

10-STD**FIRST REVISION TEST - 2024****MATHS**

Marks: 100

Time: 3.00 hours

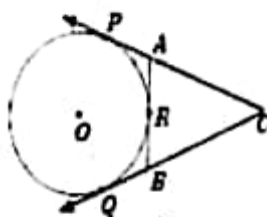
PART- I (Marks - 14)

Note: i) Answer All the 14 questions

ii) Choose the most suitable answer from given the four alternatives and write the option code with the corresponding answers.

14 x 1 = 14

- Let $n(A) = m$ and $n(B) = n$ then the total number of non-empty relations that can be defined from A to B is
 (A) m^n (B) n^n (C) $2^{mn} - 1$ (D) 2^{mn}
- $A = \{a, b, p\}$, $B = \{2, 3\}$, $C = \{p, q, r, s\}$ then; $n[(A \cup C) \times B]$ is
 (A) 8 (B) 20 (C) 12 (D) 16
- Using Euclid's division lemma, if the cube of any positive integer is divided by 9 then the possible remainders are
 (A) 0, 1, 8 (B) 1, 4, 8 (C) 0, 1, 3 (D) 1, 3, 5
- The next term of the sequence $\frac{3}{16}, \frac{1}{8}, \frac{1}{12}, \frac{1}{18}, \dots$ is
 (A) $\frac{1}{24}$ (B) $\frac{1}{27}$ (C) $\frac{2}{3}$ (D) $\frac{1}{81}$
- If $(x-6)$ is the HCF of $x^2 - 2x - 24$ and $x^2 - kx - 6$ then the value of k is
 (A) 3 (B) 5 (C) 6 (D) 8
- The solution of $(2x-1)^2 = 9$ is equal to
 (A) -1 (B) 2 (C) -1, 2 (D) None of these
- If number of columns and rows are not equal in a matrix then it is said to be a
 (A) diagonal matrix (B) rectangular matrix
 (C) square matrix (D) identity matrix
- In figure CP and CQ are tangents to a circle with centre at O . ARB is another tangent touching the circle at R . If $CP = 11$ cm and $BC = 7$ cm, then the length of BR is



(A) 80°

(B) 85°

(C) 75°

(D) 90°

9. When proving that a quadrilateral is a trapezium, it is necessary to show
 (A) Two sides are parallel. (B) Two parallel and two non-parallel sides.
 (C) Opposite sides are parallel. (D) All sides are of equal length.
10. If $x = a \cos \theta$ and $y = b \sin \theta$ then

(A) $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ (B) $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ (C) $\frac{y^2}{b^2} - \frac{x^2}{a^2} = 1$ (D) $\frac{y^2}{b^2} - \frac{x^2}{a^2} = 0$

11. If the radius of the base of a cone is tripled and the height is doubled then the volume is
 (A) made 6 times (B) made 18 times (C) made 12 times (D) unchanged
12. The ratio of the volumes of a cone, a cylinder and a sphere, if each has the same diameter and same height is
 (A) 1:2:3 (B) 2:1:3 (C) 1:3:2 (D) 3:1:2
13. The Range of the data 8, 8, 8, 8, 8 8 is
 (A) 0 (B) 1 (C) 8 (D) 3
14. Two dice are rolled together. Find the probability of getting a sum of faces as prime number.
 (A) $\frac{1}{6}$ (B) $\frac{5}{12}$ (C) $\frac{1}{2}$ (D) $\frac{7}{9}$

PART - II (Marks - 20)

Note: Answer TEN questions. Question Number 28 is compulsory. 10 x 2 = 20

15. Represent the function $f = \{ (1, 2), (2, 2), (3, 2), (4, 3), (5, 4) \}$ through
 (i) a table form (ii) an arrow diagram

16. Find the domain of the function $f(x) = \sqrt{1 + \sqrt{1 - \sqrt{1 - x^2}}}$

17. Find the least number that is divisible by the first ten natural numbers.

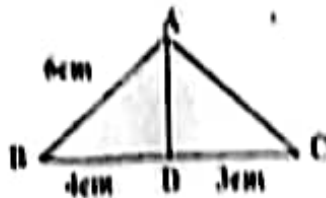
18. If $1^3 + 2^3 + 3^3 + \dots + k^3 = 44100$, then find $1 + 2 + 3 + \dots + k$

19. Simplify:- $\frac{p^2 + p - 12}{p - 4} \times \frac{p + 3}{p^2 - 3^2}$

20. If $A = \begin{pmatrix} 5 & 2 & 2 \\ -\sqrt{17} & 0.7 & \frac{5}{2} \\ 8 & 3 & 1 \end{pmatrix}$, then prove that $(A^T)^T = A$

21. If α and β are the roots of the equation $3x^2 - 6x + 4 = 0$, find the value of $\alpha^2 + \beta^2$

22. In the figure, AD is the bisector of $\angle A$. If $BD = 4$ cm, $DC = 3$ cm and $AB = 6$ cm, find AC .



23. The vertices of $\triangle ABC$ are $A(2, 1)$, $B(6, -1)$ and $C(4, 11)$. Find the equation of the straight line along the altitude from the vertex A .

