GOVERMENT.IMPORTANT QUESTIONS(2025-26)

SUB: MATHS – IB

1. Find the equation of locus of a point P such that the distance of P from the origin is twice the distance of P from A(1, 2) .
2. A (5, 3) and B (3, -2) are two fixed points. Find the equation of the locus of P. So that the area of ΔPAB is 9.
3. Find the equation of the locus of a point which forms a triangle of area 2 with the points A (1, 1) and B (-2, 3) .
4. When the origin is shifted to (-1, 2) by the translation of axes, find the transformed equations of the following (i) $x^2+y^2+2x-4y+1=0$ (ii) $2x^2+y^2-4x+4y=0$
5. When the axes are rotated through an angle 45^0, the transformed equation of curve is $17x^2-16xy+17y^2=225$. Find the original equation of the curve.
6. When the axes are rotated through an angle ~ , find the transformed equation of $x\cos\sim+y\sin\sim=P$.
7. When the axes are rotated through an angle $\frac{®}{6}$, Find the transformed equation of $x^2+2\sqrt{3}xy-y^2=2a^2$.
8. (i) If Q (h, k) is the foot of the perpendicular from $P(x_1,y_1)$ on the straight line $ax+by+c=0$ then $\frac{h-x_1}{a}=\frac{k-y_1}{b}=\frac{-(ax_1+by_1+c)}{a^2+b^2}$.

   (ii) Find the foot of the perpendicular drawn from (4, 1) upon the straight line $3x-4y+12=0$.
9. Find the orthocenter of the triangle with the following veritces (-2, -1), (6, -1) and (2, 5)
10. If p and q are the lengths of the perpendicular from the origin to the straight lines $x\sec\sim+y\cos\sim=a$ *and* $x\cos\sim-y\sin\sim=a\cos 2\sim$. Prove that $4p^2+q^2=a^2$.
11. Show that the area of a triangle formed by the lines $ax^2+2hxy+by^2=0$ *and* $lx+my+n=0$ is $\left|\frac{n^2\sqrt{h^2-ab}}{am^2-2hlm+bl^2}\right|$.
12. Show that the product of the perpendicular distances from the origin to the pair of straight lines represented by $ax^2+2hxy+by^2+2gx+2fy+c$ is $\frac{|c|}{\sqrt{(a-b)^2+4h^2}}$.
13. Find the values of k, if the line joining the origin to the points of intersection of the curve $2x^2-2xy+3y^2+2x-y-1=0$ and the line $x+2y=k$ are mutually perpendicular.

14. Find the angle between the lines joining the origin to the points of intersection of the curve $x^2+2xy+y^2+2x+2y-5=0$ and the line $3x-y+1=0$.
15. Find the condition for the chord $lx+my=1$ of the circle $x^2+y^2=a^2$ to subtend a right angle at the origin.
16. $\lim_{x\to 1}\frac{(2x-1)(\sqrt{x}-1)}{(2x^2+x-3)}$,
17. $\lim_{x\to 0}\left(\frac{cosax-\cos bx}{x^2}\right)$,
18. $\lim_{x\to 0}\frac{1-\cos x}{x}$,
19. $\lim_{x\to 0}\frac{1-\cos mx}{1-\cos nx}$,
20. If $y=\tan^{-1}\left(\frac{\sqrt{1+x^2}+\sqrt{1-x^2}}{\sqrt{1+x^2}-\sqrt{1-x^2}}\right)$ *find* $\frac{dy}{dx}$.
21. Find the derivative of $(\sin x)^{\log x}+x^{\sin x}$.
22. Find the derivative of $(\sin x)^{x}+x^{\sin x}$
23. If $x^y+y^x=a^b$ *then* $\frac{dy}{dx}=-\left[\frac{yx^{y-1}+y^x\log y}{x^y\log x+xy^{x-1}}\right]$,
24. The radius of a sphere is measured as 14cm Later it was found that there is an error 0.02cm in measuring the radius. Find the approximate error in surface area of the sphere.
25. Find the lengths of normal and subnormal at a point on the curve $y=\frac{a}{2}\left(e^{\frac{x}{a}}+e^{\frac{-x}{a}}\right)$.
26. Show that at any point (x, y) on the curve $y=be^{\frac{x}{a}}$ the length of the subtangent is a constant and the length of the subnormal is $\frac{y^2}{a}$.
27. If the distance from P to the points (2, 3) and (2, -3) are the ratio 2 : 3 then find the locus of P ?
28. Prove that the points (1, 1), (2, 15) and (-3, -5) are collinear and find the equation of the straight line containing them.
29. Find the value of x, if the slope of the line passing through (2, 5) and (x, 3) is 2
30. Find the equation of the straight line passing through (-2, 4) and making non – zero intercepts whose sum is zero.
31. Find the sum of the squares of the intercepts of the line $4x-3y=12$ on the axes of coordinates.

32. If the equation $S \equiv ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ represents a pair of parallel straight lines. Then

    (i) $h^2 = ab$ (ii) $af^2 = bg^2$ and

    (iii) the distance between the parallel lines = $2\sqrt{\frac{g^2 - ac}{a(a+b)}} = 2\sqrt{\frac{f^2 - bc}{b(a+b)}}$.

33. The diameter of a sphere is measured to be 40cm. If an error of 0.02cm is made in it, then find the approximate errors in volume and surface area of the sphere.

34. Find the angle between the lines whose direction cosines satisfy the equations $l + m + n = 0$, $l^2 + m^2 + n^2 = 0$.

35. Find the angle between the lines whose direction cosines are given by the equations $3l + m + 5n = 0$ and $6mn - 2nl + 5lm = 0$.