Suggested Remedial Measures

- Practice should be given on the application of theorems in solving problems based on them.

29. A gulab jamun, when ready for eating, contains sugar syrup of about 30% of its volume. Find, approximately how much syrup would be found in 45 such gulab jamuns, each shaped like a cylinder with two hemispherical ends, if the complete length of each of them is 5 cm and its diameter is 2.8 cm.

Ans.

Volume of a gulab jamun

= Volume of cylinderical part + Volume of 2 hemispherical parts — 1 m

$$= \left[p(1.4)^2 \times 2.2 + \frac{4p}{3}(1.4)^3\right] \text{cm}^3 \qquad 1\tfrac{1}{2}\text{ m}$$

$$= \pi(1.4)^2\left[2.2 + \frac{5.6}{3}\right] \text{cm}^3 \qquad 1\text{ m}$$

$$= \frac{22}{7} \times \frac{14}{10} \times \frac{14}{10} \times \frac{122}{30} \text{ cm}^3 \qquad \tfrac{1}{2}\text{ m}$$

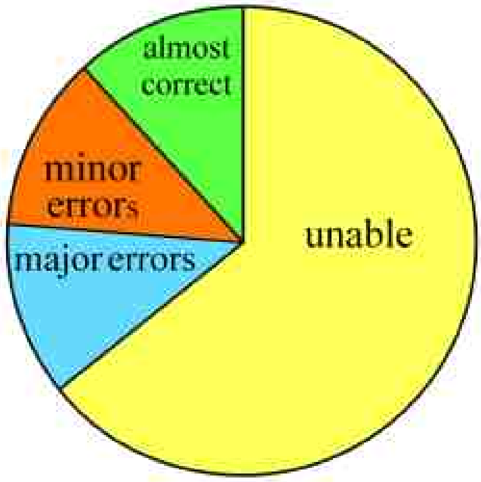
$$\therefore \text{ Volume of 45 Gulab Jamuns} = \left(\frac{22}{7} \times \frac{14}{10} \times \frac{14}{10} \times \frac{122}{30} \times 45\right) \text{cm}^3 \qquad 1\text{ m}$$

$$\therefore \text{ Amount of Sugar syrup} = \frac{22}{7} \times \frac{14}{10} \times \frac{14}{10} \times \frac{122}{30} \times \frac{45 \times 30}{100} = 338.184 \text{ cm}^3$$

or 338 cm^3 — 1 m

Performance

Marks	N.A.	0	½	1	1½	2	2½	3	3½	4	4½	5	5½	6	Mean Score
Percentage	60	4	0	4	4	0	4	8	0	0	4	8	0	4	3.2



Quantitative Analysis

- 12% students gave almost correct answer.
- 64% students either did not attempt or gave completely wrong answer.
- 12% students attempted partially and 12% students committed major mistakes.

Common Errors

- Some students could not visualise the correct shape of the solid.
- Some students used wrong formula as well as wrong values of radius of the semi circle.
- Some students did mistake in calculations.

Suggested Remedial Measures

- The students should be given more practice so that they can visualise problems and use appropriate formula.

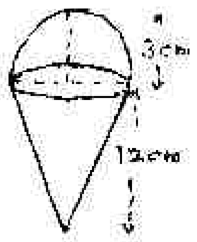
OR

A container shaped like a right circular cylinder having diameter 12 cm and height 15 cm is full of ice-cream. This ice-cream is to be filled into cones of height 12 cm and diameter 6 cm, having a hemispherical shape on the top. Find the number of such cones which can be filled with ice-cream.

Ans. Ice–cream in cylinderical container of diameter 12 cm

and height 15 cm $= \left[\pi\,(6)^2 \times 15\right] \text{cm}^3 = 540\,\pi\ \text{cm}^3$ 2 m

Volume of one ice-cream cone



$$= \frac{1}{3}\pi\ (3)^2 \times 12 + \frac{2}{3}\pi\ (3)^3 = \frac{162\ \pi}{3}\ \text{cm}^3 \qquad 2\text{ m}$$

$$\therefore \text{ Number of cones required } = \frac{540\ \pi \times 3}{162\ \pi} \qquad 1\text{ m}$$

$$= \frac{1620}{162} = 10 \qquad 1\text{ m}$$

Performance

Marks	N.A.	0	½	1	1½	2	2½	3	3½	4	4½	5	5½	6	Mean Score
Percentage	17	10	2	3	3	6	1	12	6	10	1	2	0	27	3.6

Quantitative Analysis

- 29% students attempted the question almost correctly.
- 27% students either did not attempt or gave the answer correctly.
- 29% students did partially and 15% students committed major mistakes.

