV

27. Out of the given four mixtures, the one that appears clear and transparent is :

- a) Chalk powder and water
- b) Sand and water
- c) Starch and water
- d) Sugar and water

28. Rama heated a mixture of iron filings and sulphur in a hard glass test tube for sometime till a grey-black product was formed. She cooled the test tube and then added 2 ml carbon-di-sulphide in it and shook the contents of the test tube. The observation made by her was likely to be as shown below:



- a. I
- b. II
- c. III
- d. IV

29. The equipment required to prepare iron sulphide by heating a mixture of iron filings and sulphur powder is :

- a. Petri-dish
- b. Watch glass
- c. China-dish
- d. beaker

30. On placing an iron nail in a copper sulphate solution, it is observed that:

- a. a soft and black coating is deposited on the iron nail.
- b. a reddish brown coating is deposited on the iron nail.
- c. a smooth and shiny coating is deposited on the iron nail.
- d. a grey and hard coating is deposited on the iron nail.

31. Rahul added 2 ml of Barium chloride solution to 2 ml solidim sulphate solution in a test tube and observed that :
- a clear solution was obtained
 - two solutions formed separate layers in the test tube
 - the solution turned pink
 - a white solid settled at the bottom
32. To separate a mixture of sand, common salt, camphor and iron filings, Dhoni added water to the mixture in a test tube, and shook it well. He found that one component dissolved in water. It was :
- sand
 - iron filings
 - camphor
 - common salt
33. The sequence of steps taken for separating a mixture of ammonium chloride, sand and common salt is :
- sublimation, adding water, filtration, evaporation.
 - evaporation, adding water, filtration, sublimation.
 - Filtration, evaporation, sublimation, adding water.
 - Evaporation, sublimation, adding water, filtration.
34. While determining the boiling point of water, the teacher suggested to add some pum-ice stone pieces to the hard glass test tube containing water. This was done to :
- avoid bumping
 - avoid melting of hard glass test tube
 - prevent unnecessary loss of heat energy
 - spread the heat uniformly.
35. To determine the melting point of ice, a student immersed the thermometer bulb in crushed ice in a beaker and heated the beaker on a low flame. He would observe:
- an increase in temperature during melting of ice
 - a decrease in temperature during melting of ice
 - a decrease first and then an increase in temperature during melting of ice
 - the temperature remains constant during melting of ice
36. Multinucleated condition is seen in
- only smooth muscle cells
 - only skeletal muscle cells
 - both smooth and skeletal muscle cells
 - neither smooth nor skeletal muscle cells

37. The features that best describe the cells of parenchyma cells are :
- a) Dead cells, thick walled, no intercellular spaces
 - b) Living cells, thin walled, no intercellular spaces
 - c) Dead cells, thin walled, large intercellular spaces
 - d) Living cells, thin walled, large intercellular spaces
38. The correct order of the parts of a nerve cell through which the nerve impulse is transmitted is :
- a) Nerve endings, dendrites, axon, cell body
 - b) cell body, axon, dendrites, nerve endings
 - c) dendrites, nerve endings, cell body, axon
 - d) dendrites, cell body, axon, nerve endings.
39. A coverslip must always be placed very gently while mounting in order to :
- a) Avoid the entry of oil bubbles.
 - b) Stop the stain from oozing out.
 - c) Avoid crushing of the material.
 - d) Stop the material from drying.
40. Aditya added 1 or 2 drops of iodine to three test tubes A, B and C containing 2 ml of food sample. A dark blue black colour appeared in test tubes A and B. The correct order of the food samples taken in the three test tubes A, B and C is :
- a) Rice, dal, potato
 - b) Rice, potato, dal
 - c) Potato, dal , rice
 - d) Rice, dal, dal
41. The following statements describe the steps to detect the presence of meta nil yellow in dal. One of the four statements given below is incorrect.
- a) Take 2 ml of food extract
 - b) Grind 3-5 gm of dal and prepare solution.
 - c) Add 2-4 drops of concentrated H_2SO_4
 - d) Filter the contents and collect the filtrate

