



Time Allowed: 3 Hours

General Instructions:

- (i) Section A consists of twenty questions (Q. no. 1-20) of one mark each.
- (ii) Section B consists of five questions (Q no. 21- 25) of two marks each.
- (iii) Section C consists of six questions (Q no. 26 - 31) of three marks each.
- (iv) Section D consists of four questions (Q no. 32-35) of five marks
- (v) Section E consists of three case studybased questions (Q no. 36-38) of four marks each with subparts of the values 1, 1 and 2 marks respectively.
- (vi) All Questions are compulsory. However, an internal choice has been provided.
- (vii) Draw neat figures wherever required. Take $\pi = \frac{22}{7}$ wherever required if not stated.

SECTION - A

Choose the Correct Option:

1. Between two rational numbers:
 a. there is no rational number
 b. there is exactly one rational number
 c. there are infinitely many rational numbers.
 d. there are only rational numbers and no irrational numbers

2. Ordinate of all the points on x-axis is:
 a. 0
 b. 1
 c. -1
 d. any number

3. $x=5$ and $y=2$ is the solution of which linear equation:
 a. $x+2y=7$
 b. $x+y=7$
 c. $5x+y=2$
 d. $5x+y=7$

4. If the area of an equilateral triangle is $36\sqrt{3}$ cm², then its perimeter is:
 a. 64cm
 b. 60cm
 c. 36cm
 d. None of these

5. To draw a histogram to represent the following frequency distribution:

Class interval	5-10	10-15	15-25	25-45	45-75
Frequency	6	12	10	8	15

The adjusted frequency for the class 25-45 is:

- a. 6
 b. 5
 c. 3
 d. 2

6. The number of zeroes of the polynomial $5x^3+4x^2-9x+20$.
 a. 1
 b. 0
 c. 3
 d. 2

7. If one of the factors of x^2+x-20 is $(x+5)$. Find the other:
 a. $(x+4)$
 b. $(x-2)$
 c. $(x-4)$
 d. $(x-5)$

8. Ratio of the volume of a cone and a cylinder of same radius of base and same height is:
 a. 1 : 1
 b. 1 : 2
 c. 1 : 3
 d. 1 : 4

9. $1.999\dots$ in $\frac{p}{q}$ form is:
 a. $\frac{19}{10}$
 b. $\frac{1999}{1000}$
 c. 2
 d. $\frac{1}{9}$

10. If a transversal intersects two parallel lines, then each pair of corresponding angles will be:
 a. complementary
 b. supplementary
 c. equal
 d. unequal

11. The value of 95×96 is:
 a. 9020
 b. 9120
 c. 9320
 d. 9340

12. If $AB = QR$, $BC = PR$ and $CA = PQ$ in $\triangle ABC$ and $\triangle PQR$, then:
 a. $\triangle ABC \cong \triangle PQR$
 b. $\triangle CBA \cong \triangle PRQ$
 c. $\triangle BAC \cong \triangle RPQ$
 d. $\triangle BCA \cong \triangle PQR$

13. The value of $(16)^{\frac{3}{2}}$
 a. 4
 b. 12
 c. 48
 d. 8

14. The sides of a triangle are in ratio 12:17:25 and its perimeter is 540cm. The area is:
 a. 1000 sq cm
 b. 5000 sq cm
 c. 9000 sq cm
 d. 8000 sq cm

15. Which are the zeroes of x^2-1 :
 a. 1,1
 b. -1,1
 c. -1,-1
 d. none of these

16. The two diagonals are always equal in a:
 a. Parallelogram
 b. rhombus
 c. square
 d. trapezium

17. $(2\sqrt{3} \times \sqrt{3})+1$ is equal to:
 a. $2\sqrt{9}$
 b. 6
 c. 7
 d. $4\sqrt{6}$

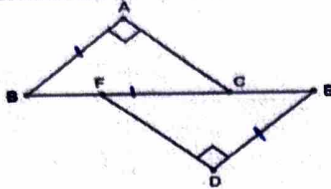
18. If $x+y+z=0$ then $x^2+y^2+z^2$ is equal to:
 a. $3xyz$
 b. $-3xyz$
 c. xy
 d. $-2xy$

Handwritten student work including:
 - Factorization: $x^2+x-20 = (x+5)(x-4)$
 - Area of equilateral triangle: $\frac{\sqrt{3}}{4} s^2 = 36\sqrt{3} \Rightarrow s = 12$
 - Volume ratio: $\frac{\frac{1}{3}\pi r^2 h}{\pi r^2 h} = \frac{1}{3}$
 - Arithmetic progression: $1.999\dots = \frac{19}{10}$
 - Triangle congruence: $\triangle ABC \cong \triangle PQR$
 - Algebraic simplification: $(2\sqrt{3} \times \sqrt{3}) + 1 = 6 + 1 = 7$
 - Identity: $x^2+y^2+z^2 = -2xy - 2yz - 2zx$ if $x+y+z=0$
 - Diagrams of triangles ABC and PQR.