Common Errors

- Some students could not visualise the shape of the solid figure.
- Some students could not find the slant height.
- Some students used wrong formula

Suggested Remedial Measures

- Students should be given practice to visualise the given situation and use of appropriate formulae.

30. A survey regarding the heights (in cm) of 50 girls of Class X of a school was conducted and the following data was obtained:

Height in cm	120-130	130-140	140-150	150-160	160-170	Total
Number of girls	2	8	12	20	8	50

Find the mean, median and mode of the above data.

Ans. i)

x_i (Mid-points) :	125	135	145	155	165	
f_i :	2	8	12	20	8	$\Rightarrow \sum f_i = 50$
$f_i x_i$:	250	1080	1740	3100	1320	$\Rightarrow \sum f_i x_i = 7490$

1 m

$$\bar{x} = \frac{\sum f_i x_i}{\sum f_i} = \frac{7490}{50} = 149.8$$ 1 m

i) Again,

Classes :	120-130	130-140	140-150	150-160	160-170
f_i :	2	8	12	20	8
Cumulative freq :	2	10	22	42	50

1 m

$$\therefore \quad \text{Median} = 150 + \frac{25-22}{20} \times 10 = 151.5$$ 1 m

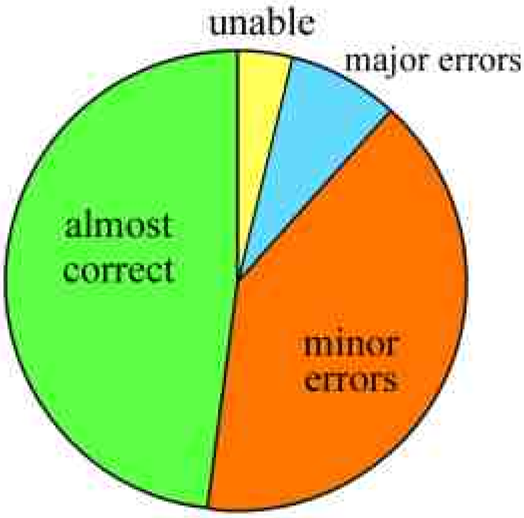
$$\text{Mode} = 150 + \frac{20-12}{40-12-8} \times 10$$

$$= 150 + \frac{80}{20} = 154.0$$ 2 m

* Alternatively, if the student finds any two measures of Central tendency, and finds the third using the empirical formula, give full credit.

Performance

Marks	N.A.	0	½	1	1½	2	2½	3	3½	4	4½	5	5½	6	Mean Score
Percentage	1	3	0	1	0	4	3	16	3	17	4	11	4	33	4.4



Quantitative Analysis

- 48% students gave almost correct answer.
- Only 4% students gave completely wrong answer.
- 40% students attempted partially where as 8% students did major mistakes.

Common Errors

- Many students wrote the correct formula for calculating median, however some of them did not know which value of frequency of corresponding median class should be taken.
- Some students did mistakes in final calculations.

Suggested Remedial Measures

- Emphasis should be given about the correct use of the formula and terms involved in it.
- Students should be explained that it is assumed that data is evenly distributed over class intervals.
- If possible, steps of the derivation of formula be explained.

PART-II
OUTSIDE
DELHI REGION

OUTSIDE DELHI REGION

QUESTION PAPER CODE 30/1

SECTION - A

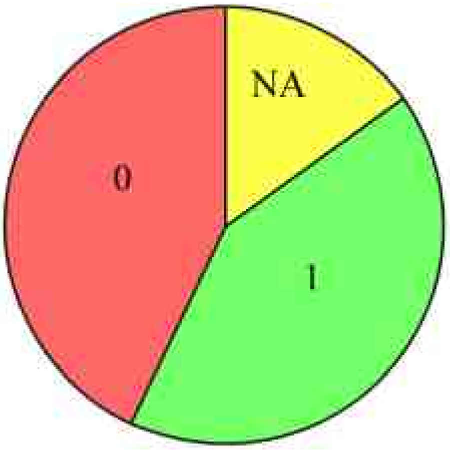
Questions number 1 to 10 carry 1 mark each.

