

RM3 THIRD REVISION EXAMINATION - 2025

10 - Std

MATHEMATICS

TIME : 3.00 Hrs

PART - I

MARKS : 100

14X1=14

CHOOSE THE CORRECT ANSWER:

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

$= 2^n \cdot P(A \times B) = 0.5$

(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 16th 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 $A = \begin{pmatrix} 0 & 0 & 0 \end{pmatrix}$ then the order of the matrix A^T is

(a) 0×0 (b) 1×3 (c) 3×1 (d) 1×0

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

(a) 6cm (b) 4cm (c) 3cm (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) $x = 4$

RM3 10 Maths E.M. PAGE - 1

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10. If $x = a \tan \theta$ and $y = b \sec \theta$ 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) $5600 \pi \text{ cm}^3$ (b) $1120 \pi \text{ cm}^3$ (c) $56 \pi \text{ cm}^3$ (d) $3600 \pi \text{ cm}^3$

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

(a) $2\pi r^2$ (b) $\pi r l$ (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) $\frac{7}{4}$

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PART - II

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

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

16. Find the value of k, such that $f \circ g = g \circ f$ 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 $\frac{400 x^4 y^{12} z^{16}}{100 x^8 y^4 z^4}$

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 $a_{ij} = |i - 2|$.

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 $BC = 2.1 \text{ cm}$. Find the length of EF.

RM3 10 Maths E.M. PAGE - 2

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 $P(\text{not } A) = 0.45$, $P(A \cup B) = 0.65$, 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: $10 \times 5 = 50$

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 $A \times (B - C) = (A \times B) - (A \times C)$.

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

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

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

31. The 104^{th} term and 4^{th} term of an A.P are 125 and 0. Find the sum of first 35 terms.
32. In a Geometric progression, the 4^{th} term is $\frac{8}{9}$ and the 7^{th} 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.

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35. Let $A = \begin{pmatrix} 1 & 2 \\ 1 & 3 \end{pmatrix}$ $B = \begin{pmatrix} 4 & 0 \\ 1 & 5 \end{pmatrix}$ $C = \begin{pmatrix} 2 & 0 \\ 1 & 2 \end{pmatrix}$ 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:

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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 $PQ = 8\text{cm}$, $\angle R = 60^\circ$ and the median RG from R to PQ is 5.8 cm. Find the length of the altitude from R to PQ .

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 $2x^2 - x - 6 = 0$.

RM3 10 Maths E.M. PAGE - 4