The incorrect statement is

- a) d
- b) a
- c) c
- d) b

**Marking Scheme
Science (Theory)
First Term (SA-1)
Class IX
2010-2011**

Section A

- | | | |
|-----|---|----------|
| 1. | Brass | 1 |
| 2. | Body is moving with a constant velocity of 4 m/s. | 1 |
| 3. | $6.66 \times 10^{-11} \text{ Nm}^2/\text{kg}^2$. same as that on the surface of moon. | 1 |
| 4. | By stopping the rainwater from flowing away. | 1 |
| 5. | a) i) liquid | 1/2 |
| | ii) gas | 1/2 |
| | b) decreasing temperature, increasing pressure | 1/2, 1/2 |
| 6. | a) filtration/decantation | 1/2 |
| | b) by using a separating funnel | 1/2 |
| | c) by using a magnet | 1/2 |
| | d) by adding the mixture to carbon-di-sulphide. | 1/2 |
| 7. | Yes, if direction of its motion changes. | 1 |
| | Example : An object moving with a constant speed in a circular path. | 1 |
| 8. | Length of minute hand $l = 7 \text{ cm}$ | |
| | Distance covered by it = $1/2$ circumference = $\pi r = \frac{22}{7} \times 7 = 22 \text{ cm}$ | 1 |
| | Displacement = $2l = 2 \times 7 \text{ cm} = 14 \text{ cm}$ | 1 |
| 9. | On a hard surface he is brought to rest in a very short time, so greater force is called into play, whereas, on a heap of sand, he is brought to rest in a longer time, so lesser force is called into play (or explanation in terms of momentum) | 2 |
| 10. | $W_m = 1.67 \text{ N}$ | |
| | Mass = 1 kg | |
| | $W_e = 6 \times W_m = 6 \times 1.67 = 10.02 \text{ N}$ | 1 |
| | Mass of an object remains the same. | |
| | \therefore Its mass on earth = 1 kg | 1 |
| 11. | a) Sclerenchyma | 1/2 |
| | Lignin | 1/2 |
| | b) Sclerenchyma consists of dead cells/with very thick walls/provides strength to plant parts. | |

	Parenchyma consists of live cells/with thin cell walls/stores food.	1
12.	(a) Assel, Leghorn	½ x 2
	(b) (i) number and quality of chicks	1
	(ii) dwarf broiler parent for commercial chick production	
	(iii) summer adaptation capacity/tolerance to high temperature	
	(iv) low maintenance requirements	
	(v) reduction in the size of the egg laying bird with ability to utilize more fibrous cheaper diets formulated using agricultural biproducts. (any one)	
13.	The animal cell will gain water and would swell up/may burst.	1
	Due to osmosis, water moves from the dilute external medium through the semipermeable cell membrane into the cell with low water concentration.	1
14.	Diag. of Fig. 1.2; p-2, N.C.E.R.T. Text Book.	1
	Description : Take a crystal of potassium permanganate and dissolve it into 100 ml of water. Observe the colour of the solution. Take 1 ml of this solution and put it into 9 ml of water, taken in another beaker and shake it well. Observe the colour of this solution.	
	Keep diluting this solution like this 8 to 10 times and observe the colour. It will be observed that with every dilution, the colour becomes light but is still visible. So it can be concluded that one crystal of $KMnO_4$ must be made of millions of tiny particles.	2
15.	a) Heat energy is used up in changing the state of matter, i.e. from liquid water to water vapour.	1
	b) The particles on the surface gain energy from surroundings which increases their kinetic energy and they change into vapour state.	1
	c) The attractive forces between the constituent particles are weakest in gases.	1
16.	a) From natural sources/capture fishing	½
	From fish farming/culture fishery.	½
	b) Lack of availability of good quality seed.	1
	By using hormonal stimulation.	1
17.	a) By hybridization.	½
	By introducing a gene that would provide the desired characteristics/through genetically modified crops.	½
	b) Growing two or more crops simultaneously on the same field in a definite pattern.	1
	Crops with different nutrient requirement/crops with different maturity duration.	1
18.	a) Parenchyma	½
	Stores food/conduction of water	½
	b) Xylem - transports water and minerals/the direction of flow is vertical.	
	Phloem - transports food from leaves to other parts/flow of the materials is in both direction.	1+1

19. i) AB ½

$$a = \text{slope of AB} = \frac{(4-0)\text{m/s}}{(4-0)\text{s}} = 1\text{m/s}^2 \quad \frac{1}{2}$$

ii) CD ½

$$\text{retardation} = \frac{4\text{m/s}^2}{2} = 2\text{m/s}^2 \quad \frac{1}{2}$$

iii) distance in first four seconds is found by area under the figure AEB

s = area of AEB

$$= \frac{1}{2}(4-0) \text{ seconds} \times (4-0)\text{m/s}$$

$$= 8 \text{ m} \quad 1$$

20. i) Initially, the horse and rider are in state of rest w.r.t. the ground. When the horse starts running suddenly, he comes into state of motion w.r.t. the ground but the rider tends to remain in state of rest and experiences a backward pull. 2

ii) action - force exerted by hands and feet of swimmer on water. ½

Reaction - water exerts force on the swimmer and pushes him forward. ½

21. $v^2 - u^2 = 2gh$

$$\therefore h = \frac{v^2 - u^2}{2g}$$
$$= \frac{0 - (40)^2}{-2 \times 10} = 80\text{m} \quad 1$$

After reaching maximum height, the stone falls freely and comes back to its initial position 1

\therefore net displacement = 0 1

Total distance = h + h = 160 m 1

22. Correct statement of the Universal law of gravitation. 1

Force of sun on earth is,

$$F = \frac{GM_1M_2}{d^2}$$

$$= \frac{6.7 \times 10^{-11} \times 2 \times 10^{30} \times 6 \times 10^{24}}{(1.5 \times 10^{11})^2}$$

$$= 3.57 \times 10^{22}\text{N} \quad 1\frac{1}{2}$$

Force of the earth on the sun is the same ½

a) Potassium Nitrate 1

- b) Potassium Nitrate 1
- c) 18 g 1
- d) Solubility of a salt increases with increase in temperature. 1
- e) 3.6 g 1

Or

Diag. of Fig. 2.7, p-20, N.C.E.R.T. Text Book. 2

Description : Crush the given mixture and put it in a china dish.

