

10M

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- 23) Find the ratio in which the x-axis divides the line segment joining the points (6, 4) and (1, -7).
 24) Prove that the straight lines $x+2y+1=0$ and $2x-y+9=0$ are perpendicular to each other.
 25) In $\triangle ABC$, AE is the external bisector of $\angle A$ meeting BC produced at E. If $AB = 10$ c.m, $AC = 6$ c.m and $BC = 12$ c.m then find CE.
- 26) Prove that $\sqrt{\frac{1-\sin\theta}{1+\sin\theta}} = \sec\theta - \tan\theta$.
- 27) The thickness of a hemispherical bowl is 0.25 c.m. The inner radius of the bowl is 5 c.m. Find the outer curved surface area of the bowl.
 28) The standard deviation of 20 observations is $\sqrt{5}$. If each observation is multiplied by 2, find the standard deviation and variance of the resulting observation.
 29) Two dice are thrown together. Find the probability that the two digit number formed with the two numbers turning up is divisible by 3.
 30) a) Find the total area of 14 squares whose sides are 11 c.m, 12 c.m,, 24 c.m respectively. **(OR)**
 b) The radius of a solid sphere is 24 c.m. It is melted and drawn into a long wire of uniform cross section. Find the length of wire if its radius is 1.2 mm.

Section - C

Note: 1. Answer any nine questions. Question No. 45 is compulsory.

2. Each question carries five marks.

9x5=45

- 31) In a town 85% of the people speak English, 40% speak Tamil and 20% speak Hindi. Also 42% speak English and Tamil, 23% speak Tamil and Hindi and 10% speak English and Hindi find the percentage of people who can speak all the three languages.
- 32) Let $A = \{4, 6, 8, 10\}$ and $B = \{3, 4, 5, 6, 7\}$. If $f : A \rightarrow B$ is defined by $f(x) = \frac{1}{2}x + 1$ then represent f by (i) an arrow diagram (ii) a set of ordered pairs and (iii) a table.
- 33) In an arithmetic series the sum of first 11 terms is 44 and that of the next 11 terms is 55. Find the arithmetic series.
- 34) Find the values of K so that the equation $x^2 - 2x(1+3K) + 7(3+2K) = 0$ has real and equal roots.
- 35) Find the square root of $ax^4 - bx^3 + 40x^2 + 24x + 36$.
- 36) If $A = \begin{pmatrix} a & b \\ c & d \end{pmatrix}$ and $I_2 = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ then show that $A^2 - (a+d)A = (bc-ad)I_2$.
- 37) Find the area of the quadrilateral formed by the points $(-4, -2)$, $(-3, -5)$, $(3, -2)$ and $(2, 3)$.
- 38) Find the equation of the straight line joining the point of intersection of the lines $3x-y+9=0$ and $x+2y=4$ and the point of intersection of the lines $2x+y-4=0$ and $x-2y+3=0$.
- 39) State and prove Thales theorem.
- 40) A flag post stands on the top of a building. From a point on the ground the angles of elevation of the top and bottom of the flag post are 60° and 45° respectively. If the height of the flag post is 10m, find the height of the building.
- 41) A vessel is in the form of a frustum of a cone. Its radius at one end and the height are 8 c.m and 14 c.m respectively. If its volume is $\frac{5676}{3}$ c.m³ then find the radius at the other end.
- 42) A solid wooden toy is in the form of a cone surmounted on a hemisphere. If the radii of the hemisphere and the base of the cone are 3.5 c.m each and the total height of the toy is 17.5 c.m then find the volume of wood used in the toy.
- 43) The following table gives the number of goals scored by 71 leading players in international football matches. Find the standard deviation of the data.

Class interval	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	8	12	17	14	9	7	4

- 44) A card is drawn at random from a well shuffled deck of 52 cards. Find the probability that it will be a spade or a king.
- 45) a) Find the sum of first n terms of the series $7+77+777+ \dots$ **(OR)**
 b) If α and β are the roots of the equation $2x^2 - 3x - 1 = 0$ find the values of

(i) $\alpha^2 + \beta^2$ (ii) $\frac{\alpha}{\beta} + \frac{\beta}{\alpha}$ (iii) $\alpha - \beta$ if $\alpha > \beta$ (iv) $\left(\alpha + \frac{1}{\beta}\right)\left(\frac{1}{\alpha} + \beta\right)$

Section - D

Note: 1. Answer both the questions choosing either of the alternatives.

2. Each question carries 10 marks.

2x10=20

- 46) a) Construct a $\triangle PQR$ in which the base $PQ = 6$ c.m, $\angle R = 60^\circ$ and the altitude from R to PQ is 4 c.m. **(OR)**
 b) Construct a cyclic quadrilateral $PQRS$ with $PQ = 4$ c.m, $\angle P = 100^\circ$, $\angle PQS = 40^\circ$ and $\angle SQR = 70^\circ$.
- 47) a) Draw the graph of $y = x^2 + 2x - 3$ and hence find the roots of $x^2 - x - 6 = 0$. **(OR)**
 b) The cost of the milk per litre is Rs. 15. Draw the graph for the relation between the quantity and cost. Hence find (i) the proportionality constant. (ii) the cost of 3 litres of milk.