

9. If F_1 and F_2 are the feet of the perpendiculars from the foci S_1 and S_2 of the ellipse $\frac{x^2}{25} + \frac{y^2}{16} = 1$ on the tangent at any point P on the ellipse, then $S_1F_1 + S_2F_2 \geq$
- 1) 2 2) 4 3) 6 4) 8
10. Tangents are drawn from the point (3,2) to the ellipse $x^2 + 4y^2 = 9$. then middle point of this chord of contact is _____
- 1) (0,1) 2) (1,0) 3) $\left(\frac{18}{25}, \frac{27}{25}\right)$ 4) $\left(\frac{27}{25}, \frac{18}{25}\right)$
11. The locus of the midpoints of focal chord of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ is ____
- 1) $\frac{x^2}{a^2} + \frac{y^2}{b^2} = \frac{ex}{a}$ 2) $\frac{x^2}{b^2} + \frac{y^2}{a^2} = \frac{ex}{a}$ 3) $\frac{x^2}{a^2} + \frac{y^2}{b^2} = \frac{ax}{e}$ 4) $\frac{x^2}{b^2} + \frac{y^2}{a^2} = \frac{ax}{e}$
12. The length of the chord of the ellipse $\frac{x^2}{25} + \frac{y^2}{16} = 1$ whose middle point is $(1/2, 2/5)$ is ____.
- 1) $7\sqrt{\frac{41}{25}}$ 2) $7\sqrt{\frac{25}{41}}$ 3) $25\sqrt{\frac{7}{41}}$ 4) $41\sqrt{\frac{25}{7}}$
13. If S and S' are the foci of the ellipse $\frac{x^2}{25} + \frac{y^2}{16} = 1$, and P is any point on it then range of values of $SP \cdot S'P$ is
- A) $9 \leq f(\theta) \leq 16$ B) $9 \leq f(\theta) \leq 25$ C) $16 \leq f(\theta) \leq 25$ D) $11 \leq f(\theta) \leq 16$

14. If tangents PQ and PR are drawn from a point on the circle $x^2 + y^2 = 25$ to the ellipse $\frac{x^2}{4} + \frac{y^2}{b^2} = 1$ ($b < 4$). So that the fourth vertex S of parallelogram PQRS lies on the circumcircle of triangle PQR, then eccentricity of the ellipse is
- 1) $\frac{\sqrt{5}}{4}$ 2) $\frac{\sqrt{7}}{3}$ 3) $\frac{\sqrt{7}}{4}$ 4) $\frac{\sqrt{5}}{3}$
15. If $x, y \in R$, satisfying the equation $\frac{(x-4)^2}{4} + \frac{y^2}{9} = 1$ then the difference between the largest and smallest value of the expression $\frac{x^2}{4} + \frac{y^2}{9}$ is
- 1) 5 2) 6 3) 7 4) 8
16. If the mid point of a chord of the ellipse $\frac{x^2}{16} + \frac{y^2}{25} = 1$ is (0,3), and length of the chord is $\frac{4k}{5}$, then k is
- 1) 8 2) 7 3) 6 4) 5
17. The area of the quadrilateral formed by the tangents at the end point of latus rectum to the ellipse $\frac{x^2}{9} + \frac{y^2}{5} = 1$ is
- 1) 27/4 sq. units 2) 9 sq. units 3) 27/2 sq. units 4) 27 sq. units
18. The equation of the locus of the middle point of the portion of the tangent of the ellipse $\frac{x^2}{16} + \frac{y^2}{9} = 1$ included between the co-ordinates axes is the curve:
- 1) $9x^2 + 16y^2 = 4x^2y^2$ 2) $16x^2 + 9y^2 = 4x^2y^2$
 3) $3x^2 + 4y^2 = 4x^2y^2$ 4) $9x^2 + 16y^2 = x^2y^2$
19. The equation of the chord of the ellipse $2x^2 + 5y^2 = 20$ which is bisected at the point (2,1) is
- 1) $4x + 5y + 13 = 0$ 2) $4x + 5y = 13$ 3) $5x + 4y + 13 = 0$ 4) $5x + 4y = 13$
20. The length of the chord of the ellipse $\frac{x^2}{4} + \frac{y^2}{2} = 1$, whose mid-point is $\left(1, \frac{1}{2}\right)$, is : $\frac{l}{m} \sqrt{15}$, $l + m =$
- 1) 6 2) 5 3) 4 4) 3
21. Let the product of the focal distances of the point $\left(\sqrt{3}, \frac{1}{2}\right)$ on the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ ($a > b$), be $\frac{7}{4}$. Then the absolute difference of the eccentricities of two such ellipses is $\frac{3 - 2\sqrt{k_1}}{2\sqrt{k_2}}$, then $k_1 + k_2 =$ _____
- 1) 3 2) 4 3) 5 4) 6
22. The equation of the chord, of the ellipse $\frac{x^2}{25} + \frac{y^2}{16} = 1$, whose mid-point is (3,1) is : $48x + 25y = k$, $k =$ _____
- 1) 169 2) 134 3) 176 4) 31