Put an inverted funnel over the china dish. Put a cotton plug on the stem of the funnel. Now heat slowly. Ammonium chloride will be collected on the cooler parts of the funnel. Now add water to the remaining mixture and stir it well. Filter it. Sand will be collected as a residue on the filter paper. Evaporate the filtrate to dryness. Common salt will be collected. 3

24. i) Correct statement of the law 1
- ii) $F \propto$ rate of change of momentum

$$= \frac{mv - mu}{t}$$

$$= \frac{m(v-u)}{t}$$

$F = ma$ 2

- iii) $m = 50 \text{ kg}$ $F = 80 \text{ N}$

$F = ma$

$$a = \frac{F}{m} = \frac{80\text{N}}{50 \text{ kg}} = 1.6\text{m/s}^2$$

$a \propto \frac{1}{m}$ 1

Hence acceleration would be doubled, when its mass is halved. 1

OR

- i) Momentum of a body is the product of mass of the body and its velocity. 1
- ii) Consider two bodies A and B of masses m_A and m_B , initial velocities u_A & u_B respectively colliding with each other, collision lasts for 't' seconds

Ball A exerts a force F_{AB} on ball B and the ball B exerts a force F_{BA} on ball A.

$$F = \frac{m(v-u)}{t}$$

$$\therefore F_{AB} = m_A \frac{(v_A - u_A)}{t} \text{ \& } F_{BA} = m_B \frac{(v_B - u_B)}{t}$$

Accord. to the III law of motion,

$$F_{AB} = -F_{BA}$$
$$\Rightarrow m_A \frac{(v_A - u_A)}{t} = - m_B \frac{(v_B - u_B)}{t}$$
$$\Rightarrow m_A u_A + m_B u_B = m_A v_A + m_B v_B$$

2

According to the law of conservation of momentum,

$$m_1 u_1 + m_2 u_2 = m_1 v_1 + m_2 v_2$$

$$1500 \times 25 + 1000 \times 15 = 1500 \times 20 + 1000 v_2$$

$$\therefore 1000 v_2 = 52500 - 30000$$

$$\therefore v_2 = \frac{22500}{1000} = 22.5 \text{ m/s}$$

2

25. a) Fig. 5.6 (plant cell) on pg 64 of N.C.E.R.T. book :

7 labels :

1/2

i) chloroplast

ii) ribosomes

iii) mitochondrion

7 x 1/2 = 3 1/2

iv) Golgi apparatus

v) Lysosome

vi) Endoplasmic reticulum

vii) Nucleus

b) Mitochondrion/Releases energy required for various chemical activities needed for life.

1/2 + 1/2 = 1

OR

(a) Bacterium

1

Diagram - fig. 5.4 pg 62 N.C.E.R.T. Book.

1/2

4 Labels -

1/2 x 4 = 2

(i) Cell wall

(ii) Plasma membrane

(iii) Ribosomes

(iv) Nucleoid

b) **Photosynthesising cell**

Presence of chloroplast/absence of membrane bound cell organelles/single chromosome/small size

1

Cell of your body

Absence of chloroplast/presence of membrane bound cell organelles/more than one chromosome/larger size. 1

- 26. a
- 27. d
- 28. a
- 29. c
- 30. b
- 31. d
- 32. d
- 33. a
- 34. a
- 35. d
- 36. b
- 37. d
- 38. d
- 39. a
- 40. b
- 41. c

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Distribution Chapterwise

S.No.	Content	Marks (Theory)	MCQ	Total
1	Chemical substances (i) Chem. Reactions & Equations (ii) Acids, Bases & Salts (iii) Metals and Non-metals	8 } 8 } 24 8 }	5	29
2.	Effects of current (i) Electricity (ii) Magnetic effects of current	11 } 10 } 21	5	26
3.	World of living (i) Life processes (ii) Control and coordination	7 } 6 } 13	6	19
4.	Natural resources Sources of energy	6 -	-	6

Blue Print

Form of Questions Unit	VSA	SA(I)	SA(II)	LA	MCQ	Total
1. Chemical Substances						
(i) Chem. Reactions & Equations	1(1)	4(2)	3(1)	-	1(1)	9(5)
(ii) Acids, Bases & Salts	-	2(1)	6(2)	-	3(3)	11(6)
(iii) Metals and Non-metals	1(1)	2(1)	-	5(1)	1(1)	9(4)
2. Effects of current						
(i) Electricity	1(1)	4(2)	6(2)	-	5(5)	16(10)
(ii) Magnetic Effects of Current	-	2(1)	3(1)	5(1)	-	10(3)
3. World of living						
(i) Life processes	-	2(1)	-	5(1)	6(6)	13(8)
(ii) Control and coordination	-	-	6(2)	-	-	6(2)
4. Natural Resources						
Sources of Energy	1(1)	2(1)	3(1)	-	-	6(3)
Total	4(4)	18(9)	27(9)	15(3)	16(16)	80(41)

