ARIYALUR DISTRICT

Reg:No: 1 0 3 0 1

SECOND REVISION EXAMINATION - 2025

MATHEMATICS

CLASS : 10

Marks : 100

Time : 3.00 Hrs.

PART-A

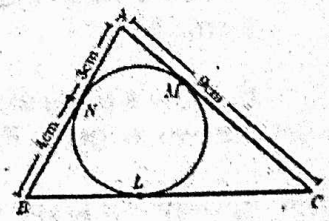
Answer all the questions. $14 \times 1 = 14$

1. Let $n(A) = m, n(B) = n$ and then the total number of non-empty relation that can be defined from A to B is
   A) m^n B) n^m C) $2^{mn} - 1$ D) 2^{mn}
2. If $f: A \to B$ is a bijective function and if $n(B) = 7$ then $n(A)$ is equal to
   A) 7 B) 49 C) 1 D) 14
3. If the HCF of 65 and 117 is expressible in the form of $65m - 117$ then the value of m is
   A) 4 B) 2 C) 1 D) 3
4. Given $F_1 = 1, F_2 = 3$ and $F_n = F_{n-1} + F_{n-2}$ then F_5 is
   A) 3 B) 5 C) 8 D) 11
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. Transpose of a column matrix is
   A) unit matrix B) diagonal matrix C) column matrix D) row matrix
7. The two tangents from an external points P to a circle with the centre at O are PA and PB. If $\angle AOP = 70°$ then the value of $\angle AOB$ is
   A) $100°$ B) $110°$ C) $120°$ D) $130°$
8. The area of the triangle formed by the points $(-5,0), (0,5), (5,0)$
   A) 0 sq.units B) 25 sq.units C) 5 sq.units D) none of these
9. If $a_1a_2 + b_1b_2 = 0$ then the two straight lines are
   A) parallel B) perpendicular C) parallel and perpendicular D) none of these
10. If the ratio of the height of a tower and the length of its shadow is $\sqrt{3} : 1$ then the angle of elevation of the sun has measure
    A) $45°$ B) $30°$ C) $90°$ D) $60°$
11. The total surface area of a cylinder whose radius is $\frac{1}{3}$ of its heights is
    A) $\frac{9\pi h^2}{8}$ sq.units B) $24\pi h^2$ sq.units C) $\frac{8\pi h^2}{9}$ sq.units D) $\frac{56\pi h^2}{9}$ sq.units
12. The ratio of the volume of a cylinder 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. Variance of first 20 natural numbers is
    A) 32.25 B) 44.25 C) 33.25 D) 30
14. Which of the following is incorrect?
    A) $P(A) > 1$ B) $0 \le P(A) \le 1$ C) $P(\varphi) = 1$ D) $P(A) + P(\bar{A}) = 1$

PART-B

Answer any 10 questions. Question number 28 is compulsory. $10 \times 2 = 20$

15. If $A = \{1,3,5\}, B = \{2,3\}$ find $A \times B, B \times A$.
16. Define reciprocal function.
17. Which is the time 100 hours after 7 a.m.
18. Find the first term of a GP in which $S_6 = 4095$ and $r = 4$.
19. Find the excluded values of $\frac{7p+2}{8p^2+13p+5}$
20. Find the values of x, y, z if $\begin{pmatrix} x-3 & 3x-z \\ x+y+7 & x+y+z \end{pmatrix} = \begin{pmatrix} 1 & 0 \\ 1 & 6 \end{pmatrix}$
21. In the figure ΔABC is circumscribing a circle. Find the length of BC.



22. Find the equation of a straight line passing through (5,7) and is
    (i) parallel to X axis (ii) parallel to Y axis
23. If $x - 2y + 3 = 0$, $6x + ky + 8 = 0$ are perpendicular, find the value of k.

24. Prove that $\sqrt{\frac{1+\cos\theta}{1-\cos\theta}} = \operatorname{cosec}\theta + \cot\theta$
25. Find the diameter of a sphere whose surface area is 154 sq.m.
26. The standard deviation and mean of a data are 6.5 and 12.5 respectively. Find the coefficient of variation.
27. A coin is tossed thrice. what is the probability of getting two consecutive tails.
28. Solve by formula method $2x^2 - 3x - 3 = 0$.

PART-C

Answer any 10 questions. Question number 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 and 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 $f: N \to N$ be defined by $f(x) = 3x + 2, x \in N$ (i) Find the image of 2 and 3 (ii) Find the pre images of 29 and 53 (iii) Identify the type of function.
31. (i) If $1^3 + 2^3 + 3^3 + \cdots + k^3 = 14400$ then find the value of $1 + 2 + 3 + \cdots + k$
(ii) $1^2 + 2^2 + 3^2 + \cdots + 19^2$
32. If $A = \frac{2x+1}{2x-1}$ and $B = \frac{2x-1}{2x+1}$ then find $\frac{1}{A-B} - \frac{2B}{A^2-B^2}$
33. If α, β are the roots of the equation $3x^2 + 7x - 2 = 0$. Find the values of
(i) $\frac{\alpha}{\beta} + \frac{\beta}{\alpha}$ (ii) $\frac{\alpha^2}{\beta} + \frac{\beta^2}{\alpha}$
34. If $A = \begin{pmatrix} 5 & 2 & 9 \\ 1 & 2 & 8 \end{pmatrix}$, $B = \begin{pmatrix} 1 & 7 \\ 1 & 2 \\ 5 & -1 \end{pmatrix}$ verify that $(AB)^T = B^T A^T$
35. Show that in a triangle the medians are concurrent.
36. If the points $A(-3,9), B(a,b), C(4,-5)$ are collinear and if $a + b = 1$ then find a and b.
37. Find the equation of a straight line through the intersection of lines $7x + 3y = 10, 5x - 4y = 1$ and the parallel to the line $13x + 5y + 12 = 0$.
38. Two ships are sailing in the sea on either side of a light house. The angle of elevation of the top of the ships are 30° and 45° respectively. If the lighthouse is 200m high, find the distance between the two ships. $(\sqrt{3} = 1.732)$
39. A container open at the top is in the form of a frustum of a cone of height 16 cm with radii of its lower and upper ends are 8 cm and 20 cm respectively. Find the cost of milk which can complete fill a container at the rate of ₹40 per litre.
40. A card is drawn from a pack of 52 cards. Find the probability of getting a king or a heart or a red card.
41. Find the coefficient of variation of 24, 26, 33, 37, 29, 31.
42. If l^{th}, m^{th}, n^{th} terms terms of AP are x, y, z respectively then show that $x(m-n) + y(n-l) + z(l-m) = 0$

PART-D

Answer the following. $2 \times 8 = 16$

43. a) Construct a ΔPQR which the base PQ=4.5 cm $\angle R = 35°$ and median RG from R to PQ is 6 cm.

(OR)

b) Draw a circle of diameter 6 cm from a point P which is 8 cm away from its centre. Draw the two tangents PA and PB to the circle and measure their lengths.

44. a) Draw the graph of $y = x^2 - 5x - 6$ and hence solve $x^2 - 5x - 14 = 0$.

(OR)

b) Draw the graph of $xy = 24$, $x, y > 0$.
Using the graph find (i) y when $x = 3$ (ii) x when $y = 6$.