**Ellipse and Hyperbola**

**Choose the most appropriate option (a, b, c or d)**

Q 1. The equation 2x2 – 3xy + 5y2 + 6x – 3y + 5 = 0 represents

(a) a parabola (b) an ellipse (c) a hyperbola (d) a pair of straight lines

Q 2. The set of real values of k for which the equation

(k + 1)x2 + 2(k – 1)xy + y2 – x + 2y + 3 = 0

represents an ellipse is

(a) (0, 3) (b) (-∞, 0) (c) (3, +∞) (d) (-∞, ∞)

Q 3. The centre of the conic section 14x2 – 4xy + 11y2 – 44x – 58y + 71 = 0 is

(a) (2, 3) (b) (2, -3) (c) (-2, 3) (d) (-2, -3)

Q 4. The eccentricity of the ellipse  is

(a)  (b)  (c)  (d) 

Q 5. The eccentricity of the hyperbola x2 – 4y2 = 16 is

(a) 2 (b)  (c) 4 (d) 

Q 6. The eccentricity of the conic section 4(x2 – y2) = 1 is

(a)  (b) 2 (c) 4 (d) 

Q 7. The latus rectum of the conic section whose eccentricity = 3, is

(a)  (b)  (c)  (d) 

Q 8. The ellipse passes through the point (-3, 1) and has the eccentricity . Then the major axis of the ellipse has the length

(a)  (b)  (c)  (d) 

Q 9. The hyperbola passes through the point (2, 3) and has the eccentricity 2. Then the transverse axis of the hyperbola has the length

(a) 1 (b) 3 (c) 2 (d) 4

Q 10. In the ellipse x2 + 3y2 = 9 the distance between the foci is

(a)  (b) 3 (c)  (d) 

Q 11. The minor axis of the ellipse 9x2 + 5y2 = 30y is

(a) 6 (b)  (c)  (d) 

Q 12. The foci of the ellipse 25x2 + 36y2 = 225 are

(a)  (b)  (c)  (d) 

Q 13. If the eccentricity of the hyperbola is e then the eccentricity of the hyperbola is

(a) e (b)  (c)  (d) e2 – e

Q 14. If in an ellipse the minor axis = the distance between the foci and its latus rectum = 10 then the equation of the ellipse in the standard form is

(a)  (b)  (c)  (d) none of these

Q 15. If in a hyperbola the eccentricity is , and the distance between the foci is 9 then the equation of the hyperbola in the standard form is

(a)  (b)  (c) (d) none of these

Q 16. If in an ellipse, a focus is (6, 7), the corresponding directrix is x + y + 2 = 0 and the eccentricity = then the equation ofhte ellipse is

(a) 7x2 + 2xy + 7y2 – 44x – 108y + 684 = 0 (b) 7x2 – 2xy + 7y2 – 52x – 116y + 676 = 0

(c) 9x2 – 2xy + 9y2 – 44x – 108y + 684 = 0 (d) none of these

Q 17. If for a rectangular hyperbola a focus is (1, 2) and the corresponding directrix is x + y = 1 then the equation of the rectangular hyperbola is

(a) x2 – y2 = 2 (b) xy – y + 2 = 0 (c) xy + y – 2 = 0 (d) none of these

Q 18. If two foci of an ellipse be (-2, 0) and (2, 0) and its eccentricity is then the ellipse has the equation

(a) 5x2 + 9y2 = 45 (b) 9x2 = 5y2 = 45 (c) 5x2 + 9y2 = 90 (d) 9x2 + 5y2 = 90

Q 19. If for a conic section a focus is (-1, 1), eccentricity = 3 and the equation of the corresponding directrix is x – y + 3 = 0 then the equation of the conic section is

(a) 7x2 – 18xy + 7y2 + 50x – 50y + 77 = 0 (b) 7x2 + 18xy + 7y2 = 1

(c) 7x2 + 18xy + 7y2 – 50x + 50y + 77 = 0 (d) none of these

Q 20. An ellipse having foci at (3, 1) and (1, 1) passes through the point (1, 3). Its eccentricity is

(a)  (b)  (c)  (d) 

Q 21. A point on the ellipse at a distance 2 from the centre of the ellipse has the eccentric angle

(a)  (b)  (c)  (d) 

Q 22. A point P on the ellipse has the eccentric angle . The sum of the distance of P from the two foci is

(a) 5 (b) 6 (c) 10 (d) 3

Q 23. If any point on a hyperbola has the coordinates (5tan φ, 4 sec φ) then the eccentricity of the hyperbola is

(a)  (b)  (c)  (d) 

Q 24. The slope of the diameter of the ellipse , whose length is the GM of the major and minor axes, is

(a)  (b)  (c)  (d) 

Q 25. PP’ is a diameter of the ellipse b2x2 + a2y2 = a2b2 such that PP’2 is the AM of the squares of the major and minor axes. Then the slope of PP’ is

(a)  (b)  (c)  (d) 

Q 26. P is a variable point on the ellipse whose foci are F1and F2. The maximum area (in unit)2 of the ΔPFF’ is

(a)  (b)  (c)  (d) 

Q 27. Which of the following points is an exterior point of the ellipse 16x2 + 9y2 – 16x – 32 = 0 ?

(a)  (b)  (c) (3, -2) (d) none of these

Q 28. For the hyperbola , which of the following remains constant when α varies ?