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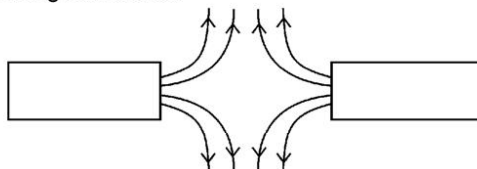
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- (ix) Question numbers 26 to 41 in section B are multiple choice questions based on practical skills. Each question is a one mark question. You are to choose one most appropriate response out of the four provided to you.

Section-A

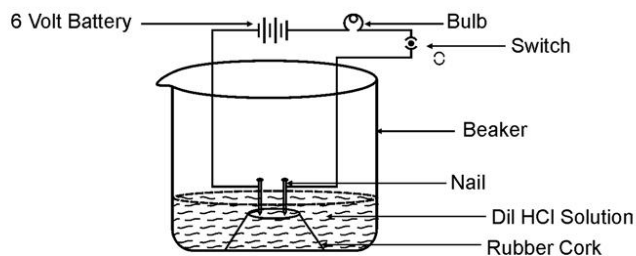
1. Write a balanced chemical equation to represent the following reaction :
Iron reacts with steam to form Iron (II, III) oxide and hydrogen gas.
2. Surface of some metals lose their brightness when kept in air for a long time. Why?
3. Mention one feature of biogas that makes it an ideal fuel.
4. State and define the unit of current.
5. The atomic number of sodium is 11, fluorine is 9 and neon is 10. Why are sodium and fluorine very reactive while neon shows almost no reactivity.
6. A drop of litmus solution is added to each of the four solutions given below. State the colour of litmus solution observed in each : soap solution, sodium carbonate solution, vinegar, lemon juice
7. Identify the substance oxidized, substance reduced, oxidizing agent and reducing agent :
 $\text{MnO}_2 + 4 \text{HCl} \rightarrow \text{MnCl}_2 + 2\text{H}_2\text{O} + \text{Cl}_2$
8. When water is added to a white powder 'A', vigorous reaction takes place and a large amount of heat is released. 'A' is also used for white washing. Identify 'A', write a chemical equation for its reaction with water and name the product.

9. Although bile juice has no digestive enzyme, it is still considered to be very important during digestion of food. Give two reasons.
10. The water in deeper sections of sea / ocean is much colder than that at the surface. Discuss how can this difference in temperature be exploited to obtain energy.
11. A piece of wire having resistance R is cut into four equal parts.
 - a. How does the resistance of each part compare with the original resistance?
 - b. If the four parts are placed in parallel, how will the resistance of combination compare with the resistance of original wire?
12. (a) Magnetic field lines of two magnets are shown as follows. Name the poles of magnets facing each other.



- (b) Why don't two magnetic field lines intersect with each other?
13. An electric room heater is rated at 2kW . Calculate the cost of using it for 2 hours daily for the month of September, if each unit costs Rs. 4.00.
14. 2g of ferrous sulphate crystals were heated in a hard glass test tube and observations recorded.
 - a. What was the successive colour change?
 - b. Identify the liquid droplets collected on the cooler parts of the test tube.
 - c. What type of odour is observed on heating ferrous sulphate crystals?
 - d. Name the products obtained on heating ferrous-sulphate crystals.
 - e. What type of reaction is taking place.
15. Name the constituents of baking powder. What is the function of each constituent of baking powder in the manufacture of cake.
16. An apparatus was set up as shown in the figure. It was observed that when an aqueous solution of HCl was taken in the beaker and the circuit was closed, the bulb in the circuit began to glow, but it did not glow when the experiment was repeated with glucose solution. What could be the reason?

Would the bulb glow if the same experiment is repeated with an aqueous solution of (i) NaOH (ii) NaCl ? Why?

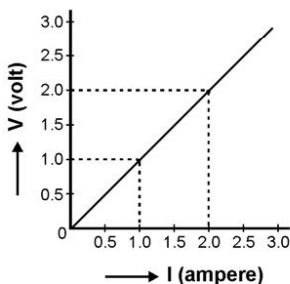


17. Name the plant growth hormone which is synthesized at the shoot tip. Explain briefly why does a plant shoot bend towards light during its growth.
18. With the help of a schematic diagram, trace the sequence of events occurring, when you step on a sharp object. Name this action.
19. State three advantages associated with using solar cells to produce electricity.
20. An electric circuit consisting of a 1.0m long metallic wire XY, an ammeter, a voltmeter, 4 cells of 1.5 V each and a plug key was set up.

Draw a schematic diagram of this electric circuit in the 'on' position.

Following graph was plotted between the values of potential difference (V) and current (I).

