Exercise-1

Marked Questions may have for Revision Questions.

OBJECTIVE QUESTIONS

PARABOLA

Section (A) : Elementary Concepts of Parabola

A-1. The equation of the parabola whose focus is $(-3, 0)$ and the directrix is, $x + 5 = 0$ is:

(1) $y^2 = 4(x-4)$ (2) $y^2 = 2(x+4)$ (3) $y^2 = 4(x-3)$ (4) $y^2 = 4(x+4)$

A-2. If (2, 0) is the vertex & y − axis is the directrix of a parabola, then its focus is:

(1) (2, 0) (2) (− 2, 0) (3) (4, 0) (4) (− 4, 0)

A-3. Length of the latus rectum of the parabola $25[(x-2)^2 + (y-3)^2] = (3x-4y+7)^2$ is:

(1) 4 (2) 2 (3) 1/5 (4) 2/5

A-4. The point on the parabola $y^2 = 12x$ whose focal distance is 4, are

(1) $\left(2, \sqrt{3}\right)$, $\left(2, -\sqrt{3}\right)$ (2) $\left(1, 2\sqrt{3}\right)$, $\left(1, -2\sqrt{3}\right)$

(3) (1, 2) (4) none of these

A-5. The latus rectum of a parabola whose directrix is $x + y - 2 = 0$ and focus is $(3, -4)$, is

(1) $-3\sqrt{2}$ (2) $3\sqrt{2}$ (3) $2\sqrt{2}$ (4) $3/\sqrt{2}$

A-6. A parabola is drawn with its focus at (3, 4) and vertex at the focus of the parabola $y^2 - 12x - 4y + 4 = 0$. The equation of the parabola is:

(1) $x^2 - 6x - 8y + 25 = 0$ (2) $y^2 - 8x - 6y + 25 = 0$

(3) $x^2 - 6x + 8y - 25 = 0$ (4) $x^2 + 6x - 8y - 25 = 0$

A-7. The length of the side of an equilateral triangle inscribed in the parabola, $y^2 = 4x$ so that one of its angular point is at the vertex is:

(1) $8\sqrt{3}$ (2) $6\sqrt{3}$ (3) $4\sqrt{3}$ (4) $2\sqrt{3}$

A-8. The ends of latus rectum of parabola $x^2 + 8y = 0$ are

(1) (–4, –2) and (4, 2) (2) (4, 2) and (–4, 2) (3) (–4, –2) and (4, –2) (4) (4, 2) and (4, –2)

A-9. The equation of the latus rectum of the parabola $x^2 + 4x + 2y = 0$ is

(1) $2y + 3 = 0$ (2) $3y = 2$ (3) $2y = 3$ (4) $3y = -2$

A-10. Vertex of the parabola $9x^2 - 6x + 36y + 9 = 0$ is

(1) $\left(\frac{1}{3}, -\frac{2}{9}\right)$ (2) $\left(-\frac{1}{3}, -\frac{1}{2}\right)$ (3) $\left(-\frac{1}{3}, \frac{1}{2}\right)$ (4) $\left(\frac{1}{3}, \frac{1}{2}\right)$

A-11. The focus of the parabola is (1, 1) and the tangent at the vertex has the equation $x + y = 1$. Then:

(1) length of the latus rectum is $2\sqrt{2}$

(2) equation of the parabola is $(x-y)^2 = 4(x+y-1)$

(3) the co-ordinates of the vertex are (1/2, 1/2)
(4) All of these

A-12. The focal distance of a point on the parabola $y^2 = 16x$ whose ordinate is twice the abscissa, is
(1) 6 (2) 8 (3) 10 (4) 12

A-13. Which one of the following equations parametrically represents equation to a parabolic profile?
(1) $x = 3\cos t;\ y = 4\sin t$ (2) $x^2 - 2 = -2\cos t;\ y = 4\cos^2\frac{t}{2}$
(3) $\sqrt{x} = \tan t;\ \sqrt{y} = \sec t$ (4) $x = \sqrt{1-\sin t}\ ;\ y = \sin\frac{t}{2} + \cos\frac{t}{2}$

A-14. The latus rectum of a parabola whose focal chord is PSQ such that SP = 3 and SQ = 2 is given by:
(1) 24/5 (2)) 12/5 (3) 6/5 (4) none of these

Section (B) : Position of point /Line, Chord

B-1. Point (2,3) lies
(1) In side the parabola $y^2 = 4x$ (2) In side the parabola $x^2 = 4y$
(3) On the parabola $y^2 = 4x$ (4) On the parabola $x^2 = 4y$

B-2. If the point $(\alpha - 1, \alpha)$ lies in side the parabola $x^2 = 4(y-1)$ then range of values of α is
(1) (1, 5) (2) (4, 7) (3) (2, 9) (4) (0, 4)

B-3. The length of chord intercepted on the line $2x + y = 2$ by the parabola $y^2 = 4x$, is
(1) 5 (2) 3 (3) 2 (4) 1

B-4. A variable chord PQ of the parabola, $y^2 = 4x$ is drawn parallel to the line $y = x$. If the parameters of the points P & Q on the parabola be p & q respectively, then (p + q) equal to.
(1) 1 (2) 1/2 (3) 2 (4) 4

B-5. The length of the chord of the parabola, $y^2 = 12x$ passing through the vertex & making an angle of 60º with the axis of x is:
(1) 8 (2) 4 (3) 16/3 (4) none of these

B-6. If one end of a focal chord of the parabola $y^2 = 4x$ is (1, 2), the other end is
(1) (1, – 2) (2) (2, 2) (3) (2, 1) (4) (–2, –1)

B-7. In the parabola $y^2 = 6x$, the equation of the chord through vertex and negative end of latus rectum, is
(1) $y = 2x$ (2) $y + 2x = 0$ (3) $y + 3x = 0$ (4) $x + 2y = 0$