19. Assertion(A): A parallelogram consists of two congruent triangles.
Reason(R): Diagonals of a parallelogram divides it into two congruent triangles.
a. Both Assertion(A) and reason(R) are correct and reason is the correct explanation for assertion
b. Both Assertion(A) and reason(R) are correct and reason is not the correct explanation for assertion
c. Assertion(A) is true but the reason(R) is false.
d. Assertion(A) is false but reason(R) is true.
20. Assertion(A): A cone is a solid figure.
Reason(R): A cone is generated when rectangular sheet is rotated about its axis.
a. Both Assertion(A) and reason(R) are correct and reason is the correct explanation for assertion
b. Both Assertion(A) and reason(R) are correct and reason is not the correct explanation for assertion
c. Assertion(A) is true but the reason(R) is false.
d. Assertion(A) is false but reason(R) is true.

SECTION - B

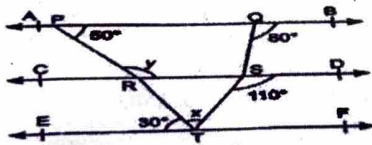
21. Represent $\sqrt{10}$ on a number line.
22. In figure $BA \perp AC$, $DE \perp DP$. Such that $BA = DE$ and $BF = EC$. Show that $\triangle ABC \cong \triangle DEF$.



23. Find the value of k, if $(x-1)$ is a factor of $4x^3 + 3x^2 - 4x + k$
24. Find the curved surface area of hemisphere of radius 4 cm.
Or
Find the volume of a cone with radius 12 cm and height 21 cm.
25. Show that the diagonals of rhombus are perpendicular to each other.

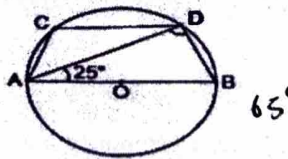
SECTION - C

26. Draw the line passing through (2,3) and (3,2). Find the coordinates of the points at which this line meets x-axis and y-axis.
27. If $x = \frac{2-\sqrt{5}}{2+\sqrt{5}}$ and $y = \frac{2+\sqrt{5}}{2-\sqrt{5}}$, find the value of $x^2 - y^2$.
28. Factorise: $x^3 + x^2 - 4x - 4$
Or
Simplify $(2x-5y)^3 - (2x+5y)^3$
29. In the given figure, $AB \parallel CD \parallel EF$. Find the value of $(y+x) : (y-x)$



$x^2 - 10x + 16$
 $x^2 - 2$

30. In the given figure, AB is diameter of the circle with centre O and $CD \parallel AB$. If $\angle DAB = 25^\circ$, then find the measure of $\angle CAD$.



31. The circumference of the base of 10 m high conical tent is 44 m. Calculate the length of canvas used in making the tent, if width of canvas is 2 m.

SECTION - D

32. There is a slide in a park. One of its side walls has been painted in some colour with a message "KEEP THE PARK GREEN AND CLEAN". If the sides of the wall are 15 m, 11 m and 6 m, find the area painted in colour.



2052

$$\begin{array}{r} x^2 - 4 \\ x^3 + x^2 - 4x - 4 \\ x^3 + x^2 \\ \hline (-) \quad (-) \quad | \\ 0 - 4x - 4 \\ -4x - 4 \end{array}$$

$(-1)^3 + (-1)^2 - 4(-1) - 4$
 $-1 + 1 + 4 - 4 = 0$

$x+1 = 0$
 $x = -1$

$-x - 4\sqrt{5} + 4 - 4\sqrt{5}$

$(-4\sqrt{5})^2 - 18$
 $16 \cdot 5 - 18 = 80 - 18 = 62$

$$\begin{array}{r} 18 \\ 144 \\ \hline 162 \\ 144 \\ \hline 18 \\ 180 \\ \hline 198 \\ 180 \\ \hline 18 \end{array}$$

$$\begin{array}{r} 12 \\ 120 \\ \hline 132 \\ 120 \\ \hline 12 \end{array}$$

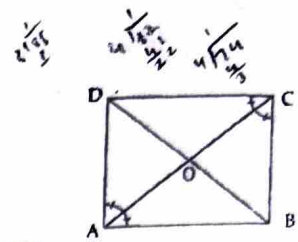
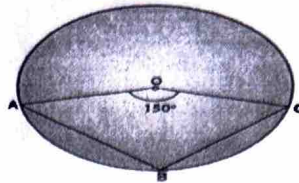
$$\begin{array}{r} 12 \\ 120 \\ \hline 132 \\ 120 \\ \hline 12 \end{array}$$

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$$\begin{array}{r} 12 \\ 120 \\ \hline 132 \\ 120 \\ \hline 12 \end{array}$$

$(x+2)(x^2-4)$
 $(x+2)(x-2)^2$
 $(x+2)(x-2)(x-2)$

33. a. Prove that the angle subtended by an arc at the centre is double the angle subtended by it at any point on the remaining part of the circle
 b. In the given figure, find $\angle ABC$. **105**



34. ABCD is a rectangle in which diagonal AC bisects $\angle A$ as well as $\angle C$. Show that:
 (a) ABCD is a square (b) diagonal BD bisects $\angle B$ as well as $\angle D$.