What conclusion do you draw about the relation between V and I from this graph. State this relation in your words.



21. (a) Distinguish between the terms, electrical resistance and resistivity of a conductor.
 (b) A copper wire of resistivity 1.6×10^{-8} ohm meter has a cross sectional area of 20×10^{-4} cm². Calculate the length of this wire required to make a 10 ohm coil.
22. (a) State the function of 'a fuse' in a circuit. How is it connected in the domestic circuit?
 (b) An electric fuse of rating 3A is connected in a circuit in which an electric iron of power 1 kW is connected which operates at 220V. What would happen? Explain.
23. Account for the following :
 - (a) Melting and boiling points of ionic compounds are high.
 - (b) Aluminium is more active than iron, yet there is less erosion of aluminium when both are exposed to air.
 - (c) Solder is used for welding electrical wires together.
 - (d) A sulphide ore is converted into its oxide to extract the metal.
 - (e) Tarnished copper vessels are cleaned with tamarind juice.

OR

- (a) Giving one example of each, explain how the following metals are obtained from their compounds by the process of reduction.
 - (i) Metal 'A' which is low in the activity series of metals.
 - (ii) Metal 'B' which is in the middle of the activity series of metals.

- (iii) Metal 'C' which is high in the activity series of metals.
- (b) What is meant by refining of metals? In the electrolytic refining of metal M, name the cathode, anode and the electrolyte.
24. (a) Draw a neat diagram of an excretory unit of a human kidney and label the following parts.
- (i) Bowman's capsule
 - (ii) Renal artery
 - (iii) Glomerulus
 - (iv) Collecting duct
- (b) Give one advantage of having a large number of these highly coiled structures in our kidneys.
- (c) Mention any two substances which are selectively reabsorbed as the filtrate flows along the tubular part of this unit.

OR

- (a) Draw a neat diagram of the human respiratory system and label the parts.
- (i) that has cartilagenous rings
 - (ii) that encloses the vocal cords.
 - (iii) sheet of muscle that separates the chest cavity from the abdominal cavity.
 - (iv) serves as a common passage for food and air.
- (b) How are the alveoli designed to maximize the exchange of gases. Suggest any two features.
25. Draw the pattern of magnetic field lines through and around a current carrying solenoid. What does the magnetic field pattern inside the solenoid indicate?
- How can this principle be utilized to make an electromagnet?
- State two ways by which strength of this electromagnet can be increased?

OR

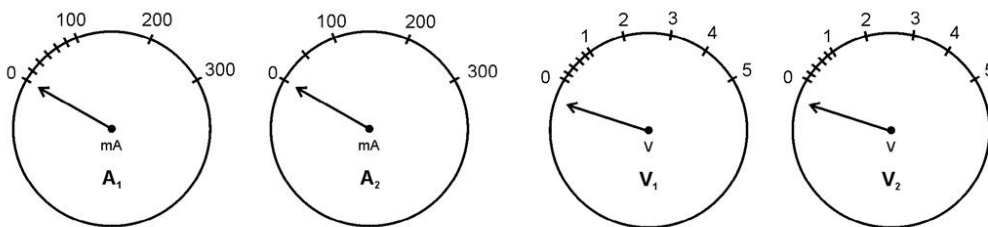
- (i) Describe an activity to show how a moving magnet may be used to generate an electric current. State the rule to find the direction of electric current generated in the coil.
- (ii) A coil 'A' of insulated copper wire is connected to a galvanometer. What would you observe when :
- a. a current carrying coil 'B' is brought near 'A'?
 - b. strength of current in coil B is changed?

Section 'B'

26. On putting a few drops of a liquid on a pH strip, the colour of pH strip changed to green. The liquid is most probably
- a. Lemon juice

- b. dil HCl
 - c. NaOH solution
 - d. Water
27. When a few drops of universal indicator were added to a dilute solution of HCl, it is observed that the colour of the solution changes from
- a. Colourless to blue
 - b. Colourless to red
 - c. Blue to colourless
 - d. Colourless to green
28. Rahul took some zinc granules in a test tube and added dilute HCl to it. He observed that the colour of the zinc granules changed to
- a. Yellow
 - b. Brown
 - c. Black
 - d. White
29. Aluminium powder was added to a solution of copper sulphate. The colour of the solution changed from :
- a. Colourless to blue
 - b. Blue to colourless
 - c. Light green to blue
 - d. Reddish brown to light green
30. When a solution of barium chloride in water is added to an aqueous solution of sodium sulphate, the following happens:
- a. a white precipitate is formed
 - b. a red precipitate is formed
 - c. the colour of the solution turns blue
 - d. a pungent smelling gas is evolved
31. While performing the experiment to study the dependence of current on potential difference, if the circuit that is used to measure current and voltage is kept 'on' for a long time, then
- a. the voltmeter will start giving wrong readings
 - b. the ammeter's zero error will change
 - c. the resistor will get heated up changing the value of 'R'
 - d. the potential difference of the cell will change