Section-(C) : Tangent of Parabola

C-1. The value λ such that line $y = x + \lambda$ is tangent to the parabola $y^2 = 8x$
(1) 2 (2) 4 (3) 6 (4) 8

C-2. If $y = 2x - 3$ is a tangent to the parabola $y^2 = 4a\left(x - \frac{1}{3}\right)$, then 'a' is equal to:
(1) 1 (2) -1 (3) $\frac{14}{3}$ (4) $\frac{-14}{3}$

C-3. The equation of the tangent to the parabola $y = (x - 3)^2$ parallel to the chord joining the points (3, 0)

and (4, 1) is:
(1) $2x - 2y + 6 = 0$ (2) $2y - 2x + 6 = 0$ (3) $4y - 4x + 11 = 0$ (4) $4x - 4y = 13$

C-4. The value of a such that line $\frac{y}{a+3} = \frac{x}{a} - 1$ is tangent to the parabola $y^2=6x$, parallel to the line x+ y= 4.
(1) – 4 (2) – 3 (3) $-\frac{3}{2}$ (4) – 2

C-5. The tangent drawn at any point P to the parabola $y^2 = 4ax$ meets the directrix at the point K, then angle which KP subtends at its focus is
(1) 30º (2) 45º (3) 60º (4) 90º

C-6. Equation of a tangent to the parabola $y^2 = 12x$ which make an angle of 45° with line y = 3x + 77 is
(1) 2x – 4y + 3 = 0 (2) x + 2y + 12 = 0 (3) 4x + 2y + 3 = 0 (4) 2x + y – 12 = 0

C-7. The point where the tangent to the parabola $y^2 = 7x$ which is parallel to the straight line 4y – x + 3 = 0 touches the parabola is
(1) (28, 14) (2) (2, 3) (3) (–2, 1) (4) (0, 1)

C-8. The mirror image of the parabola $y^2 = 4x$ in the tangent to the parabola at the point (1, 2) is
(1) $(x - 1)^2 = 4(y - 2)$ (2) $(x + 3)^2 = 4(y + 2)$ (3) $(x + 1)^2 = 4(y - 1)$ (4) $(x - 1)^2 = 4(y - 1)$

C-9. The equation of tangent to the parabola $y^2 = 9x$, which pass through the point (4, 10) is
(1) 4y = 9x + 4 (2) 4y = x – 36 (3) y = x + 36 (4) 4y = x + 32

Section-(D) : Normal, Pair of tangents, Director circle, Chord of conctact,chord with given mid point

D-1. The equation of director circle of the parabola $y^2 = 10(x - 1)$
(1) $x^2 + y^2 - 2x - 4y + 4 = 0$ (2) 2x + 3 = 0
(3) 2x + 5 = 0 (4) $x^2 + y^2 - 4x + 2y + 2 = 0$

D-2. Equation of the normal to the parabola, $y^2 = 4ax$ at its point $(am^2, 2am)$ is:
(1) $y = -mx + 2am + am^3$ (2) $y = mx - 2am - am^3$
(3) $y = mx + 2am + am^3$ (4) none

D-3. At what point on the parabola $y^2 = 4x$ the normal makes equal angles with the axes?
(1) (4, 4) (2) (9, 6) (3) (4, – 1) (4) (1, 2)

D-4. The line 2x + y + λ = 0 is a normal to the parabola $y^2 = -8x$, then λ is
(1) 12 (2) – 12 (3) 24 (4) – 24

D-5. The distance between a tangent to the parabola $y^2 = 4Ax$ (A > 0) and the parallel normal with gradient 1 is :
(1) 4 A (2) $2\sqrt{2}$ A (3) 2 A (4) $\sqrt{2}$ A

D-6. If a line x + y = 1 cut the parabola $y^2 = 4ax$ in points A and B and normals drawn at A and B meet at C. The normal to the parabola from C other, than above two meet the parabola in D, then point D is
(1) (a, a,) (2) (2a, 2a) (3) (3a, 3a) (4) (4a, 4a)

D-7. Number of distinct normals of a parabola passing through the focus of the parabola is
(1) 0 (2) 1 (3) 2 (4) 3

D-8. If y = 2x + c – 4 is a normal to the parabola $y^2 = 4x$, then value of 'c' is

(1) 8 (2) – 8 (3) 12 (4) – 12

D-9. The equation of tangent drawn from the point (2,3) to the parabola $y^2 = 4x$,are
(1) $x-y+1 = 0$, $x+2y = 4$ (2) $x+y-1= 0$, $x+2y +4 = 0$
(3) $x-y+1= 0$, $x-2y +4 = 0$ (4) $x+y-1= 0$, $x+2y - 4 = 0$

D-10. The angle between the tangents drawn from a point (– a, 2a) to $y^2 = 4$ ax is
(1) $\frac{\pi}{4}$ (2) $\frac{\pi}{2}$ (3) $\frac{\pi}{3}$ (4) $\frac{\pi}{6}$

D-11. The angle between the tangents drawn from a point (– a, 2a) to $y^2 = 4$ ax is
(1) $\frac{\pi}{4}$ (2) $\frac{\pi}{2}$ (3) $\frac{\pi}{3}$ (4) $\frac{\pi}{6}$

D-12. The line $4x - 7y + 10 = 0$ intersects the parabola, $y^2 = 4x$ at the points A & B. The co-ordinates of the point of intersection of the tangents drawn at the points A & B are:
(1) $\left(\frac{7}{2}, \frac{5}{2}\right)$ (2) $\left(-\frac{5}{2}, -\frac{7}{2}\right)$ (3) $\left(\frac{5}{2}, \frac{7}{2}\right)$ (4) $\left(-\frac{7}{2}, -\frac{5}{2}\right)$

D-13. The feet of the perpendicular drawn from focus upon any tangent to the parabola, $y = x^2 - 2x - 3$ lies on
(1) $y + 4 = 0$ (2) $y = 0$ (3) $y = -2$ (4) $y + 1 = 0$

