

## 9 - STD

## ANNUAL EXAMINATION - 2024

Time: 2.30 Hrs.

Mathematics

Maximum Marks - 100

PART - I (Marks - 14)

Note: Answer ALL the questions: -

14 x 1 = 14

- The set  $P = \{x | x \in Z, -1 < x < 1\}$  is a  
(A) Singleton set (B) Power set (C) Null set (D) Subset
- If  $n(A) = 10$  and  $n(B) = 15$ , then the minimum and maximum number of elements in  $A \cap B$  is  
(A) 10, 15 (B) 15, 10 (C) 10, 0 (D) 0, 10
- The length and breadth of a rectangular plot are  $5 \times 10^5$  and  $4 \times 10^4$  metres respectively. Its area is  
(A)  $9 \times 10^1 m^2$  (B)  $9 \times 10^9 m^2$  (C)  $2 \times 10^{10} m^2$  (D)  $20 \times 10^{20} m^2$
- If  $\sqrt{9^x} = \sqrt[3]{9^6}$  then  $x =$  \_\_\_\_\_  
(A) 1 (B) 36 (C)  $\frac{1}{3}$  (D) 0
- If  $x^3 + 6x^2 + kx + 6$  is exactly divisible by  $(x+2)$  then  $k = ?$   
(A) -6 (B) -7 (C) -8 (D) 11
- If  $x-2$  is a factor of  $p(x)$ , then the remainder is  
(A) 2 (B) -2 (C)  $p(2)$  (D)  $p(-2)$
- Find the GCD of  $x^4 - y^4$  and  $x^2 - y^2$  is  
(A)  $x^4 - y^4$  (B)  $x^2 - y^2$  (C)  $(x+y)^2$  (D)  $(x+y)^4$
- If one angle of a cyclic quadrilateral is  $55^\circ$ , then the opposite angle is  
(A)  $120^\circ$  (B)  $125^\circ$  (C)  $55^\circ$  (D)  $90^\circ$
- The points  $(-5, 2)$  and  $(2, -5)$  lie in the \_\_\_\_\_  
(A) Same quadrant (B) II and III quadrants respectively  
(C) II and IV quadrants respectively (D) IV and II quadrants respectively
- The point whose ordinate is 4 and which lies on the y-axis is \_\_\_\_\_  
(A)  $(4, 0)$  (B)  $(0, 4)$  (C)  $(1, 4)$  (D)  $(4, 2)$
- If  $2 \sin 2\theta = \sqrt{3}$  then, the value of  $\theta$  is  
(A)  $90^\circ$  (B)  $30^\circ$  (C)  $45^\circ$  (D)  $60^\circ$
- The semi-perimeter of a triangle having sides 15 cm, 20 cm and 25 cm is  
(A) 60 cm (B) 45 cm (C) 30 cm (D) 15 cm

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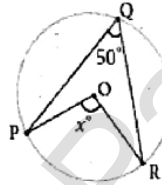
13. A particular observation which occurs maximum number of times in a given data is called its  
 (A) Frequency (B) Range (C) Mode (D) Median.
14. If  $(x+2, 4) = (5, y-2)$  then the coordinates  $(x, y)$  are \_\_\_\_\_  
 (A) (7, 12) (B) (6, 3) (C) (3, 6) (D) (2, 1)

**PART - II (Marks - 20)**

**Note: Answer any 10 questions. Question Number 28 is compulsory: -**

**10 x 2 = 20**

15. Write the set of letters of the following words in Roster form  
 (i) INDIA (ii) MISSISSIPPI
16. If  $A = \{6, 7, 8, 9\}$  and  $B = \{8, 10, 12\}$ , then find  $A \Delta B$
17. Find any two rational numbers between  $\frac{1}{2}$  and  $\frac{2}{3}$
18. Simplify  $\sqrt{63} - \sqrt{175} + \sqrt{28}$
19. Evaluate  $10^3 - 15^3 + 5^3$
20. What is the remainder when  $x^{2024} + 2024$  is divided by  $(x-1)$
21. Find the value of  $k$  for which the system of linear equations  $8x + 5y = 9$ ;  $kx + 10y = 15$  has no solution.
22. Find the value of  $x^\circ$  in the figure