32. The normal positions of two ammeters and two voltmeters are shown. For verification of ohm's law, the student should select:

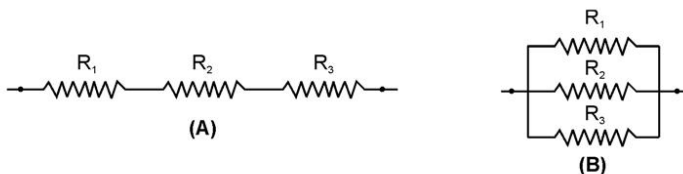


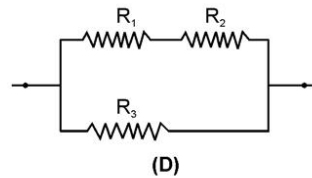
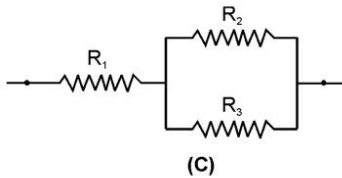
- ammeter A_1 and voltmeter V_1
 - ammeter A_2 and voltmeter V_1
 - ammeter A_1 and voltmeter V_2
 - ammeter A_2 and voltmeter V_2
33. While performing the experiment to study the dependence of current on potential difference, across a resistor, following observations were made by four students, A, B, C and D.

Student	Reading 1	Reading 2	Reading 3
A	V=0.5A I=0.1A	V=1.0V I=0.2A	V=1.5V I=0.3A
B	V=0.8V I=0.4A	V=1.6V I=0.8A	V=2.4V I=1.2A
C	V=1.0V I=0.5A	V=1.2V I=1.4A	V=1.4V I=1.0A
D	V=2.4A I=0.8A	V=2.7V I=0.9A	V=3.0V I=1.0A

The student who made wrong observation is :

- A
 - B
 - C
 - D
34. To determine the equivalent resistance of three resistors, when connected in a parallel arrangement, four students connected the resistors as follows :

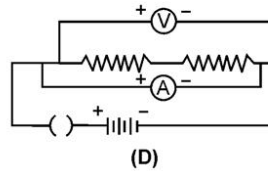
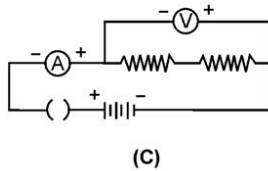
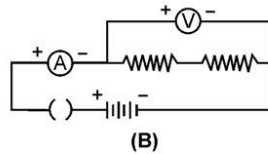
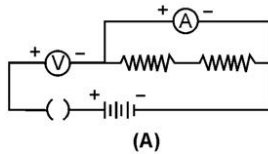




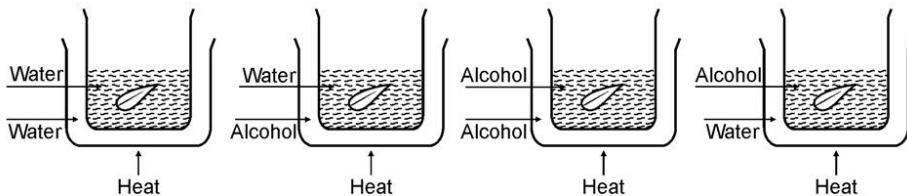
The correct set up is that of student :

- a. A
- b. B
- c. C
- d. D

35. To determine the equivalent resistance of two resistors, when connected in series, the correct way of connecting the ammeter and voltmeter in the circuit is :

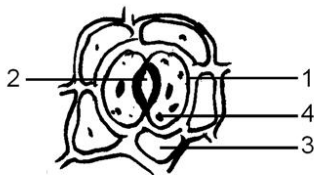


36. We test for starch and not glucose to prove that photosynthesis has taken place because:
- a. Glucose is not produced during photosynthesis in variegated leaves.
 - b. Glucose formed during photosynthesis gets stored as sucrose.
 - c. Glucose formed during photosynthesis gets stored as starch.
 - d. Glucose is a stable product and cannot be tested.
37. The figure that correctly depicts the removal of chlorophyll is



- a. I
- b. II
- c. III
- d. IV

38. Given below is the figure of a stomata. Select the correct labelling for this diagram.



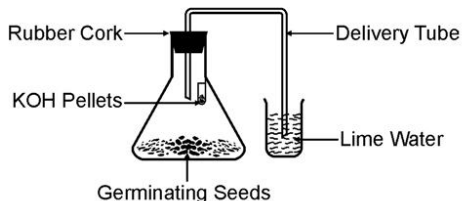
- a. 1. Epidermal cells 2. Stoma 3. Guard cell 4. Chloroplast
- b. 1. Guard cell 2. Stoma 3. Epidermal cells 4. Chloroplast
- c. 1. Stoma 2. Epidermal Cells 3. Chloroplast 4. Guard Cell
- d. 1. Chloroplast 2. Stoma 3. Epidermal Cell 4 Guard Cell