23. Let $E_1 : \frac{x^2}{9} + \frac{y^2}{4} = 1$ be an ellipse. Ellipse E_i 's are constructed such that their centres and eccentricities are same as that of E_1 , and the length of minor axis of E_i is the length of major axis of E_{i-1} ($i \geq 1$). If A_i is the area of the ellipse E_i , then $\frac{5}{\pi} \left(\sum_{i=1}^5 A_i \right)$, is equal to
- 1) 51 2) 52 3) 53 4) 54
24. If the mid point of a chord of the ellipse $\frac{x^2}{9} + \frac{y^2}{4} = 1$ is $(\sqrt{2}, 4/3)$, and the length of the chord is $\frac{2\sqrt{a}}{3}$, then α^2 is
- 1) 22 2) 484 3) 496 4) 56
25. Let the ellipse, $E_1 : \frac{x^2}{a^2} + \frac{y^2}{b^2} = 1, a > b$ and $E_2 : \frac{x^2}{A^2} + \frac{y^2}{B^2} = 1, A < B$ have same eccentricity $\frac{1}{\sqrt{3}}$. Let the product of their lengths of latus rectums be $\frac{32}{\sqrt{3}}$, and the distance between the foci of E_1 be 4. If E_1 and E_2 meet at A, B, C and D, then the area of the quadrilateral ABCD equals : $\frac{k\sqrt{6}}{5}, k = \underline{\hspace{2cm}}$
- 1) 22 2) 23 3) 24 4) 25
26. If $\alpha x + \beta y = 109$ is the equation of the chord of the ellipse $\frac{x^2}{9} + \frac{y^2}{4} = 1$, whose mid point is $\left(\frac{5}{2}, \frac{1}{2}\right)$, then $\frac{\alpha + \beta}{2}$ is equal to
- 1) 26 2) 27 3) 28 4) 29
27. A sequence of ellipses $E_1, E_2, E_3, \dots, E_n$ is constructed as follows : Ellipse E_n is drawn so as to touch ellipse E_{n-1} as the extremities of the major axis of E_{n-1} and to have its foci at the extremities of the minor axis of E_{n-1} . If E_n is independent of n, then the eccentricity of ellipse E_{n-2} is
- 1) $\left(\frac{3-\sqrt{5}}{5}\right)$ 2) $\left(\frac{\sqrt{5}-1}{2}\right)$ 3) $\left(\frac{2-\sqrt{3}}{2}\right)$ 4) $\left(\frac{\sqrt{3}-1}{2}\right)$
28. The length of the chord of the ellipse $\frac{x^2}{25} + \frac{y^2}{16} = 1$ where mid-points is $\left(\frac{1}{2}, \frac{2}{3}\right)$ is
- 1) $\frac{1}{10}$ 2) $\frac{\sqrt{8161}}{10}$ 3) $\frac{\sqrt{8061}}{10}$ 4) None of these
29. F_1 and F_2 are the foci of the ellipse $\frac{x^2}{9} + \frac{y^2}{4} = 1$. Let P be a point on the ellipse such that $|PF_1| = 2|PF_2|$, where F_1 and F_2 are the two foci of the ellipse. The area of ΔPF_1F_2 is
- 1) 3 2) 4 3) $\sqrt{5}$ 4) $\frac{\sqrt{13}}{3}$