(a) abscissa of vertices (b) abscissa of foci (c) eccentricity (d) directrix

Q 29. The foci of the ellipse and the hyperbola coincide. Then the value of b2 is

(a) 5 (b) 7 (c) 9 (d) 1

Q 30. The equation of the tangent to the ellipse 4x2 + 3y2 = 12 at the point whose eccentric angle is is

(a)  (b)  (c)  (d) none of these

Q 31. The number of values of m for which the line touches the hyperbola 4(x2 – 1) = y2is

(a) two (b) zero (c) one (d) infinite

Q 32. The value of c for which the line y = 3x + c touches the ellipse 16x2 + y2 = 16 is

(a) 5 (b) 1 (c) 4 (d) 3

Q 33. The number of values of φ ∈ [0, 2π] for which the line 2x cos φ + 3y sin φ = 6 touches the ellipse 4x2 + 9y2 = 36 is

(a) four (b) two (c) one (d) infinite

Q 34. The line 3x + 5y = k is a tangent to the ellipse 16x2 + 25y2 = 400 if k is

(a)  (b)  (c)  (d) 

Q 35. The line px + qy = r touches the hyperbola b2x2 – a2y2 = a2b2 if

(a) a2p2 + b2q2 = r2 (b) a2p2 – b2q2 = r2 (c) a2q2 + b2p2 = r2 (d) a2q2 – b2p2 = r2

Q 36. The equation of the tangent to the ellipse , which is parallel to the line y = 3x, is

(a)  (b) y = 3x + 13 (c)  (d) none of these

Q 37. The equation of the tangent to the hyperbola x2 – 2y2 = 18, which is perpendicular to the line x – y = 0, is

(a) x + y = 3 (b) x + y + 2 = 0 (c) x + y =  (d) x + y + = 0

Q 38. If the tangents from the point (λ, 3) to the ellipse are at right angles then λ is

(a) ±1 (b) ±3 (c) ±2 (d) none of these

Q 39. A point on the ellipse x2 + 3y2 = 9, where the tangent is parallel to the line y – x = 0, is

(a)  (b)  (c)  (d) 

Q 40. The ordinate of the point of contact of a tangent is 2. Then the equation of the tangent to x2 + 4y2 = 25 is

(a) 3x + 8y = 25 (b) 8x + 3y = 25 (c) 3x – 8y = 25 (d) none of these

Q 41. The tangent to the ellipse 16x2 + 9y2 = 144, making equal intercepts on both the axes, is

(a) y = x + 3 (b) y = x − 2 (c) x + y = 5 (d) y = -x + 4

Q 42. If the tangent to the ellipse x2 + 4y2 = 16 at the point ‘φ’ is a normal to the circle x2 + y2 – 8x – 4y = 0 then φ is equal to

(a)  (b)  (c)  (d) 

Q 43. The area of the quadrilateral formed by tangents at the end points of latus recta of the ellipse is

(a)  (b)  (c)  (d) 

Q 44. The tangent at cos θ, sin θ) is drawn to the ellipse . Then the value of θ such that the sum of intercepts on axes made by the tangent is minimum is

(a)  (b)  (c)  (d) 

Q 45. The number of normals that can be drawn to the curve 4x2 + 9y2 = 36 from an external point, in general, is

(a) 1 (b) 3 (c) 4 (d) infinite

Q 46. The number of distinct normal lines from the exterior point (0, c), c > b, to the ellipse is

(a) 3 (b) 4 (c) 2 (d) 1

Q 47. The equation of the normal to the ellipse x2 + 4y2 = 16 at the end of the latus rectum in the first quadrant is

(a)  (b)  (c)  (d) none of these

Q 48. If the tangent and the normal to x2 – y2 = 4 at a point cut off intercepts a1, a2 on the x-axis respectively and b1, b2 on the y-axis respectively then the value of a1a2 + b1b2 is

(a) 1 (b) -1 (c) 0 (d) 4

Q 49. The normal to the rectangular hyperbola xy = c2 at the point ‘t1’ meets the curve again at the point ‘t2’. The value of is

(a) 1 (b) c (c) –c (d) -1

Q 50. If P and Q are the ends of a pair of conjugate diameter and C is the centre of the ellipse 4x2 + 9y2 = 36 then the area of the ΔCPQ is

(a) 6 unit2 (b) 3 unit2 (c) 2 unit2 (d) 12 unit2

Q 51. If y = x and 3y + 2x = 0 are the equations of a pair of conjugate diameters of the ellipse then its eccentricity is

(a)  (b)  (c)  (d) 

Q 52. The locus of a point P(α, β) moving under the condition that the line y = αx + β is a tangent to the hyperbola is

(a) a circle (b) an ellipse (c) a hyperbola (d) a parabola

**Choose the correct option. One or more option may be correct.**

Q 53. A focus of the hyperbola 25x2 – 36y2 = 225 is

(a)  (b)  (c)  (d) 

Q 54. The point P on the ellipse 4x2 + 9x2 = 36 is such that the area of the ΔPF1F2 = where F1, F2 are foci. Then P has the coordinates

(a)  (b)  (c)  (d) 

Q 55. A point on the ellipse x2 + 3y2 = 37, where the normal is parallel to the line 6x – 5y = 2, is

(a) (5, -2) (b) (5, 2) (c) (-5, 2) (d) (-5, -2)

**Answers**

1b 2a 3a 4c 5b 6a 7c 8b 9c 10d

11b 12a 13b 14a 15b 16b 17c 18a 19a 20a

21a 22c 23d 24c 25a 26a 27c 28b 29b 30b

31d 32a 33d 34c 35b 36a 37a 38c 39c 40a

41c 42a 43d 44b 45c 46d 47b 48c 49d 50b

51c 52c 53bd 54ad 55bd