1. Write a rational number between $\sqrt{2}$ and $\sqrt{3}$.

Ans. 1.5 (Or any terminating decimal number or fraction between 1.414 and 1.732) 1 m

Performance

Marks	N.A.	0	1	Mean Score
Percentage	15	44	41	0.5



Quantitative Analysis

- Only 41% of the students could score full marks.
- 15% of the candidates did not attempt the question white 44% gave wrong answer.

Common Errors Committed by students

- Difference between a rational and an irrational number is not very clearly understood by a large number of students, so the following type of incorrect answers were given by them

$$\sqrt{2.1}, \sqrt{2.2}, \sqrt{2.3}, 2+\sqrt{2}, \frac{\sqrt{2}+\sqrt{3}}{2}=\frac{\sqrt{5}}{2}, \sqrt{3}-\sqrt{2},$$

- The values of $\sqrt{2}, \sqrt{3}$, correct up to 2 or 3 decimal places are not known to most of the students.

Suggestive Remedial Measures

- Decimal representation of a rational number as terminating or non terminating but repeating and irrational number as non terminating and non repeating have to be made clear by taking different examples of rational and irrational numbers and converting them in decimal form.

- Operations on irrational numbers, e.g. $\sqrt{2} \pm \sqrt{3}$, $\sqrt{2} \cdot \sqrt{3}$, $\frac{\sqrt{3}}{\sqrt{5}}$ etc is not clearly understood by the students. So sufficient practice has to be given.
- Representation of irrational numbers like $\sqrt{2}$, $\sqrt{3}$, $\sqrt{5}$ etc on the number line will definately give them the exact position and so they will be in a better position to find the rational numbers between two irrationals.

2. Write the number of zeros of the polynomial y = f(x) whose graph is given in Figure 1.

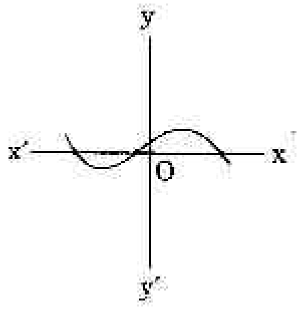
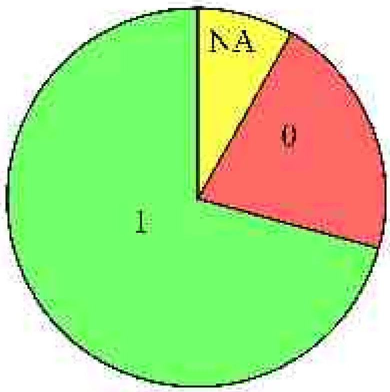


Figure 1

Ans. 3 (Three) 1 m

Performance

Marks	N.A.	0	1	Mean Score
Percentage	8	21	71	0.8



Quantitative Analysis

- A good number of students (71%) gave the correct answer and hence scored full marks.
- 21% of the students gave wrong answer while 8% of them did not attempt the question.

Common Errors Committed by students

- Most of the students gave correct answer but a few gave the answer as 1. Some of the students consider the zero as the point of intersection of the curve with y-axis.

  The definition of zeroes as the value of x for which the polynomial i.e. y becomes zero, is not well understood by some of the students.

Suggestive Remedial Measures

- Concept of zero of a polynomial as the value of x for which y = f(x) becomes zero is well understood by most of the students, but graph of polynomial and the position of zeroes as points on x-axis is not very clear to some of the students. So sufficient practice of drawing the graph and showing position of zeroes on it, has to be given to the students.

3. Is $x = -2$ a solution of the equation $x^2 - 2x + 8 = 0$?.

Ans. No 1 m

Performance

Marks	N.A.	0	1	Mean Score
Percentage	6	29	65	0.7

Quantitative Analysis

- 65% of the students scored full marks by giving correct answer.
- 29% of the students gave wrong answer while 6% of them did not attempt the question.