D-14. The locus of the middle points of the focal chords of the parabola, $y^2 = 4x$ is:
(1) $y^2 = x - 1$ (2) $y^2 = 2 (x - 1)$ (3) $y^2 = 2 (1 - x)$ (4) none of these

D-15. The equaton of chord of parabola $y^2=4x$ whose midpoint is (2,2)
(1) $2x - 2y + 5= 0$ (2) $y=x$ (3) $2y + 2x + 5= 0$ (4) $2y - 2x + 5= 0$

ELLIPSE

Section (A) : Standard

A-1. Eccentricity of the conic $\frac{x^2}{4} + \frac{y^2}{9} = 1$ is
(1) $\frac{\sqrt{2}}{3}$ (2) $\frac{\sqrt{5}}{3}$ (3) $\frac{\sqrt{7}}{3}$ (4) $\frac{1}{2}$

A-2. The focii of the ellipse $\frac{x^2}{25} + \frac{y^2}{9} = 1$ are
(1) (±4, 0) (2) (±3,0) (3) (± 5,0) (4) (±2,0)

A-3. The equation of the ellipse whose focus is (1, –1), directrix is the line $x - y - 3 = 0$ and the eccentricity is $\frac{1}{2}$, is
(1) $7x^2 + 2xy + 7y^2 - 10x + 10y + 7 = 0$ (2) $7x^2 + 2xy + 7y^2 + 7 = 0$
(3) $7x^2 + 2xy + 7y^2 + 10x - 10y - 7 = 0$ (4) none of these

A-4. The eccentricity of the ellipse $4x^2 + 9y^2 + 8x + 36y + 4 = 0$ is
(1) $\frac{5}{6}$ (2) $\frac{3}{5}$ (3) $\frac{\sqrt{2}}{3}$ (4) $\frac{\sqrt{5}}{3}$

A-5. If distance between the directrices be thrice the distance between the focii, then eccentricity of ellipse is

(1) $\frac{1}{2}$ (2) $\frac{2}{3}$ (3) $\frac{1}{\sqrt{3}}$ (4) $\frac{4}{5}$

A-6. The length of the latus rectum of the ellipse $9x^2 + 4y^2 = 1$, is

(1) $\frac{3}{2}$ (2) $\frac{8}{3}$ (3) $\frac{4}{9}$ (4) $\frac{8}{9}$

A-7. The eccentricity of the ellipse which meets the straight line $\frac{x}{7} + \frac{y}{2} = 1$ on the axis of x and the straight line $\frac{x}{3} - \frac{y}{5} = 1$ on the axis of y and whose axes lie along the axes of coordinates is

(1) $\frac{\sqrt{6}}{7}$ (2) $\frac{4\sqrt{6}}{7}$ (3) $\frac{2\sqrt{6}}{5}$ (4) $\frac{2\sqrt{6}}{7}$

A-8. Let P be a variable point on the ellipse $\frac{x^2}{25} + \frac{y^2}{16} = 1$ with focii at S and S'. If A be the area of triangle PSS', then the maximum value of A is

(1) 24 sq. units (2) 12 sq. units (3) 36 sq. units (4) none of these

A-9. Equation of the ellipse whose foci are (2, 2) and (4, 2) and the major axis is of length 10 is

(1) $\frac{(x+3)^2}{4} + \frac{(y+2)^2}{5} = 1$ (2) $\frac{(x+3)^2}{24} + \frac{(y+2)^2}{25} = 1$

(3) $\frac{(x+3)^2}{25} + \frac{(y+2)^2}{24} = 1$ (4) $\frac{(x-3)^2}{25} + \frac{(y-2)^2}{24} = 1$

A-10. The length of the axes of the conic $9x^2 + 4y^2 - 6x + 4y + 1 = 0$, are

(1) $\frac{1}{2}$, 9 (2) 3, $\frac{2}{5}$ (3) 1, $\frac{2}{3}$ (4) 3, 2

A-11. The equation $\frac{x^2}{2-r} + \frac{y^2}{r-5} + 1 = 0$ represents an ellipse, if -

(1) $r > 2$ (2) $2 < r < 5$ (3) $r > 5$ (4) $r \in \{2, 5\}$

A-12. An ellipse has OB as semi-minor axis, F and F' are its foci and $\angle FBF'$ is a right angle then eccentricity of the ellipse is

(1) $\frac{1}{2}$ (2) $\frac{1}{\sqrt{2}}$ (3) $\frac{2}{3}$ (4) $\frac{1}{3}$

A-13. The eccentricity of an ellipse in which distance between their focii is 10 and that of focus and corresponding directrix is 15 is

(1) $\frac{1}{3}$ (2) $\frac{1}{2}$ (3) $\frac{1}{4}$ (4) $\frac{1}{\sqrt{2}}$

A-14. If $P = (x, y)$, $F_1 = (3, 0)$, $F_2 = (-3, 0)$ and $16x^2 + 25y^2 = 400$, then $PF_1 + PF_2$ equals

(1) 8 (2) 6 (3) 10 (4) 12

A-15. If focus and corresponding directrix of an ellipse are (3, 4) and x + y – 1 = 0 and eccentricity $\frac{1}{2}$ is then the co-ordinates of extremities of major axis are
(1) (2, 3), (4, 7) (2) (6, 7), (2, 3) (3) (1, 3), (2, 3) (4) (4, 7), (6, 7)

A-16. The equation, $3x^2 + 4y^2 - 18x + 16y + 43 = C$.
(1) cannot represent a real pair of straight lines for any value of C
(2) represents an ellipse, if C > 0
(3) no locus, if C < 0
(4) all of these

A-17. The distance of the point 'θ' on the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ from a focus is
(1) a(e + cos θ) (2) a(e – cos θ) (3) a(1 + e cos θ) (4) a(1 + 2e cos θ)