24. Prove that $\frac{1 - \tan^2 \theta}{\cot^2 \theta - 1} = \tan^2 \theta$.

25. Find the diameter of a sphere whose surface area is 154 m^2 .

26. The ratio of the volumes of two cones is $2:3$. Find the ratio of their radii if the height of second cone is double the height of the first.

27. An integer is chosen at random from 1 to 100. Find the probability that the number is perfect square.

28. Find the slope and y intercept of $\sqrt{3}x + (1 - \sqrt{3})y = 3$.

PART - III (Marks - 50)

Note: Answer TEN questions. Question Number 42 is compulsory.

10 x 5 = 50

29. Given $A = \{1, 2, 3\}$, $B = \{2, 3, 5\}$, $C = \{3, 4\}$ and $D = \{1, 3, 5\}$ check if $(A \cap C) \times (B \cap D) = (A \times B) \cap (C \times D)$ is true?

30. Find x , if $gf(x) = fgg(x)$, given $f(x) = 3x + 1$ and $g(x) = x + 3$.

31. The sum of the first n , $2n$ and $3n$ terms of an A.P. are S_1 , S_2 and S_3 respectively. Prove that $S_1 = 3(S_2 - S_3)$.

32. Find the sum to n terms of the series $3 + 33 + 333 + \dots$.

33. There are 12 pieces of five, ten and twenty rupee currencies whose total value is ₹105. When first 2 sorts are interchanged in their numbers its value will be increased by ₹20. Find the number of currencies in each sort.

34. Find the square root of $121x^4 - 198x^3 - 183x^2 + 216x + 144$.

35. If $A = \begin{pmatrix} 1 & 2 \\ 1 & 3 \end{pmatrix}$ and $B = \begin{pmatrix} 4 & 0 \\ 1 & 5 \end{pmatrix}$ then, show that $(A - B)^T = A^T - B^T$.

36. State and prove Pythagoras theorem.

37. If (x, y) is any point on the line segment joining the points $(a, 0)$ and $(0, b)$ then prove that $\frac{x}{a} + \frac{y}{b} = 1$, where $a, b \neq 0$.

38. From the top of a 12 m high building, the angle of elevation of the top of a cable tower is 60° and the angle of depression of its foot is 30° . Determine the height of the tower. 4
39. An industrial metallic bucket is in the shape of the frustum of a right circular cone whose top and bottom diameters are 10 m and 4 m and whose height is 4 m. Find the curved and total surface area of the bucket. 5
40. A hemispherical bowl of radius 30 cm is filled with soap paste. If this paste is made into cylindrical soap cakes each of radius 5 cm and height 2 cm, how many cakes do we get? 2
41. The time taken (in minutes) to complete a homework by 8 students in a day are given by 38, 40, 47, 44, 46, 43, 49, 53. Find the coefficient of variation. 3
42. Find the equation of a straight line through the point of intersection of the lines $8x+3y=18$, $4x+5y-9=0$ and bisecting the line segment joining the points $(5, -4)$ and $(-7, 6)$. 2

PART - IV (Marks- 16)

Note: Answer both questions.

2 x 8 = 16

43. (A). Construct a ΔPQR in which $PQ=8$ cm, $\angle R=60^\circ$ and the median RG from R to PQ is 5.8 cm. Find the length of the altitude from R to PQ .

OR

- (B). Draw the two tangents from a point which is 10 cm away from the centre of a circle of radius 5 cm. Also, measure the lengths of the tangents.

44. (A). Nishanth is the winner in a Marathon race of 12 km distance. He ran at the uniform speed of 12 km/hr and reached the destination in 1 hour. He was followed by Aradhana, Ponmozhi, Jeyanth, Sathya and Swetha with their respective speed of 6 km/hr, 4 km/hr, 3 km/hr and 2 km/hr. And, they covered the distance in 2 hrs, 3 hrs, 4 hrs and 6 hours respectively.

Draw the speed-time graph and use it to find the time taken to Kaushik with his speed of 2.4 km/hr.

OR

- (B). Draw the graph of $y = x^2 - 4x + 3$ and hence find the roots of $x^2 - 6x + 9 = 0$.