35. Draw a frequency polygon for the following distribution:

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
No. of Marks	7	10	6	8	12	3	2	2

OR

The following table gives the life times of 400 neon lamps:

Life time (in hours)	Lamps
300 - 400	14
400 - 500	56
500 - 600	60
600 - 700	86
700 - 800	74
800 - 900	62
900 - 1000	48

- (a) Represent the given information with the help of a histogram.
 (b) How many lamps have a life time of more than 700 hours? **134**

SECTION-E

36. On his birthday, Manoj planned that this time he celebrates his birthday in a small orphanage centre. He bought apples to give to children and adults working there. Manoj donated 2 apples to each children and 3 apples to each adult working there along with Birthday cake. He distributed 60 total apples.

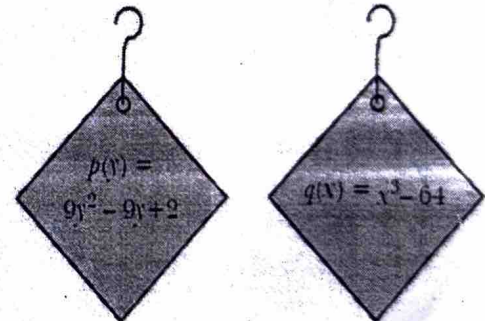


- (a) Taking the number of children as 'x' and the number of adults as 'y'. Represent the above situation in linear equation in two variables. **$2x + 3y = 60$**
 (b) If the number of adults is 12, then find the number of children. **12**
 (c) If $x = -5$ and $y = 2$ is a solution of the equation $3x + 5y = b$, then find the value of 'b'. **-5**

Or

Find two solutions for the linear equation $2x + 3y = 60$

37. A school organised a mathematics exhibition in the school premises. Children of all classes made various models and games to depict the use of mathematics in daily life. To make the decoration more attractive, they made hangings related to mathematics one of the students made two hangings with polynomials written on them.

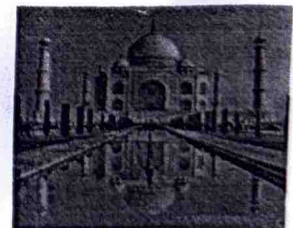


- (a) Find the value of $q(-1)$. **-62**
 (b) Find the value of value of $p(-2)$. **20**
 (c) Find the factors of polynomial $q(x)$

Or

Find the factors of $r(x) = x^3 + 64$ **$(x+4)(x+4)(x+4)$**

38. Mathematics teacher of a school took his 10th standard students to show Taj Mahal. It was a part of their Educational trip. The teacher had interest in history as well. He narrated the facts of Taj Mahal to the students. Then the teacher said in this monument one can find combination of solid figures. There are 4 pillars which are cylindrical in shape. Also, 2 domes at the back side which are hemispherical. 1 big domes at the centre. It is the finest example of the symmetry. (Use $\pi = 22/7$)



- (a) Write the formula to find the curved surface area of dome. **$2\pi r^2$**
 (b) Write the formula to find the volume of one pillar (including hemispherical dome).
 (c) Find the volume of the hemispherical dome at the centre if base radius is 7 m. **$718 \frac{6}{7}$**

Or

Find the curved surface area of the dome at the centre.

Handwritten calculations for question 38(c):
 $V = \pi r^2 h + \frac{2}{3}\pi r^3$
 $V = \frac{22}{7} \times 7^2 \times 7 + \frac{2}{3} \times \frac{22}{7} \times 7^3$
 $V = 22 \times 49 \times 7 + \frac{2}{3} \times 22 \times 343$
 $V = 22 \times 343 + \frac{2}{3} \times 22 \times 343$
 $V = 22 \times 343 \times (1 + \frac{2}{3})$
 $V = 22 \times 343 \times \frac{5}{3}$
 $V = \frac{22 \times 343 \times 5}{3}$
 $V = \frac{37730}{3}$
 $V = 12576 \frac{2}{3}$
 (Note: The handwritten answer in the image is 718 6/7, which is approximately 718.857, but the calculation above shows a much larger value. There might be a typo in the handwritten answer or the question.)