A-18. The curve represented by x = 3 (cos t + sin t), y = 4 (cos t – sin t), is
(1) ellipse (2) parabola (3) hyperbola (4) circle

Section (B) : Position of Point, Chord/Tangent of Ellipse

B-1. The position of point (4, 3) with respect to the ellipse $\frac{x^2}{8} + \frac{y^2}{9} = 1$ is
(1) Out side the ellipse (2) In side the ellipse
(3) On the ellipse (4) On the major axis of ellipse

B-2. The position of the point (1, 3) with respect to the ellipse $4x^2 + 9y^2 - 16x - 54y + 61 = 0$ is
(1) outside the ellipse (2) on the ellipse (3) on the major axis (4) on the minor axis

B-3. If the line y = 2x + c be a tangent to the ellipse $\frac{x^2}{8} + \frac{y^2}{4} = 1$, then c is equal to
(1) ± 4 (2) ± 6 (3) ± 1 (4) ± 8

B-4. If the line $3x + 4y = -\sqrt{7}$ touches the ellipse $3x^2 + 4y^2 = 1$ then, the point of contact is
(1) $\left(\frac{1}{\sqrt{7}}, \frac{1}{\sqrt{7}}\right)$ (2) $\left(\frac{1}{\sqrt{3}}, \frac{-1}{\sqrt{3}}\right)$ (3) $\left(\frac{1}{\sqrt{7}}, \frac{-1}{\sqrt{7}}\right)$ (4) $\left(\frac{-1}{\sqrt{7}}, \frac{-1}{\sqrt{7}}\right)$

B-5 The equation of tangent to the ellipse $\frac{x^2}{50} + \frac{y^2}{32} = 1$ which passes through a point (15, – 4) is
(1) 4x + 5y = 40 (2) 4x + 35y = 200 (3) 4x – 5y = 40 (4) none of these

B-6. The tangents at the point P on the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ and its corresponding point Q on the auxiliary circle meet on the line :
(1) x = a/e (2) x = 0 (3) y = 0 (4) x = –a/e

B-7. If $\frac{x}{a} + \frac{y}{b} = \sqrt{2}$ touches the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ at a point P, then eccentric angle of P is
(1) 0 (2) 45° (3) 60° (4) 90°

B-8. The equation of the tangents drawn at the ends of the major axis of the ellipse $9x^2 + 5y^2 - 30y = 0$, are

(1) $y = \pm 3$ (2) $x = \pm\sqrt{5}$ (3) $y = 0, y = 6$ (4) none of these

B-9. The minimum area of triangle formed by the tangent to the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ and coordinate axes is

(1) ab sq. units (2) $\frac{a^2+b^2}{2}$ sq. unit

(3) $\frac{(a+b)^2}{2}$ sq. units (4) $\frac{a^2+ab+b^2}{3}$ sq. units

Section (C) : Normal, Pair of Tangents, Director circle, Chord of conctact, chord with given mid point of ellipse

C-1. The value of λ, for which the line $2x - \frac{8}{3}\lambda y = -3$ is a normal to the conic $x^2 + \frac{y^2}{4} = 1$ is

(1) $\pm\frac{\sqrt{3}}{2}$ (2) $\pm\frac{1}{2}$ (3) $-\frac{\sqrt{3}}{4}$ (4) $\pm\frac{3}{8}$

C-2. The eccentric angle of the point where the line, $5x - 3y = 8\sqrt{2}$ is a normal to the ellipse $\frac{x^2}{25} + \frac{y^2}{9} = 1$ is

(1) $\frac{\pi}{4}$ (2) $\frac{\pi}{2}$ (3) $\frac{\pi}{3}$ (4) $\frac{\pi}{6}$

C-3. The equation of the normal to the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ at the positive end of latus rectum is

(1) $x + ey + e^2a = 0$ (2) $x - ey - e^3a = 0$ (3) $x - ey - e^2a = 0$ (4) none of these

C-4. If the normal at the point P(θ) to the ellipse $\frac{x^2}{14} + \frac{y^2}{5} = 1$ intersects it again at the point Q(2θ), then cosθ is equal to

(1) $\frac{2}{3}$ (2) $-\frac{2}{3}$ (3) $\frac{3}{2}$ (4) $-\frac{3}{2}$

C-5. If the normal at an end of a latus-rectum of an ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ passes through one extremity of the minor axis, then the eccentricity of the ellipse is given by the relation

(1) $e^4 + 2e^2 - 4 = 0$ (2) $e^4 + e^2 - 1 = 0$ (3) $e^4 + e^2 - \frac{3}{2} = 0$ (4) $e^4 - e^2 - 1 = 0$

C-6. The pair of tangents drawn from the point (4,3) to the ellipse $\frac{x^2}{16} + \frac{y^2}{9} = 1$ is

(1) $3x + 4y - xy - 12 = 0$ (2) $x^2 + y^2 - 3x + 4y - 12 = 0$

(3) $4x + 3y + xy + 12 = 0$ (4) $x^2 + y^2 + 2xy + 2x + 2y + 1 = 0$

C-7. Equation of director circle of the ellipse $\frac{x^2}{25} + \frac{y^2}{16} = 1$

(1) $x^2 + y^2 = 25$ (2) $x^2 + y^2 = 16$ (3) $x^2 + y^2 = 41$ (4) $x^2 + y^2 = 9$

C-8. A triangle ABC right angled at 'A' moves so that its sides touch the curve $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ all the time. The locus of the point 'A' is

(1) $x^2 + y^2 = 2a^2$ (2) $x^2 + y^2 = 2b^2$ (3) $x^2 + y^2 = a^2 + b^2$ (4) none of these

C-9. If $3x + 4y = 12$ intersect the ellipse $\frac{x^2}{25}+\frac{y^2}{16}=1$ at P and Q, then the point of intersection of tangents at P and Q is