30. Consider an ellipse $E: \frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, centred at point 'O' (origin) and having AB and CD as its major and minor axes respectively. If S_1 be one of the focus of the ellipse, radius of incircle of $\triangle OCS_1$ be 1 unit and $OS_1 = 6$ units. Then number of following are correct
- A) The area of ellipse (E) is $\frac{65\pi}{4}$ sq. units
- B) The perimeter of $\triangle OCS_1$ is 15 units
- C) The equation of the director circle of (E) is $x^2 + y^2 = \frac{169}{4}$
- D) Product of perpendicular distances from foci to any tangent of ellipse (E) is $\frac{5}{2}$
- 1) 1 2) 2 3) 3 4) 4
31. If the midpoint of a chord of the ellipse $\frac{x^2}{16} + \frac{y^2}{25} = 1$ is (0,3) and length of the chord is $\frac{4K}{5}$ then K is
- 1) 5 2) 6 3) 7 4) 8
32. Equation of the largest circle with centre (1,0) that can be inscribed in the ellipse $x^2 + 4y^2 = 16$ is
- 1) $(x-1)^2 + y^2 = \frac{11}{3}$ 2) $(x-1)^2 + y^2 = \frac{5}{3}$ 3) $(x-1)^2 + y^2 = \frac{7}{3}$ 4) $(x-1)^2 + y^2 = \frac{15}{2}$
33. If PSQ is a focal chord of the ellipse $16x^2 + 25y^2 = 400$, such that $SP=8$, then the length of SQ is ____
- 1) 0 2) 1 3) 2 4) 3
34. If $P(x, y)$ be any point on the ellipse $16x^2 + 25y^2 = 400$ and $F_1 = (3, 0), F_2 = (-3, 0)$, then the value of $PF_1 + PF_2$ is ____
- 1) 7 2) 8 3) 9 4) 10
35. An ellipse having foci at (3,3) and (-4,4) and passing through the origin, then eccentricity of the ellipse.
- 1) $\frac{7}{5}$ 2) $\frac{5}{7}$ 3) $\frac{5}{6}$ 4) $\frac{1}{2}$
36. The length of the focal radii drawn from the point $(4\sqrt{3}, 5)$ on the ellipse $25x^2 + 16y^2 = 1600$ are ____
- 1) 7, 13 2) 6, 12 3) 7, 12 4) 6, 13
37. The equations of the focal radii drawn from the point $(4\sqrt{3}, 5)$ on the ellipse $25x^2 + 16y^2 = 1600$ are ____
- 1) $x - 4\sqrt{3}y + 24\sqrt{3} = 0, 11x - 4\sqrt{3}y - 24\sqrt{3} = 0$
- 2) $x + 4\sqrt{3}y - 24\sqrt{3} = 0, 11x - 4\sqrt{3}y - 24\sqrt{3} = 0$
- 3) $x + 4\sqrt{3}y - 24\sqrt{3} = 0, 11x + 4\sqrt{3}y + 24\sqrt{3} = 0$
- 4) $x - 4\sqrt{3}y - 24\sqrt{3} = 0, 11x + 4\sqrt{3}y - 24\sqrt{3} = 0$

38. The integral value of α for which the point $\left(7 - \frac{5\alpha}{4}, -\alpha\right)$ lies inside the ellipse $\frac{x^2}{25} + \frac{y^2}{16} = 1$ is ____
- 1) 2 2) 3 3) 4 4) 5
39. The maximum area of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ which touches the line $y = 3x + 2$ is
- 1) $\frac{\pi}{3}$ 2) $\frac{2\pi}{3}$ 3) π 4) 2π
40. A sequence of ellipses $E_1, E_2, E_3, \dots, E_n$ is constructed as follows: Ellipse E_n is drawn so as to touch ellipse E_{n-1} as the extremities of the major axis of E_{n-1} and to have its foci at the extremities of the minor axis of E_{n-1} .
- If eccentricity of ellipse E_n is e_n , then the locus of (e_n^2, e_{n-1}^2) is
- A) a parabola B) an ellipse C) a hyperbola D) a rectangular hyperbola
41. The minimum area of triangle formed by the tangent to the $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ and coordinate axes is
- 1) ab sq units 2) $\frac{a^2 + b^2}{2}$ sq units 3) $\frac{(a+b)^2}{2}$ sq units 4) $\frac{a^2 + ab + b^2}{3}$ sq units
42. An ellipse has the point $(1, -1)$ and $(2, -1)$ as its foci and $x + y = 5$ as one of its tangent then the coordinates of the point where this line touches the ellipse are
- 1) $\left(\frac{34}{9}, \frac{11}{9}\right)$ 2) $\left(\frac{32}{9}, \frac{13}{9}\right)$ 3) $\left(-\frac{34}{9}, \frac{79}{9}\right)$ 4) $\left(-\frac{32}{9}, \frac{77}{9}\right)$
43. If the length of two perpendicular focal chords of the ellipse $\frac{(x+2)^2}{16} + \frac{y^2}{12} = 1$ are a and b , then the H.M of a and b is
- 1) $\frac{24}{7}$ 2) $\frac{48}{7}$ 3) 3 4) 6

KEY

1-10	4	4	1	1	3	3	4	1	4	1
11-20	2	2	3	1	4	2	3	4	2	4
21-30	2	2	4	1	3	4	2	1	2	2
31-35	2	4	1	1	2					

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21-30	2	2	4	1	3	4	2	1	2	2
31-35	2	4	1	1	2					