

Madurai - dt - 2025 14/02/2025.

RM2

## SECOND REVISION EXAMINATION-2025

10 - Std

MATHS



Time: 3.00 Hrs

Marks : 100

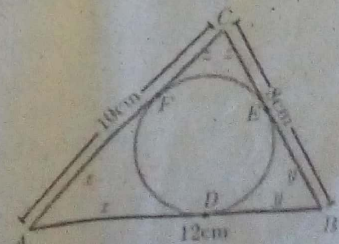
**I Answer all the questions.**

14 X 1 = 14

- If the ordered pairs  $(a + 2, 4)$  and  $(5, 2a + b)$  are equal then  $(a, b)$  is  
a)  $(2, -2)$  b)  $(5, 1)$  c)  $(2, 3)$  d)  $(3, -2)$
- If  $g = \{(1, 1), (2, 3), (3, 5), (4, 7)\}$  is a function given by  $g(x) = \alpha x + \beta$  then the values of  $\alpha$  and  $\beta$  are.  
a)  $(-1, 2)$  b)  $(2, -1)$  c)  $(-1, -2)$  d)  $(1, 2)$
- The sum of the exponents of the prime factors in the prime factorization of 1729 is  
a) 1 b) 2 c) 3 d) 4
- The value of  $(1^3 + 2^3 + 3^3 + \dots + 15^3) - (1 + 2 + 3 + \dots + 15)$  is  
a) 14400 b) 14200 c) 14280 d) 14520
- The number of points of intersection of the quadratic polynomial  $x^2 + 4x + 4$  with the x axis is  
a) 0 b) 1 c) 0 or 1 d) 2
- Find the matrix x if  $2x + \begin{pmatrix} 1 & 3 \\ 5 & 7 \end{pmatrix} = \begin{pmatrix} 5 & 7 \\ 9 & 5 \end{pmatrix}$   
a)  $\begin{pmatrix} -2 & -2 \\ 2 & -1 \end{pmatrix}$  b)  $\begin{pmatrix} 2 & 2 \\ 2 & -1 \end{pmatrix}$  c)  $\begin{pmatrix} 1 & 2 \\ 2 & 2 \end{pmatrix}$  d)  $\begin{pmatrix} 2 & 1 \\ 2 & 2 \end{pmatrix}$
- In  $\triangle LMN$   $\angle L = 60^\circ$ ,  $\angle M = 50^\circ$ . If  $\triangle LMN \sim \triangle PQR$  then the value of  $\angle R$  is  
a)  $40^\circ$  b)  $70^\circ$  c)  $30^\circ$  d)  $110^\circ$
- If slope of the line PQ is  $\frac{1}{\sqrt{3}}$  then slope of the perpendicular bisector of PQ is  
a)  $\sqrt{3}$  b)  $-\sqrt{3}$  c)  $\frac{1}{\sqrt{3}}$  d) 0
- If  $(5, 7)$ ,  $(3, p)$  and  $(6, 6)$  are collinear, then the value of p is  
a) 3 b) 6 c) 9 d) 12
- If  $(\sin \alpha + \operatorname{cosec} \alpha)^2 + (\cos \alpha + \sec \alpha)^2 = k + \tan^2 \alpha + \cot^2 \alpha$  then the value of k is equal to  
a) 9 b) 7 c) 5 d) 3
- The total surface area of a hemi-sphere is how much times the square of its radius.  
a)  $\pi$  b)  $4\pi$  c)  $3\pi$  d)  $2\pi$
- The curved surface area of a right circular cone of height 15cm and base diameter 16cm is  
a)  $60\pi \text{ cm}^2$  b)  $69\pi \text{ cm}^2$  c)  $120\pi \text{ cm}^2$  d)  $136\pi \text{ cm}^2$
- The range of the data 8, 8, 8, 8, 8 ..... 8 is a) 0 b) 1 c) 8 d) 3
- The probability of getting a job for a person is  $\frac{x}{3}$ , if the probability of not getting the job is  $\frac{2}{3}$   
then the value of x is a) 2 b) 1 c) 3 d) 1.5

**II Answer any 10 questions. Question No. 28 is compulsory. 10 X 2 = 20**

- If  $A = \{-1, 1\}$  and  $B = \{-1, 1\}$  then geometrically describe the set of points of  $A \times B$ .
- If  $f(x) = x^2 - 1$ ,  $g(x) = x^2 - 2$  find a, if  $\operatorname{gof}(a) = 1$ .
- Find the HCF of 252525 and 363636.
- Find the number of terms in the A.P. 3, 6, 9, 12, ..... 111.
- Find the sum of  $1 + 3 + 5 + \dots$  to 40 terms.
- Find the excluded values of the following expressions.  $\frac{x+10}{8x}$ .
- Find the square root of the following expressions.  $\frac{144a^8b^{12}c^{16}}{81f^{12}g^4h^{14}}$ .
- A circle is inscribed in  $\triangle ABC$  having sides 8cm, 10cm and 12cm as shown in figure, find AD, BE and CF.