39. Stomata plays an important role in

- a. Respiration
- b. Photosynthesis
- c. Transpiration
- d. All the above

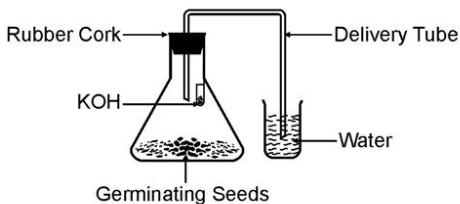
40. Given below to the diagram of the experiment set up to show carbon dioxide is given out during respiration. The part which is incorrectly labelled is

- a. KOH pellets
- b. Delivery tube
- c. Germinating seeds
- d. Lime water



41. In the experiment shown in the figure given below, the water level rises in the bent tube because.

- a) The germinating seeds consume all the oxygen and carbon dioxide.
- b) The germinating seeds consume oxygen and give out carbon dioxide which is absorbed by KOH.
- c) Carbondioxide is given out by the germinating seeds.
- d) Seeds need water for germination.



**Marking Scheme
Science (Theory)
First Term (SA-I)
Class X
2010-2011**

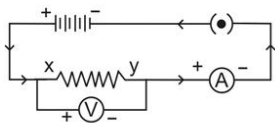
Section A

- | | | |
|-----|---|-------|
| 1. | $3\text{Fe} + 4\text{H}_2\text{O} \rightarrow \text{Fe}_3\text{O}_4 + 4\text{H}_2$ | 1 |
| 2. | They react with constituents of air (oxygen, carbon dioxide, moisture etc.) to form compounds. | 1 |
| 3. | Burns without smoke / leaves no residue / has high calorific value (any one). | 1 |
| 4. | Ampere | ½ |
| | 1 ampere is the amount of current flowing when a charge of 1 coulomb flows through a conductor in 1 second. | ½ |
| 5. | Sodium has one electron more (2,8,1) and fluorine has one electron less (2,7) than stable configuration. | 1 |
| | Neon has a stable configuration (2,8,8). | 1 |
| 6. | Soap solution : Blue | |
| | Sodium carbonate solution : Blue | |
| | Vinegar : red | |
| | Lemon juice : Red | |
| | Substance oxidized : HCl | |
| | Substance reduced : MnO_2 | |
| | Oxidizing agent : MnO_2 | |
| | Reducing agent : HCl | ½ x 8 |
| 8. | Calcium oxide / Quick lime / CaO | ½ |
| | $\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca}(\text{OH})_2 + \text{heat}$ | 1 |
| | Product : Calcium hydroxide / slaked lime | ½ |
| 9. | Makes the medium alkaline for the action of pancreatic enzyme. | 1 |
| | Emulsification of fats. | 1 |
| 10. | By use of ocean thermal energy conversion plants; warm surface water is used to boil volatile liquid; vapours are used to turn the turbine of the generator; colder water from the depth is pumped up, it helps in condensing the vapour into liquid. | ½ x 4 |
| 11. | a. Resistance of each part becomes 1/4th the original vaue. | 1 |
| | b. $R_p = \frac{R}{n} = \frac{R/4}{4} = \frac{R}{16}$ | 1 |

It becomes 1/16th the original vaue.

12. i. North poles 1
 ii. Intersection of field lines implies that the compass needle would point towards two directions at that point, which is not possible. 1
13. E = P x t x no. of days ½
 = 2kw x 2h x 30 ½
 = 120 kwh
 E = 120 units ½
 ∴ Cost= Rs. 4.00 x 120 ½
 = Rs. 480.00
14. i. Green to white, then brown ½, ½
 ii. Water ½
 iii. As of burning sulphur ½
 iv. Ferric oxide, sulphur dioxide, sulphur trioxide ½
 v. Décomposition réaction ½
15. Baking soda / NaHCO₃ ½
 Tartaric acid (a mild edible acid) ½
 Baking soda releases CO₂ on heating and causes the cake to rise/ make it soft and spongy. 1
 Tartaric acid neutralizes the effect of (bitter taste) of the sodium salt of the acid formed. 1
16. The bulb could glow when an aqueous solution of HCl was taken because HCl (aq) provided hydrogen and chloride (H⁺ and Cl⁻) ions which are carriers of electric charges in a solution, while glucose (being a covalent compound) did not furnish any ions in the solution. 1
 i. NaOH : The bulb will glow 1
 ii. NaCl : The bulb will glow 1
 Because both of them being ionic compounds furnish ions in aqueous solutions.
17. Auxins, when the growing shoot of a plant detects light, auxin is synthesised at the shoot tip and diffuses towards the shady side of the shoot. This stimulates cells to grow longer on the shadier side causing the plant to bend. ½ + 2½
18. Stimulus received by the receptor cells → Sensory neuron → Spinal cord (relay neuron)
 ↓
 Effector (muscle) ← Motor neuron 5x½=2½
 Reflex action. ½
19. Can be set up in remote areas where power transmission line is not commercially viable, have no moving parts / need no maintenance, need no focusing device, pollution free. (any 3) 3