(1) (0, 1) (2) (1, –2) (3) $\left(\frac{25}{4},\frac{16}{3}\right)$ (4) $\left(-\frac{25}{4},\frac{16}{3}\right)$

C-10. The angle between the pair of tangents drawn to the ellipse $3x^2 + 2y^2 = 5$ from the point (1, 2) is

(1) $\tan^{-1}\left(\frac{12}{5}\right)$ (2) $\tan^{-1}(6\sqrt{5})$ (3) $\tan^{-1}\left(\frac{12}{\sqrt{5}}\right)$ (4) $\tan^{-1}(12\sqrt{5})$

C-11. If F_1 & F_2 are the feet of the perpendiculars from the focii S_1 & S_2 of an ellipse $\frac{x^2}{5}+\frac{y^2}{3}=1$ on the tangent at any point P on the ellipse, then $(S_1F_1).(S_2F_2)$ is equal to :

(1) 2 (2) 3 (3) 4 (4) 5

C-12. A ray emanating from (6, 2) is incident on ellipse $\frac{(x-1)^2}{45}+\frac{(y-2)^2}{20}=1$ at (4, 6). The equation of reflected ray (after 1st reflection) is

(1) $x – 2y + 8 = 0$ (2) $x + 2y + 8 = 0$ (3) $x + 2y – 8 = 0$ (4) $x – 2y – 8 = 0$

C-13. The equation of chord of the ellipse $2x^2+y^2= 2$ whose midpoint is $\left(\frac{1}{2},1\right)$

(1) $x+y = \frac{3}{2}$ (2) $2x+y = \frac{3}{2}$ (3) $x+2y = \frac{5}{2}$ (4) $x+y = \frac{5}{2}$

HYPERBOLA

Section- (A) : Elementary Concepts of Hyperbola/Conjugate/ Rectangular Hyperbola($xy= c_2$)

A-1. The eccentricity of the conic represented by $x^2 – y^2 – 4x + 4y + 16 = 0$ is

(1) 1 (2) $\sqrt{2}$ (3) 2 (4) 1/2

A-2. Which of the following pair, may represent the eccentricities of two conjugate hyperbolas, for all $\alpha \in (0, \pi/2)$?

(1) sin α, cos α (2) tan α, cot α (3) sec α, cosec α (4) 1 + sin α, 1 + cos α

A-3. The length of latus rectum of the hyperbola $\frac{x^2}{9}-\frac{y^2}{16}=1$, is

(1) $\frac{16}{3}$ (2) $\frac{32}{3}$ (3) 8 (4) 6

A-4. The eccentricity of the hyperbola whose latus rectum is 8 and conjugate axis is equal to half the distance between the focii, is :

(1) $\frac{4}{3}$ (2) $\frac{4}{\sqrt{3}}$ (3) $\frac{2}{\sqrt{3}}$ (4) none of these

A-5. The equation of the hyperbola whose conjugate axis is 5 and the distance between the focii is 13, is
(1) $25x^2 - 144y^2 = 900$ (2) $144x^2 - 25y^2 = 900$
(3) $144x^2 + 25y^2 = 990$ (4) $25x^2 + 144y^2 = 900$

A-6. The length of the transverse axis of a hyperbola is 7 and it passes through the point (5, –2). The equation of the hyperbola is
(1) $\frac{4}{49}x^2 - \frac{196}{51}y^2 = 1$ (2) $\frac{4}{49}x^2 - \frac{196}{51}y^2 = 1$ (3) $\frac{4}{49}x^2 - \frac{51}{196}y^2 = 1$ (4) None of these

A-7. The equation of the hyperbola whose directrix is x + 2y = 1, focus (2,1) and eccentricity 2 will be
(1) $x^2 - 16xy - 11y^2 - 12x + 6y + 21 = 0$ (2) $3x^2 + 16xy + 15y^2 - 4x - 14y - 1 = 0$
(3) $3x^2 + 16xy + 11y^2 - 12x - 6y + 21 = 0$ (4) None of these

A-8. The vertices of a hyperbola are at (0, 0) and (10, 0) and one of its foci is at (18, 0). The equation of the hyperbola is
(1) $\frac{x^2}{25} - \frac{y^2}{144} = 1$ (2) $\frac{(x-5)^2}{25} - \frac{y^2}{144} = 1$ (3) $\frac{x^2}{25} - \frac{(y-5)^2}{144} = 1$ (4) $\frac{(y-5)^2}{25} - \frac{y^2}{144} = 1$

A-9. The equation of the directrices of the conic $x^2 + 2x - y^2 + 5 = 0$ are
(1) $x = \pm 1$ (2) $y = \pm 2$ (3) $y = \pm\sqrt{2}$ (4) $x = \pm\sqrt{3}$

A-10. If e and e' are the eccentricities of the ellipse $5x^2 + 9y^2 = 45$ and the hyperbola $5x^2 - 4y^2 = 45$ respectively then ee' =
(1) – 1 (2) 1 (3) – 4 (4) 9

A-11. The equation of auxilary circle of hyperbola $\frac{x^2}{9} - \frac{y^2}{16} = 1$
(1) $x^2 + y^2 = 9$ (2) $x^2 + y^2 = 16$ (3) $x^2 + y^2 = 41$ (4) $x^2 + y^2 = 7$

A-12. An ellipse and a hyperbola have the same centre origin, the same foci and the minor-axis of the one is the same as the conjugate axis of the other. If e_1, e_2 be their eccentricities respectively, then $\frac{1}{e_1^2} + \frac{1}{e_2^2} =$
(1) 1 (2) 2 (3) 4 (4) none of these

A-13. If e and e' are the eccentricities of the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ and $\frac{y^2}{b^2} - \frac{x^2}{a^2} = 1$, then the point $\left(\frac{1}{e}, \frac{1}{e'}\right)$ lies on the circle :
(1) $x^2 + y^2 = 1$ (2) $x^2 + y^2 = 2$ (3) $x^2 + y^2 = 3$ (4) $x^2 + y^2 = 4$