23. Calculate the slope and y intercept of the straight line  $8x - 7y + 6 = 0$ .  
 24. Show that the straight lines  $2x + 3y - 8 = 0$  and  $4x + 6y + 18 = 0$  are parallel.

25. Prove that  $\sqrt{\frac{1+\cos\theta}{1-\cos\theta}} = \operatorname{cosec}\theta + \cot\theta$ .

26. The volume of a solid right circular cone is  $11088 \text{ cm}^3$ . If its height is  $24 \text{ cm}$  then find the radius of the cone.  
 27. Write the sample space for tossing three coins using tree diagram.  
 28. Find the range and coefficient of range of the following data : 25, 67, 48, 53, 18, 39, 44.

**III Answer any 10 questions. Question No. 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. If the function  $f: \mathbb{R} \rightarrow \mathbb{R}$  is defined by  $f(x) = \begin{cases} 2x+7 & , x < -2 \\ x^2-2 & -2 \leq x < 3 \\ 3x-2 & x \geq 3 \end{cases}$  then find the value of i)  $f(4)$

ii)  $f(-2)$     iii)  $f(4) + 2f(1)$     iv)  $\frac{f(1) - 3f(4)}{f(-3)}$

31. Find the sum of all natural numbers between 300 and 600 which are divisible by 7.  
 32. Find the sum of the series  $(2^3 - 1^3) + (4^3 - 3^3) + (6^3 - 5^3) + \dots$  to 8 terms.

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

34. If  $\alpha$  and  $\beta$  are the roots of  $x^2 + 7x + 10 = 0$  find the values of  
 i)  $(\alpha - \beta)$     ii)  $\alpha^2 + \beta^2$     iii)  $\alpha^3 - \beta^3$     iv)  $\alpha^4 + \beta^4$

35. State and prove the Pythagoras theorem.

36. Find the value of  $k$ , if the area of a quadrilateral is 28 sq. units, whose vertices are taken in the order  $(-4, -2)$ ,  $(-3, k)$ ,  $(3, -2)$  and  $(2, 3)$ .

37.  $A(-3, 0)$ ,  $B(10, -2)$  and  $C(12, 3)$  are the vertices of  $\Delta ABC$ . Find the equation of the altitude through A and B.

38. From the top of a lighthouse, the angle of depression of two ships on the opposite sides of it are observed to be  $30^\circ$  and  $60^\circ$ . If the height of the lighthouse is  $h$  meters and the line joining the ships passes through the foot of the lighthouse, show that the distance between the ships

is  $\frac{4h}{\sqrt{3}}$  m.

39. A toy is in the shape of a cylinder surmounted by a hemisphere. The height of the toy is  $25 \text{ cm}$ . Find the total surface area of the toy if its common diameter is  $12 \text{ cm}$ . Solution let  $r$  and  $h$  be the radius and height of the cylinder respectively

40. The marks scored by the students in a slip test are given below. Find the standard deviation of their marks.

x	4	6	8	10	12
f	7	3	5	9	5

41. In an apartment, in selecting a house from door numbers 1 to 100 randomly, find the probability of getting the door number of the house to be an even number or a perfect square number or a perfect cube number.

42. Find the values of  $a$  and  $b$  if the following polynomials are perfect squares  
 $ax^4 + bx^3 + 361x^2 + 220x + 100$ .

**IV Answer all the questions.**

$2 \times 8 = 16$

43. Construct a  $\Delta PQR$   $PQ = 8 \text{ cm}$ ,  $\angle R = 60^\circ$  and the median  $RG$  from  $R$  to  $PQ$  is  $5.8 \text{ cm}$ . Find the length of the altitude from  $R$  to  $PQ$ . (OR)

Draw a circle of radius  $4.5 \text{ cm}$ . Take a point on the circle. Draw the tangent at the point using the alternate segment theorem.

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

Nishanth is the winner in a Marathon race of  $12 \text{ km}$  distance. He ran at the uniform speed of  $12 \text{ km/hr}$  and reached the destination in 1 hour. He was followed by Aradhana, Jeyanth, Sathya and Swetha with their respective speed of  $6 \text{ km/hr}$ ,  $4 \text{ km/hr}$ ,  $3 \text{ km/hr}$  and  $2 \text{ km/hr}$ . 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  $2.4 \text{ km/hr}$ .