Common Errors Committed by students

- A good number of students substituted $x = -2$ in the equation but due to computational errors, did not reach at the correct answer.

- A few students substituted x = – 2 and got 0 = 0, but left it there without writing the answer.

Suggestive Remedial Measures

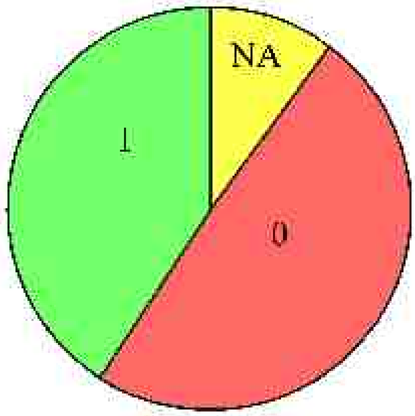
- Sufficient practice of operations in integers must be given. Some of the students write $(2)^2 = 4$ and $(-2)^2 = -4$.
- Students have to be told, that in 1 mark questions, writing the answer specificly is very important. Writing the steps of solution but not writing the answer, will not give marks.

4. Write the next term of the A.P. $\sqrt{8}, \sqrt{18}, \sqrt{32}, ...$

Ans. $\sqrt{50}$ or $5\sqrt{2}$ 1 m

Performance

Marks	N.A.	0	1	Mean Score
Percentage	10	49	41	0.5



Quantitative Analysis

- Only 41% of the students gave correct answer and scored full marks.
- 49% of the students gave wrong answer, white 10% of them did not attempt the question.

Common Errors Committed by students

- A large number of students could not write
  $\sqrt{8} = 2\sqrt{2}, \sqrt{18} = 3\sqrt{2}, \sqrt{32} = 4\sqrt{2}$.
  So, they found d = $\sqrt{18} - \sqrt{8} = \sqrt{10}$ and so $a_4 = a + 3d = \sqrt{8} + 3\sqrt{10}$
  Some of them gave the answer as $\sqrt{32} + \sqrt{10} = \sqrt{42}$.

- Some students took $d_1 = \sqrt{18} - \sqrt{8} = \sqrt{10}$ and

  $d_2 = \sqrt{32} - \sqrt{18} = \sqrt{14}$ and have written,

  Since $d_1 \neq d_2$, so it is not an A.P.

Suggestive Remedial Measures

- Sufficient practice has to be given for the simplification of surds like

  $\sqrt{8} = 2\sqrt{2}, \sqrt{18} = 3\sqrt{2}, \sqrt{32} = 4\sqrt{2}$ etc

- Operations of addition or subtraction in surds, like

  $5\sqrt{3} - 2\sqrt{3}, 2\sqrt{5} + 7\sqrt{5}, \sqrt{5} + \sqrt{7}$ etc

  is not clear to the students. So by taking sufficient type of examples, the concept has to be made clear in the minds of students.

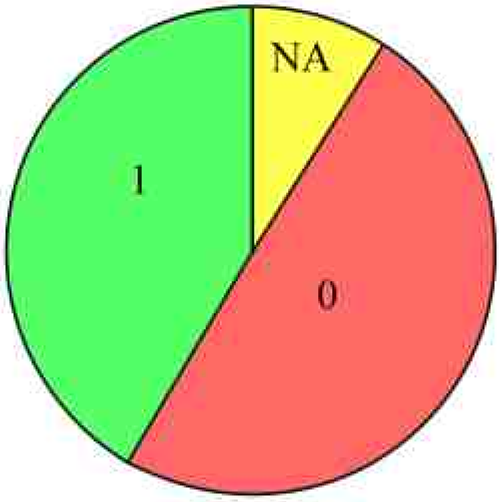
5. D, E and F are the mid-points of the sides AB, BC and CA respectively of Δ ABC.

   Find $\frac{\text{ar}(\Delta \text{ DEF})}{\text{ar}(\Delta \text{ ABC})}$

Ans. $\frac{ar(\Delta \text{ DEF})}{ar(\Delta \text{ ABC})} = \frac{1}{4}$ 1 m

Performance

Marks	N.A.	0	1	Mean Score
Percentage	9	49	42	0.5



Quantitative Analysis

- Only 42% of the students could score full marks.
- 49% of the students gave wrong answer white 9% of them did not attempt.

