RS3

THIRD REVISION EXAMINATION - 2025

10 – Std

MATHEMATICS

TIME : 3.00 Hrs **PART – I** **MARKS : 100**

CHOOSE THE CORRECT ANSWER: **14X1=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. The function f : N $\rightarrow$ Z is defined by $f(x) = (-1)^x$. then the function f is

   (a) one to one function (b) many-one function
   (c) constant function (d) identity function

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. An A.P consists of 31 terms. If its 16^{th} term is m, then the sum of all the terms of this A.P. is

   (a) 16m (b) 62m (c) 31m (d) $\frac{31m}{2}$

5. The square root of $\frac{256x^8y^4z^{10}}{25x^6y^6z^6}$ is equal to

   (a) $\frac{16}{5}\left|\frac{x^2z^4}{y^2}\right|$ (b) $16\left|\frac{y^2}{x^2z^4}\right|$ (c) $\frac{16}{5}\left|\frac{y}{xz^2}\right|$ (d) $\frac{16}{5}\left|\frac{xz^2}{y}\right|$

6. For the given matrix A = (0 0 0) then the order of the matrix A^T is

   (a) 0 x 0 (b) 1 x 3 (c) 3 x 1 (d) 1 x 0

7. In a ΔABC , AD is the bisector of $\angle BAC$. If AB = 8cm, BD = 6cm and DC = 3cm. The length of the side AC is

   (a) 6cm (b) 4 cm (c) 3 cm (d) 8cm

8. The slope of the line which is perpendicular to a line joining the points (0,0) and (-8,8) is

   (a) -1 (b) 1 (c) $\frac{1}{3}$ (d) - 8

9. Which one of the following equation of straight line passing through origin?

   (a) x = 2y + 5 (b) y = $\frac{1}{2}$ x (c) y = 7 (d) x = 4

10. If x = a tan θ and y = b sec θ then

(a) $\frac{y^2}{b^2} - \frac{x^2}{a^2} = 1$ (b) $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$

(c) $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ (d) $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 0$

11. In a hollow cylinder, the sum of the external and internal radii is 14cm and the width is 4 cm. If its height is 20 cm, the volume of the material in it is

(a) 5600 πcm^3 (b) 1120 πcm^3 (c) 56π cm^3 (d) 3600π cm^3

12. The CSA of a right circular cone whose height is equal to its radius -----(sq. units)

(a) $2\pi r^2$ (b) πrl (c) $\sqrt{2}\,\pi r^2$ (d) $\sqrt{2}\,\pi r$

13. Which of the following is not a measure of dispersion?

(a) Range (b) standard deviation (c) arithmetic mean (d) variance

14. Which of the following values cannot be a probability of an event?

(a) $\frac{3}{10}$ (b) $\frac{4}{5}$ (c) 0 (d) $\frac{7}{4}$

PART - II

ANSWER ANY 10 QUESTIONS. QUESTION NO.28 IS COMPULSORY: 10 X 2 = 20

15. If B X A= { (-2, 3), (-2, 4), (0, 3), (0, 4),(3, 3),(3, 4) } find A and B .

16. Find the value of k , such that fog = g of if f(x) = 2x-k, g(x) = 4x +5.

17. Find the 15th term of an A.P given by 3,15,27,39,..

18. Find the sum of 8 term of the G.P 1, -3, 9, -27...

19. Find the square root of the following rational expression $\frac{400}{100}\frac{x^4y^{12}z^{16}}{x^8y^4z^4}$

20. If α and β are the roots of find the value of $x^2 + 7x + 10 = 0$. Find the value of $\alpha - \beta$.

21. Construct a 3X3 matrix whose element are given by $a_{ij} = |i - 2j|$.

22. If $\Delta ABC \sim \Delta DEF$ such that area of ΔABC is 9 cm^2 and the area of ΔDEF is 16 cm^2 and BC =2.1 cm. Find the length of EF.

23. Find the value of 'a' , if the line through (-2,3) and (8,5) is perpendicular to y = ax +2.

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

25. The external radius and the length of a hollow wooden log are 16cm and 13 cm respectively. If its thickness is 4cm then find its T.S.A.

26. Find the range and coefficient of range of the following data : 25, 67, 48, 53, 18, 39, 44.

27. If A and B are two mutually exclusive events of a random experiment and P (not A) = 0.45, $P(A \cup B) = 0.65$, then find P(B).

28. The hill in the form of a right triangle has its foot at (5,0) . The inclination of the hill to the ground is 30° . Find the equation of the hill joining the foot and top.

PART III

ANSWER ANY 10 QUESTIONS. QUESTION NO.42 IS COMPULSORY: 10 X 5 = 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 X (B – C) = (A X B) – (A X C).

30. If the function f:[-5,9]→R is defined as follows $f(x) = \begin{cases} 6x+1 & ; -5 \le x < 2 \\ 5x^2 - 1 & ; 2 \le x < 6 \\ 3x - 4 & ; 6 \le x \le 9 \end{cases}$

then find the values of (i) f(-3)+ f(2) (ii) f(7) - f(1)

(iii) 2 f(4) + f(8) (iv) $\frac{2f(-2)-f(6)}{f(4)+f(-2)}$.

31. The 104th term and 4th term of an A.P are 125 and 0. Find the sum of first 35 terms.

32. In a Geometric progression, the 4th term is $\frac{8}{9}$ and the 7th term is $\frac{64}{243}$. Find the Geometric Progression.

33. Simplify $\frac{1}{x^2-5x+6} + \frac{1}{x^2-3x+2} - \frac{1}{x^2-8x+15}$.

34. A bus covers a distance of 90 km at a uniform speed. Had the speed been 15km/hour more it would have taken 30 minutes less for the journey. Find the original speed of the bus.

35. Let $A = \begin{bmatrix} 1 & 2 \\ 1 & 3 \end{bmatrix}$ $B = \begin{bmatrix} 4 & 0 \\ 1 & 5 \end{bmatrix}$ $C = \begin{bmatrix} 2 & 0 \\ 1 & 2 \end{bmatrix}$ show that $(A-B)C = (AC - BC)$.

36. State and prove Thales theorem.

37. A quadrilateral has vertices at A (-4 ,-2), B (5, -1), C (6,5) and D (-7,6). Show that the mid points of its sides form a parallelogram.

38. Find the equation of a straight line through the point of intersection of the lines $8x+3y = 18$, $4x+5y = 9$ and bisecting the line segment joining the points (5,-4) and(-7,6).

39. 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.

40. Nathan, an engineering student was asked to make a model shaped like a cylinder with two cones attached at its two ends. The diameter of the model is 3 cm and its length is 12 cm. If each cone has a height of 2 cm, find the volume of model that Nathan made.

41. The number of televisions sold in each day of a week are 13, 8, 4, 9, 7, 12, 10. Find its standard deviation.

42. Two dice are rolled once. Find the probability of getting a composite number on the first die or a prime number on the second die.

PART - IV

ANSWER ALL THE QUESTIONS: **2 X 8 = 16**

43. (a) Take a point which is 11 cm away from the centre of a circle of radius 4 cm and draw the two tangents to the circle from that point. Also measure the length of the tangents. ***(OR)***

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

44 a) Nishanth is the winner in a marathon race of 12km 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, 2 km/hr . And, they covered the distance in 2hrs, 3 hrs, 4 hrs and 6 hrs 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 $y = 2x^2$ and hence solve $2x^2 - x - 6 = 0$.