CLASS : 10

Register Number [ ][ ][ ][ ][ ][ ]

THIRD REVISION EXAMINATION - 2025
MATHEMATICS

Time Allowed : 3.00 Hours]

[Max. Marks : 100

PART – I

I.   Answer all of the following: 14x1=14

1. $A = \{a, b, p\}$, $B = \{2, 3\}$, $C = \{p, q, r, s\}$ then $n[(A \cup C) \times B]$ is -----------
   - a) 8
   - b) 20
   - c) 12
   - d) 16

2. $f(x) = (x+1)^3 - (x-1)^3$ represents a function which is ---------
   - a) linear
   - b) cubic
   - c) reciprocal
   - d) quadratic

3. $7^{4k} \equiv$ (mod 100)
   - a) 1
   - b) 2
   - c) 3
   - d) 4

4. The next term of the sequence $\frac{3}{16}, \frac{1}{8}, \frac{1}{12}, \frac{1}{18}$ is
   - a) $\frac{1}{24}$
   - b) $\frac{1}{27}$
   - c) $\frac{2}{3}$
   - d) $\frac{1}{8}$

5. Graph of a linear equation is a -----------
   - a) Straight line
   - b) Circle
   - c) Parabola
   - d) Hyperbola

6. The solution of $(2x - 1)^2 = 9$ is equal to -----------
   - a) -1
   - b) 2
   - c) -1, 2
   - d) None of these

7. A tangent is perpendicular to the radius at the --------
   - a) Centre
   - b) Point of contact
   - c) Infinity
   - d) Chord

8. In $\triangle ABC$ is an isosceles triangle with $\angle C = 90°$ and $AC = 5$ cm then AB is -----------
   - a) 2.5 cm
   - b) 5 cm
   - c) 10 cm
   - d) $5\sqrt{2}$ cm

9. The point of intersection of $3x - y = 4$ and $x + y = 8$ is
   - a) (5, 3)
   - b) (2, 4)
   - c) (3, 5)
   - d) (4, 4)

10. If $\sin\theta = \cos\theta$ then $2\tan^2\theta + \sin^2\theta - 1$ is equal to
    - a) $-3/2$
    - b) $3/2$
    - c) $2/3$
    - d) $-2/3$

11. The height of a right circular cone whose radius is 5 cm and slant height is 13 cm will be
    - a) 12 cm
    - b) 10 cm
    - c) 13 cm
    - d) 5 cm

12. The total surface area of a hemisphere is how much times the square of its radius.
    - a) π
    - b) 4π
    - c) 3π
    - d) 2π

13. The range of the data 8, 8, 8, 8, 8,............8 is -----------
    - a) 0
    - b) 1
    - c) 8
    - d) 3

14. Variance of first 20 natural number is --------
    - a) 32.25
    - b) 44.25
    - c) 33.25
    - d) 30

PART - II

II. Answer any 10 questions. Question No. 28 is compulsory.   10x2=20

15. A relation R is given by the set $\{(x, y) / y = x + 3, x \in \{0, 1, 2, 3, 4, 5\}$. Determine its domain and range.

16. Find k if fof (k) = 5 where f(k) = 2k - 1.

17. If $1 + 2 + 3 + ...+ k = 325$ then find $1^3 + 2^3 + 3^3 + ...k^3$

18. If $A = \begin{pmatrix} 7 & 8 & 6 \\ 1 & 3 & 9 \\ -4 & 3 & -1 \end{pmatrix}$ $B = \begin{pmatrix} 4 & 11 & -3 \\ -1 & 2 & 4 \\ 7 & 5 & 0 \end{pmatrix}$ then find 2A + B

19. Determine the nature of the roots for the quadratic equation $15x^2 + 11x + 2 = 0$

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20. A man goes 18m due east and then 24m due north. Find the distance of his current position from the starting point?

21. Show that the straight lines $x - 2y + 3 = 0$ and $6x + 3y + 8 = 0$ are perpendicular.

22. Find the slope of a line joining the points $(5, \sqrt{5})$ with the origin.

23. Prove that $\tan^2\theta - \sin^2\theta = \tan^2\theta \cdot \sin^2\theta$

24. Find the diameter of a sphere whose surface area is 154 m².

25. If the ratio of radii of two spheres is 4 : 7, Find the ratio of their volumes.

26. Find the standard deviation of first 21 Natural Numbers.

27. A coin is tossed thrice. What is the probability of getting two consecutive tails?

28. If $p^2 \times q^1 \times r^4 \times s^3 = 315000$ then find the value of p, q, r, s.

PART - III

III. Answer the following any 10 questions. Q.No.42 is compulsory.   **10x5=50**

29. Let A = The set of all natural numbers less than 8, B = the set of all prime numbers less than 8, C = The set of even prime number. Verify that $A \times (B - C) = (A \times B) - (A \times C)$

30. Let f be a function $f : N \rightarrow N$ be defined by $f(x) = 3x + 2, x \in N$
    i) Find the images of 1, 2, 3   ii) Find the pre images of 29, 53
    iii) Identify the type of function

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

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

33. If one root of the equation $2y^2 - ay + 64 = 0$ is twice the other then find the value of a.

34. If $x = \dfrac{a^2 + 3a - 4}{3a^2 - 3}$ and $y = \dfrac{a^2 + 2a - 8}{2a^2 - 2a - 4}$ find the values of $x^2 y^2$

35. If $A = \begin{pmatrix} 3 & 1 \\ -1 & 2 \end{pmatrix}$. Show that $A^2 - 5A + 7I_2 = 0$

36. State and prove Basic Proportionality theorem.

37. Find the area of the quadrilateral formed by the points (8,6), (5,11), (-5,12) and (-4,3).

38. If the vertices of a △ABC are A (6, 2) B (-5, -1) and C (1, 9) then find the equation of median.

39. An Aeroplane at an altitude of 1800 m finds that two boats are sailing towards it in the same direction. The angles of depression of the boats as observed from the aeroplane are 60° and 30° respectively. Find the distance between the two boats.

40. If the radii of the circular ends of a frustum which is 45 cm high are 28 cm and 7 cm, Find the volume of the Frustum.

41. Two dice are rolled once. Find the probability of getting an even number on the first die or a total of face sum 8.

42. The volume of a cone is $1005\dfrac{5}{7}$ cu.cm the area of its base is $201\dfrac{1}{7}$ sq. cm. Find the slant height of the cone

PART - IV

IV. Answer the following.   **2x8=16**

43. a) Draw a triangle ABC of base BC = 8 cm, ∠A = 60° and the bisector of ∠A meets BC at D such that BD = 6 cm.
                               (OR)
    b) Draw the two tangents from the 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) Draw the graph of xy = 24, x, y > 0 using the graph find, i) y when x = 3 and ii) x when y = 6.
                               (OR)
    b) Discuss the nature of solutions of Quadratic equations $x^2 + x - 12 = 0$

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