20. i.



placement of ammeter and volt meter

½

direction of current

½

placement of 4 cells in series

½

closed key

½

ii. $V \propto I$

Current flowing through a conductor is directly proportional to the potential difference across it, if other physical conditions are constant. 1

21. i. Electrical resistivity of a conductor remains constant at a particular temperature, whereas, electrical resistance of a conductor changes with change in length or area of cross section of the conductor. 1

ii. $R=10\Omega$ $\rho=1.6 \times 10^{-8} \Omega m$ $A=20 \times 10^{-4} cm^2$
 $=20 \times 10^{-8} m^2$

$$R = \frac{\rho \ell}{A}$$

½

$$\begin{aligned} \therefore \ell &= \frac{RA}{\rho} \\ &= \frac{10\Omega \times 20 \times 10^{-8} m^2}{1.6 \times 10^{-8} \Omega m} \\ &= \frac{2000}{16} m \end{aligned}$$

½

$$\ell = 125m$$

(answer with correct unit)

1

22. i. It prevents damage to the appliance and the circuit due to overloading.

½

It is connected in series with the household circuit.

½

ii. $I = \frac{P}{V}$

$$\begin{aligned} &= \frac{1kw}{220v} = \frac{1000W}{220v} \\ &= 4.55A \end{aligned}$$

The electric current flowing / required by the electric iron is more than the current that can flow through the fuse without its melting.

Hence, fuse wire will melt, circuit breaks and the electric iron will not work.

2

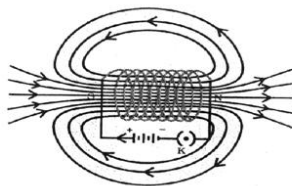
23. a. Large amount of heat energy is required to break the inter-ionic attractive forces.
 b. A thin but strong layer of aluminium oxide is formed on its surface which protects aluminium atoms underneath.
 c. Solder has a low melting point.
 d. It is easier to extract a metal from its oxide by the process of reduction than from its sulphide.
 e. Tamarind juice is acidic and neutralizes the basic layer of copper carbonate on tarnished copper vessels. 1x5

OR

- a. i. By heating
 Exmple : $\text{HgS} + \text{O}_2 \xrightarrow{\text{heat}} \text{Hg} + \text{SO}_2$ 1
- ii. By reduction of its oxide with carbon / carbon monoxide
 Example: $\text{ZnO} + \text{C} \longrightarrow \text{Zn} + \text{CO}$ 1
- iii. By electrolysis of fused compounds of the metal
 Exmple : $2\text{NaCl} \xrightarrow{\text{electricity}} 2\text{Na} + \text{Cl}_2$
 (molten) 1
- b. Removal of impurities from the crude metal. ½
 Cathode : Pure M ½
 Anode : Impure (crude) M ½
 Electrolyte : A water soluble salt of M. ½
24. a. Fig. 6.14 page 111, NCERT text book, labelling 1, ½ x 4
 b. Help in increasing the surface area for filtration/ help in increasing the surface area for proper reabsorption of useful substance. 1
 c. Glucose, amino acids, salts, water (any two) ½ x 2

OR

- a. Fig. 6.9 page 104, NCERT text book 1
 Label :
 i. Trachea
 ii. Larynx
 iii. Diaphragm
 iv. Pharynx ½ x 4
- b. Thin walled (easy diffusion), greater surface area for diffusion, large number, highly elastic, surrounded by network of blood capillaries. ½ x 4



Pattern 1

Correct Direction 1

Magnetic field pattern inside the solenoid indicates that the magnetic field is same at all points inside the solenoid. 1

This principle is utilized to magnetise a piece of magnetic material like soft iron when placed inside the coil. 1

Ways to strengthen this electromagnet :

i. Increase the amount of electric current through it $\frac{1}{2}$

ii. Increase the number of turns of coil. $\frac{1}{2}$

OR

(i) Activity :

- Take a coil of wire, AB, having a large number of turns and connect it to a galvanometer.
- Move the north pole of a strong bar magnet towards one end, B, of the coil. The galvanometer shows a momentary deflection indicating the presence of electric current in the coil AB.
- When the magnet is withdrawn / taken away from the coil, the galvanometer again shows momentary deflection in a direction, opposite to the first, indicating that the current is set up in the opposite direction. 2

Rule :

Fleming's right hand rule : stretch the thumb, forefinger and middle finger of right hand so that these are perpendicular to each other. If the forefinger indicates the direction of the magnetic field and the thumb shows the direction of motion of the conductor, then the middle finger will show the direction of current generated in the coil. 1

ii. a) The galvanometer shows a momentary deflection (due to electric current induced in it) 1

b) The galvanometer shows a momentary deflection (due to change in amount of electric current). 1

Section 'B'

- 26. d
- 27. b
- 28. c
- 29. b
- 30. a
- 31. c
- 32. a
- 33. c
- 34. b
- 35. b
- 36. c
- 37. d
- 38. b
- 39. d
- 40. d
- 41. b