A-14. If P ($\sqrt{2}\sec\theta$, $\sqrt{2}\tan\theta$) is a point on the hyperbola whose distance from the origin is $\sqrt{6}$ where P is in the first quadrant then θ =
(1) $\frac{\pi}{4}$ (2) $\frac{\pi}{3}$ (3) $\frac{\pi}{6}$ (4) None of these

A-15. Foci of the hyperbola $\frac{x^2}{16} - \frac{(y-2)^2}{9} = 1$ are
(1) (5, 2), (–5, 2) (2) (5, 2), (5.–2) (3) (5, 2), (–5, –2) (4) None of these

A-16. The ellipse $\frac{x^2}{25}+\frac{y^2}{16}=1$ and the hyperbola $\frac{x^2}{25}-\frac{y^2}{16}=1$ have in common
(1) centre only
(2) centre, foci and directries
(3) Centre, foci and vertices
(4) centre and vertices only

A-17. If the normal at $\left(ct, \frac{c}{t}\right)$ on the curve xy = c^2 meets the curve again at t', then
(1) $t' = -\frac{1}{t^3}$
(2) $t' = \frac{1}{t}$
(3) $t' = \frac{1}{t^2}$
(4) $t'^2 = -\frac{1}{t^2}$

A-18. If (λ, 4) is the orthocentre of the triangle whose vertices lie on the rectangular hyperbola xy = 16, then λ is equal to
(1) 3
(2) 4
(3) 12
(4) 8

A-19. If (5, 12) and (24, 7) are the focii of a conic passing through the origin then the eccentricity of conic is
(1) $\sqrt{386}/12$
(2) $\sqrt{386}/13$
(3) $\sqrt{386}/25$
(4) $\sqrt{386}/38$ or ;k $\sqrt{386}/12$

Section-(B) : Position of Point/Line, Tangent, Chord of hyperbola

B-1. The line x + y = a touches the hyperbola $x^2 - 2y^2 = 18$, if a is equal to ± b, then value of | b | is
(1) 3
(2) 4
(3) 12
(4) 8

B-2. Equation of a tangent passing through (2, 8) to the hyperbola $5x^2 - y^2 = 5$ is :
(1) $3x - y + 2 = 0$
(2) $3x + y - 14 = 0$
(3) $23x + 3y - 22 = 0$
(4) $3x - 23y + 178 = 0$

B-3. Tangent at any point on the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ cut the axes at A and B respectively. If the rectangle OAPB (where O is origin) is completed then locus of point P is given by
(1) $\frac{a^2}{x^2} - \frac{b^2}{y^2} = 1$
(2) $\frac{a^2}{x^2} + \frac{b^2}{y^2} = 1$
(3) $\frac{a^2}{y^2} - \frac{b^2}{x^2} = 1$
(4) none of these

B-4. The number of possible tangents which can be drawn to the curve $4x^2 - 9y^2 = 36$, which are perpendicular to the straight line 5x + 2y −10 = 0 is :
(1) zero
(2) 1
(3) 2
(4) 4

B-5. The equation of the tangent lines to the hyperbola $x^2 - 2y^2 = 18$ which are perpendicular to the line y = x are :
(1) y = – x + 7
(2) y = x + 3
(3) y = – x – 4
(4) y = – x ± 3

B-6. Number of non-negative integral values of b for which tangent parallel to line y = x + 1 can be drawn to hyperbola
$\frac{x^2}{5} - \frac{y^2}{b^2} = 1$ is
(1) 16
(2) 2
(3) 3
(4) 4

B-7. An equation of a tangent to the hyperbola, $16x^2 - 25y^2 - 96x + 100y - 356 = 0$ which makes an angle $\frac{\pi}{4}$ with the transverse axis is $y = x + \lambda$, $(\lambda > 0)$, then 2λ is

(1) 16 (2) 4 (3) 3 (4) 9

B-8. If (a sec θ, b tan θ) and (a secφ, b tan φ) are the ends of a focal chord of $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$, then $\tan\frac{\theta}{2}\tan\frac{\phi}{2}$ equals to

(1) $\frac{e-1}{e+1}$ (2) $\frac{e+1}{e-1}$ (3) $\frac{1+e}{1-e}$ (4) none of these

B-9. The locus of the middle points of chords of hyperbola $3x^2 - 2y^2 + 4x - 6y = 0$ parallel to $y = 2x$ is

(1) $3x - 4y = 4$ (2) $3y - 4x + 4 = 0$ (3) $4x - 4y = 3$ (4) $3x - 4y = 2$

B-10. The chords passing through L(2, 1) intersects the hyperbola $\frac{x^2}{16} - \frac{y^2}{9} = 1$ at P and Q. If the tangents at P and Q intersects at R then Locus of R is

(1) $x - y = 1$ (2) $9x - 8y = 72$ (3) $x + y = 3$ (4) None of these

Section- (C): Normal/Director Circle / Chord of Contact/Chord with given midpoint/ pair of tangent of hyperbola

C-1. The tangents from $(1, 2\sqrt{2})$ to the hyperbola $16x^2 - 25y^2 = 400$ include between them an angle equal to:

(1) $\frac{\pi}{6}$ (2) $\frac{\pi}{4}$ (3) $\frac{\pi}{3}$ (4) $\frac{\pi}{2}$

C-2. The number of points from where a pair of perpendicular tangents can be drawn to the hyperbola, $x^2 \sec^2\alpha - y^2 \operatorname{cosec}^2\alpha = 1$, $\alpha \in (0, \pi/4)$, is :

(1) 0 (2) 1 (3) 2 (4) infinite

C-3. The product of the lengths of the perpendiculars from the two focii on any tangent to the hyperbola $\frac{x^2}{25} - \frac{y^2}{3} = 1$ is $\sqrt{k}$, then k is