Common Errors Committed by students

- Students could not recall and apply mid point theorem, could not establish DE || AC and DE = $\frac{1}{2}$ AC and similar results for DF and EF.
- Students could not see that $\Delta DEF \sim \Delta CAB$
- Some of the students used the result.

$$\frac{ar(\Delta DEF)}{ar(\Delta ABC)} = \frac{ar(\Delta DEF)}{ar(\Delta CAB)} = \left(\frac{DF}{BC}\right)^2$$ = but could not see that BC = 2DF or DF = $\frac{1}{2}$ BC.

Suggestive Remedial Measures

- Sufficient practice to use **mid point theorem or Basic proportionality theorem** has to be given to the students.
- The concept of similar triangles as equiangular triangles or the triangles with one of corresponding sides parallel, has to be given practice.

6. In Figure 2, if $\angle ATO = 40°$, find $\angle AOB$.

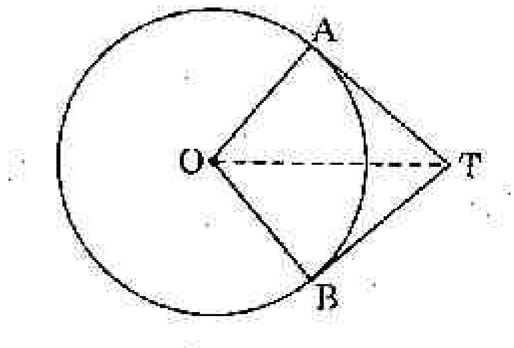
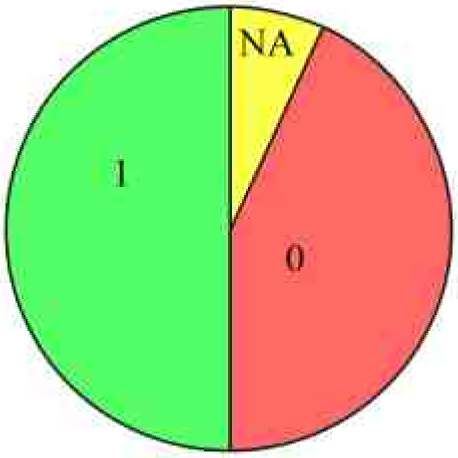


Figure 2

Ans. 100° 1 m

Performance

Marks	N.A.	0	1	Mean Score
Percentage	7	42	51	0.5



Quantitative Analysis

- 51% of the students gave correct answer and scored full marks.
- 42% of the students gave incorrect answer while 7% did not attempt the question.

Common Errors Committed by students

- Most of the students could not apply the result that the tangent to a circle is perpendicular to the radius at the point of contact.
- Many student could not use that. $\angle AOB = 2\angle AOT$ and $\angle ATB = 2(40^{\circ}) = 80^{\circ}$
- The students could not find the fourth angle of quadrilateral AOBT, when three angles were given. e.g. $\angle AOB = 360 - [90^{\circ} + 90^{\circ} + 80^{\circ}] = 100^{\circ}$

Suggestive Remedial Measures

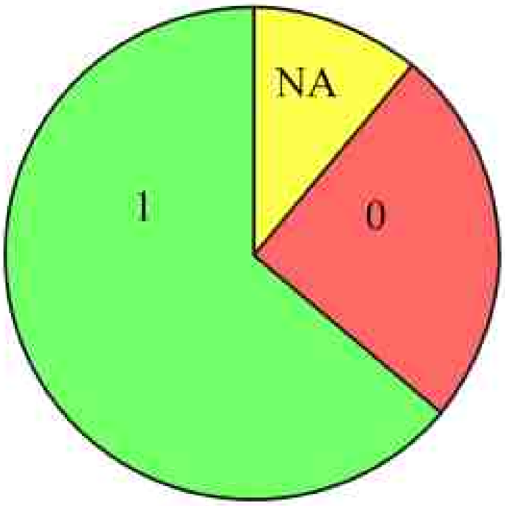
- Sufficient practice by taking different problems should be given to apply the result that the tangent to a circle is perpendicular to the radius, at the point of contact. i.e. $\angle OAT = \angle OBT = 90^{\circ}$
- Use of
  - (i) Sum of three angles of a triangle is 180°, or
  - (i) Sum of four angles of a quadrilateral is 360°. To find one angle, when other angles are given, has to be made clear by examples.
- Practice of writing corresponding parts of congruent triangles, are equal, has to be given.

