



IPE MODEL :: MATHS-IB (75 Marks)

SYLLABUS: 2D-GEOMETRY (Complete), LOCUS (Complete), TRANSFORMATION OF AXES (Complete), STRAIGHT LINES UPTO EX 3.3 (Complete)

SECTION-A

- I. VSAQ: Answer ALL the questions. 10 x 2 = 20 M**
- Find the value of 'a' if the distance between the points $(a, 2), (3, 4)$ is $2\sqrt{2}$.
 - Find the ratios in which x -axis and y -axis divides the line segment joining the points $(2, 4), (-4, 3)$.
 - If two vertices of a triangle are $(4, 8), (-2, 6)$ and the centroid is $(2, 7)$, then find the third vertex.
 - Find the locus of the point for which is equidistant to the coordinate axes.
 - Find the equation to the locus of the point for which the square of whose distance from origin is 4 times its y -coordinate.
 - Find the point to which the origin has to be shifted to eliminate x and y terms in the equation $4x^2 + 9y^2 - 8x + 36y + 4 = 0$.
 - When the axes are rotated to an angle of 60° the point P is changed as $(3, 4)$. Find P.
 - Find the value of y . If the line joining $(3, y), (2, 7)$ is parallel to the line joining $(-1, 4), (0, 6)$.
 - If the area of the triangle formed by the straight lines $x = 0, y = 0$ and $3x + 4y = a (a > 0)$ is 6 sq. unit. Find the value of a .
 - Find the distance between the parallel lines $3x + 4y - 3 = 0, 6x + 8y - 1 = 0$

SECTION-B

- II. SAQ: Answer any FIVE of the following questions. 5 x 4 = 20 M**
- If the area of the triangle formed by $(k, 0), (3, 4), (5, -2)$ is 10 sq. unit. Then find k .
 - If the distances from P to the points $(5, -4), (7, 6)$ are in the ratio 2 : 3. Then find the locus of P .
 - Find the locus of a point P if the join of the points $(2, 3)$ and $(-1, 5)$ subtends a right angled triangle at P .
 - Find the transformed equation of $2x^2 + y^2 - 4x + 4y = 0$ when the origin is shifted to the point $(-1, 2)$.

15. If the transformed equation of a curve is $17X^2 - 16XY + 17Y^2 = 225$ when the axes are rotated through an angle 45° , then find the original equation of the curve.
16. A straight line forms a triangle of area 24 sq. unit with the coordinate axes in the first quadrant. Find the equation of the line if it passes through $(3, 4)$.
17. Find the points on the line $3x - 4y - 1 = 0$ which are at a distance of 5 unit from the point $(3, 2)$.

SECTION-C

III. LAQ: Answer any FIVE of the following questions.

5 x 7 = 35 M

18. $A(5, 3)$, $B(3, -2)$ are two points. If a point P forms a triangle of area 9 square unit with A, B then find the locus of P.
19. $A(2, 3)$, $B(2, -3)$ are two points. If P is a point such that $PA + PB = 8$, then find the locus of P.
20. If the transformed equation of a curve is $X^2 + 3YX - 2Y^2 + 17X - 7Y - 11 = 0$ when the axes are translated to the point $(2, 3)$, find the original equation of curve.
21. Show that the angle of rotation of axes to eliminate xy term in the equation $ax^2 + 2hxy + by^2 = 0$ is $\frac{1}{2} \tan^{-1} \left(\frac{2h}{a-b} \right)$ when $a \neq b$ and $\frac{\pi}{4}$ when $a = b$.
22. $A(10, 4)$, $B(-4, 9)$, $C(-2, -1)$ are the vertices of a triangle. Find the equation of
i) the median through A ii) the perpendicular bisector of the side AB .
23. Transform the equation $\sqrt{3}x + y = 4$ into slope intercept form, intercept, normal form.
24. If p, q are the perpendiculars from the origin to the lines $x \sec \alpha + y \csc \alpha = a$ and $x \cos \alpha - y \sin \alpha = a \cos 2\alpha$, then show that $4p^2 + q^2 = a^2$.