23. Find the coordinates of the point which divides the line segment joining the points  $(3, 5)$  and  $(8, -10)$  internally in the ratio 3 : 2
24. Find the centroid of the triangle whose vertices are  $A(6, -1)$ ,  $B(8, 3)$  and  $C(10, -5)$
25. Find the value of  $\tan 15^\circ \tan 75^\circ \tan 45^\circ \tan 30^\circ \tan 60^\circ$
26. If the total surface area of a cube is  $2400 \text{ cm}^2$  then, find its lateral surface area.
27. In a week, temperature of a certain place is measured during winter are as follows  $26^\circ \text{C}$ ,  $24^\circ \text{C}$ ,  $28^\circ \text{C}$ ,  $31^\circ \text{C}$ ,  $30^\circ \text{C}$ ,  $26^\circ \text{C}$ ,  $24^\circ \text{C}$ , . Find the mean temperature of the week
28. When a dice is rolled, find the probability to get the number which is greater than 4?

## PART - III (Marks - 50)

Note: Answer any 10 questions. Question Number. 42 is compulsory: -

10 x 5 = 50

29. Verify  $A - (B \cap C) = (A - B) \cup (A - C)$ , using Venn diagrams.
30. In a college, 240 students play cricket, 180 students play football, 164 students play hockey, 42 play both cricket and football, 38 play both football and hockey, 40 play both cricket and hockey and 16 play all the three games. If each student participates in at least one game, then find  
(i) the number of students in the college  
(ii) the number of students who play only one game.
31. Arrange in ascending order  $\sqrt[3]{2}$ ,  $\sqrt[4]{4}$ ,  $\sqrt[3]{3}$
32. Represent  $\sqrt{9.3}$  on a number line.
33. If  $x^2 + \frac{1}{x^2} = 23$ , then find the value of  $x + \frac{1}{x}$  and  $x^3 + \frac{1}{x^3}$
34. Factorise:  $x^3 + 13x^2 + 32x + 20$
35. Solve  $3x + 5y = 21$  and  $7x + 6y = 49$  by the method of cross multiplication.
36. Find the length of a chord which is at a distance of  $2\sqrt{11}$  cm from the centre of a circle of radius 12cm.
37. Show that the following points  $A(3, 1)$ ,  $B(6, 4)$  and  $C(8, 6)$  lies on a straight line.
38. Show that  $(4, 3)$  is the centre of the circle passing through the points  $(9, 3)$ ,  $(7, -1)$  and  $(-1, 3)$ . Also find its radius.
39. If  $\tan A = \frac{2}{3}$ , then find all the other trigonometric ratios.
40. The lengths of sides of a triangular field are 28 m, 15 m and 41 m. Calculate the area of the field. Find the cost of levelling the field at the rate of ₹ 20 per  $m^2$ .
41. The following are the marks scored by the students, in the Summative Assessment exam. Find the median.
- |                    |      |       |       |       |       |       |
|--------------------|------|-------|-------|-------|-------|-------|
| Class              | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 |
| Number of Students | 2    | 7     | 15    | 10    | 11    | 5     |
42. In an office, where 42 staff members work, 7 staff members use cars, 20 staff members use two-wheelers and the remaining 15 staff members use cycles. Find the relative frequencies.

## PART - IV (Marks- 16)

Note: Answer ALL the questions: -

2 x 8 = 16

43. (A). Construct the centroid of  $\Delta PQR$  whose sides are  $PQ = 8$  cm,  $QR = 6$  cm and  $RP = 7$  cm.

OR

- (B). Construct the circumcentre of the  $\Delta ABC$  with  $AB = 5$  cm,  $\angle A = 60^\circ$  and  $\angle B = 80^\circ$ .

Also draw the circumcircle and find the circumradius of the  $\Delta ABC$ .

44. (A). Use graphical method to solve the following system of equations:  $x + y = 7$  and  $x - y = 3$

OR

- (B). Draw the graph of  $y = \left(\frac{2}{3}\right)x + 3$