7. If $\sin\theta = \cos\theta$, find the value of θ.

Ans. $\theta = 45°$ 1 m

Performance

Marks	N.A.	0	1	Mean Score
Percentage	11	26	63	0.7



Quantitative Analysis

- 63% of the students got full marks.
- Only 26% of the students gave incorrect answer white 11% of them did not attempt the question.

Common Errors Committed by students

- Most of the students had written the correct answer, but some has written $\theta = \frac{\sin}{\cos}$

Suggestive Remedial Measures

- Concept of $\sin\theta$ as ratio of two sides in a right triangle with one acute angle θ is to be emphasized.
- Students take $\sin\theta$ as product of (sin) and (θ)
- examples like $\sin 60^{o} \neq 2\sin 30^{o}$
  $\cos 90^{o} \neq 3\cos 30^{o}$ have to made clear to the students.

8. Find the perimeter of Figure 3, where $\overset{\frown}{AED}$ is a semi-circle and ABCD is a rectangle.

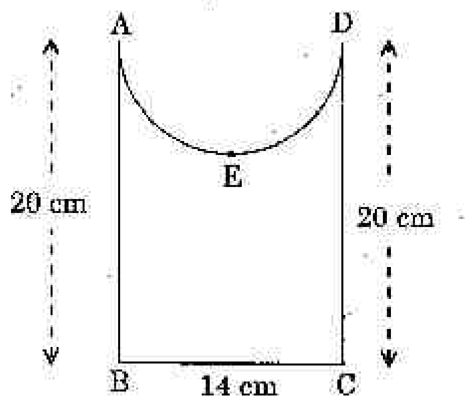
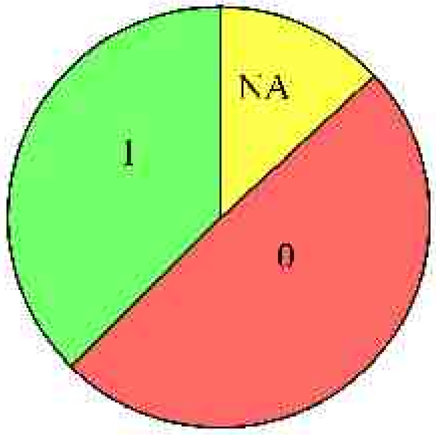


Figure 3

Ans. $(54 + 7\pi)$ cm or 76 cm. 1 m

Performance

Marks	N.A.	0	1	Mean Score
Percentage	13	49	38	0.4



Quantitative Analysis

- Only 38% of the students could score full marks.
- 49% of the students gave incorrect answer while 13% of them did not attempt the question.

Common Errors Committed by students

- The concept of perimeter after visualising the figure, could not be read correctly. The following type of errors were made.

  (i) Perimeter of given figure = Perimeter of Rectangle – Permeter of semi circle

$$= 2(\ell + b) - \frac{1}{2} \times 2\pi r$$

(ii) Perimeter of given figure $= (\ell + b) + \frac{1}{2} \times 2\pi r$

(iii) Some of students have written perimeter in terms of cm^2

(iv) A few students have taken radius $= \frac{7}{2}$ cm.

Suggestive Remedial Measures

- Students simply used the formula of perimeter of rectangle and perimeter of semi circle.

  The concept of perimeter of any figure means the distance travelled on its boundary from any one point back to the same point. This has to be given practice by taking different figures involving rectangle, circle, sector or segment.

- Units of perimeter, area and volume in terms of cm, cm^2, and cm^3 respectivily should be given sufficient practice.

9. A bag contains 4 red and 6 black balls. A ball is taken out of the bag at random. Find the probability of getting a black ball.

Ans. P (Black) $= \frac{6}{10}$ or $\frac{3}{5}$ 1 m

Performance

Marks	N.A.	0	1	Mean Score
Percentage	5	26	69	0.7