10-STD

Time: 3.00 hours

FIRST REVISION TEST - 2024

MATHS

Marks: 100

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**

1. 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^m (C) $2^{mn}-1$ (D) 2^{mn}

2. $A=\{a,b,p\}$, $B=\{2,3\}$, $C=\{p,q,r,s\}$ then; $n\left[\left[(A\cup C)\times B\right]\right]$ is

   (A) 8 (B) 20 (C) 12 (D) 16

3. 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

4. The next term of the sequence $\frac{3}{16}, \frac{1}{8}, \frac{1}{12}, \frac{1}{18}, \ldots$ is

   (A) $\frac{1}{24}$ (B) $\frac{1}{27}$ (C) $\frac{2}{3}$ (D) $\frac{1}{81}$

5. 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

6. The solution of $(2x-1)^2=9$ is equal to

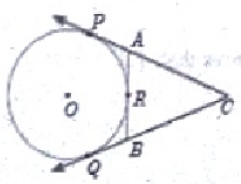
   (A) -1 (B) 2 (C) $-1, 2$ (D) None of these

7. 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

8. 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.

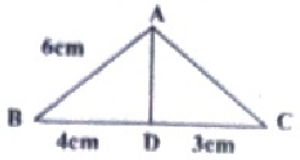
18. If $1^3+2^3+3^3+.....+k^3 = 44100$, then find $1+2+3+.....+k$

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 $\left(A^T\right)^T = A$

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 ΔABC are $A(2, 1)$, $B(6, -1)$ and $(4, 11)$. Find the equation of the straight line along the altitude from the vertex A.

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

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 $\sqrt{3}x + \left(1-\sqrt{3}\right)y = 3$.

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 $gff(x) = fgg(x)$, 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 $S_3 = 3(S_2 - S_1)$

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

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. Sate 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 $\dfrac{x}{a} + \dfrac{y}{b} = 1$, 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.

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.

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?

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.

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 $(-7,6)$.

PART - IV (Marks- 16)

Note: Answer both questions. **2 x 8 = 16**

43. **(A).** Construct a ΔPQR in which $PQ=8$ cm, $\angle R=60^0$ 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 $x^2-6x+9=0$.