(1) 16 (2) 4 (3) 3 (4) 9

C-4. The equation to the locus of the feet of the perpendicular from the focus of the hyperbola $4x^2 - 9y^2 = 36$ upon any of its tangent has the equation

(1) $x^2 + y^2 = 9$ (2) $x^2 + y^2 = 4$ (3) $x^2 + y^2 = 1$ (4) $x^2 + y^2 = 16$

C-5. From Point p(2,3) two tangents PA and PB are drawn to the hyperbola $x^2-y^2 - 4x+4y + 16 = 0$. The equation of line AB is

(1) $y = 3$ (2) $y = 2$ (3) $x = 1$ (4) $x = 3$

C-6. The equation of chord of the hyperbola $x^2-2y^2 = 2$ whose midpoint is (3,1)

(1) $3x -2y+7 = 0$ (2) $2x -3y+7 = 0$ (3) $2x -3y=7$ (4) $3x -2y=7$

Section-(D): Problems involving more than one conic

D-1. $x - 2y + 4 = 0$ is a common tangent to $y^2 = 4x$ & $\frac{x^2}{4} + \frac{y^2}{b^2} = 1$. Then the value of 'b' and the other common tangent are respectively

(1) $b = \sqrt{3}$; $x + 2y + 4 = 0$ (2) $b = 3$; $x + 2y + 4 = 0$

(3) $b = \sqrt{3}$; $x + 2y - 4 = 0$ (4) $b = \sqrt{3}$; $x - 2y - 4 = 0$

D-2. The equation of common tangent of $x^2 + y^2 = 2$ and $y^2 = 8x$ is

(1) $x - y + 2 = 0$ (2) $x + y + 1 = 0$ (3) $x - y + 1 = 0$ (4) $x + y - 2 = 0$

D-3. The line $y = x$ intersects the hyperbola $\frac{x^2}{9} - \frac{y^2}{25} = 1$ at the points P and Q. The eccentricity of ellipse with PQ as major axis and miror axis of length $\frac{5}{\sqrt{2}}$ is

(1) $\frac{\sqrt{5}}{3}$ (2) $\frac{5}{\sqrt{3}}$ (3) $\frac{5}{9}$ (4) $\frac{2\sqrt{2}}{3}$

D-4. The equation of common normal to the circle $x^2 + y^2 - 12x + 16 = 0$ and parabola $y^2 = 4x$ is

(1) $y = 0$ (2) $2x - y = 12$ (3) $2x + y = 12$ (4) All of the above

D-5. Equation of common tangent to circle $x^2 + y^2 = 5$ and ellipse $x^2 + 9y^2 = 9$ is

(1) $x - y + \sqrt{10} = 0$ (2) $x + y = \sqrt{10}$ (3) $x - y = \sqrt{10}$ (4) All of the above

D-6. Equation of common tangent to ellipse $5x^2 + 2y^2 = 10$, and hyperbola $11x^2 - 3y^2 = 33$ is

(1) $y = \pm 3x \pm 21$ (2) $y = \pm x \pm 3$ (3) $y = \pm 4x \pm 37$ (4) $3x \pm y = 12$

D-7. If latus rectum of ellipse $\frac{x^2}{25} + \frac{y^2}{16} = 1$ is double ordiante of parabola $y^2 = 4ax$ value of a is

(1) $\frac{64}{25}$ (2) $\frac{25}{64}$ (3) $\frac{64}{50}$ (4) $\frac{64}{75}$

D-8. The equation of common tangent to the parabola $y^2 = 8x$ and hyperbola $3x^2 - y^2 = 3$ is

(1) $2x \pm y + 1 = 0$ (2) $2x \pm y - 1 = 0$ (3) $x \pm 2y + 1 = 0$ (4) $x \pm 2y - 1 = 0$

Exercise-2

Marked Questions may have for Revision Questions.

*** Marked Questions may have more than one correct option.**

PART - I : OBJECTIVE QUESTIONS

1. The focus of the parabola $x^2 + 2y - 3x + 5 = 0$ is

(1) $\left(\frac{3}{2}, -\frac{15}{8}\right)$ (2) $\left(\frac{3}{2}, \frac{15}{8}\right)$ (3) $\left(-\frac{3}{2}, \frac{15}{8}\right)$ (4) $\left(-\frac{3}{2}, -\frac{15}{8}\right)$

2. Length of the focal chord of the parabola $y^2 = 4ax$ at a distance p from the vertex is:

(1) $\frac{2a^2}{p}$ (2) $\frac{a^3}{p^2}$ (3) $\frac{4a^3}{p^2}$ (4) $\frac{p^2}{a}$

3. If the segment intercepted by the parabola $y^2 = 4ax$ with the line $\ell x + my + n = 0$ subtends a right angle at the vertex, then

(1) $4a\ell + n = 0$ (2) $4a\ell + 4am + n = 0$ (3) $4am + n = 0$ (4) None of these

4. The tangents at the extremities of a focal chord of a parabola

(1) intersect at the vertex (2) are parallel

(3) intersect on the directrix (4) none of these

5. The locus of the mid point of the focal radii of a variable point moving on the parabola, $y^2 = 4ax$ is a parabola whose

(1) Latus rectum is half the latus rectum of the original parabola

(2) Vertex is (a/2, 0)

(3) Directrix is y-axis

(4) All of these

6. Let $y^2 = 4ax$ be a parabola and $x^2 + y^2 + 2bx = 0$ be a circle. If parabola and circle touch each other externally then:

(1) $a > 0, b > 0$ (2) $a > 0, b < 0$ (3) $a < 0, b > 0$ (4) $ab > 0$

7. Length of common chord of the parabolas $x^2 = 4y$ and $y^2 = 4x$ is

(1) 4 (2) $4\sqrt{3}$ (3) $4\sqrt{2}$ (4) 2

8. The circle $x^2 + y^2 = 5$ meets the parabola $y^2 = 4x$ at P & Q. Then the length PQ is equal to

(1) 1 (2) 2 (3) 3 (4) 4

9. The circles on focal radii of a parabola as diameter touch:

(1) the tangent at the vertex (2) the axis

(3) the directrix (4) none of these

10. A circle described on any focal chord of the parabola, $y^2 = 4ax$ as its diameter will touch

(1) the axis of the parabola

(2) the directrix of the parabola

(3) the tangent drawn at the vertex of the parabola

(4) latus rectum

11. The distance between the directrices of the ellipse $\frac{x^2}{36} + \frac{y^2}{20} = 1$ is

(1) 18 (2) 9 (3) 27 (4) 5

12. If the eccentricity of an ellipse be $\frac{5}{8}$ and the distance between its focii be 10, then its latus rectum is

(1) $\frac{39}{4}$ (2) $\frac{39}{8}$ (3) $\frac{39}{2}$ (4) $\frac{\sqrt{39}}{2}$

13. If the distance between a focus and corresponding directix of an ellipse be 8 and the eccentricity be $\frac{1}{2}$, then length of the semi minor axis is

(1) $\frac{8}{\sqrt{3}}$ (2) $\frac{4}{\sqrt{3}}$ (3) $8\sqrt{3}$ (4) $4\sqrt{3}$

14. Sum of distances of a point on the ellipse $\frac{x^2}{9} + \frac{y^2}{16} = 1$ from the focii is

(1) 2 (2) 4 (3) 8 (4) 16

15. Equation of circle centered at extremity of positive minor axis and passing through the focus (on positive x-axis) of the ellipse $\frac{x^2}{16} + \frac{y^2}{9} = 1$ is

(1) $x^2 + y^2 - 6y - 7 = 0$ (2) $x^2 + y^2 - 6y = 0$

(3) $x^2 + y^2 - 6y - 16 = 0$ (4) $x^2 + y^2 - 3x - 3y = 0$

16. If a point $P(x_1, y_1)$ lies on ellipse $\frac{x^2}{9} + \frac{y^2}{25} = 1$, then focal distance of P is

(1) $4 + \frac{4}{5}y_1$ (2) $3 + \frac{4}{5}y_1$ (3) $4 - \frac{4}{5}y_1$ (4) $5 - \frac{4}{5}y_1$

17. A latus rectum of an ellipse is a line

(1) passing through a focus (2) parallel to the major axis

(3) perpendicular to the minor axis (4) all of these

18. $\frac{x^2}{r^2 - r - 6} + \frac{y^2}{r^2 - 6r + 5} = 1$ will represents the ellipse, if r lies in the interval :

(1) $(-\infty, \infty)$ (2) $(3, \infty)$ (3) $(5, \infty)$ (4) $(1, \infty)$

19. The equations of the common tangent to the ellipse, $x^2 + 4y^2 = 8$ & the parabola $y^2 = 4x$ is

(1) $2y - x = 8$ (2) $2y + x = 4$ (3) $2y + x + 4 = 0$ (4) $2y + x = 0$

20. The total number of real common tangents that can be drawn to the ellipse $3x^2 + 5y^2 = 32$ and $25x^2 + 9y^2 = 450$ passing through (3, 5) is

(1) 1 (2) 2 (3) 0 (4) 3

21. If the mid point of a chord of the ellipse $\frac{x^2}{16} + \frac{y^2}{25} = 1$ is (0, 3), then length of the chord is

(1) $\frac{32}{3}$ (2) $\frac{32}{5}$ (3) $\frac{8}{5}$ (4) $\frac{16}{5}$

22. A ray emanating from the point (− 4, 0) is incident on the ellipse $9x^2 + 25y^2 = 225$ at the point P with abscissa 3. The equation of the reflected ray after first reflection is

(1) $12x + 5y = 48$ (2) $5x - 12y = 48$ (3) $12x - 5y = 24$ (4) all of these

23. Identify the correct statement(s) -

(1) the equation of the director circle of the ellipse, $5x^2 + 9y^2 = 45$ is $x^2 + y^2 = 14$.

(2) the sum of the focal distances of the point (0, 6) on the ellipse $\frac{x^2}{25} + \frac{y^2}{36} = 1$ is 10.

(3) the point of intersection of any tangent to a parabola & the perpendicular to it from the focus lies on directrix.

(4) all of these

24. Find the centre of the ellipse $\frac{(x+y-1)^2}{2} + \frac{(x-y+2)^2}{3} = 1$

(1) $\left(-\frac{1}{2},\frac{3}{2}\right)$ (2) $\left(\frac{3}{2}\frac{1}{2}\right)$ (3) $\left(-\frac{1}{2},-\frac{3}{2}\right)$ (4) $\left(\frac{1}{2},-\frac{3}{2}\right)$

25. The centre of ellipse $5x^2+5y^2-2xy+8x+8y+2=0$ is
(1) (–1, 2) (2) (–2, 1) (3) (–2,–2) (4) (–1,–1)

26. The foci of a hyperbola coincide with the foci of the ellipse $\frac{x^2}{25}+\frac{y^2}{9}=1$. The equation of the hyperbola if its eccentricity is 2 is
(1) $3x^2-y^2-4=0$ (2) $3x^2-y^2-16=0$
(3) $3x^2-y^2-12=0$ (4) $-3x^2+y^2+20=0$

27. The hyperbola $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$ passes through the point of intersection of the lines, $7x+13y-87=0$ & $5x-8y+7=0$ & the latus rectum is $32\sqrt{2}/5$. The value of ab is
(1) $10\sqrt{2}$ (2) $5\sqrt{2}$ (3) $10\sqrt{3}$ (4) 200

28. The one which does not represent a hyperbola is
(1) $xy=1$ (2) $x^2-y^2=5$ (3) $(x-1)(y-3)=3$ (4) $x^2-y^2=0$

29. The latus rectum of the hyperbola
$9x^2-16y^2-18x-32y-151=0$ is
(1) $\frac{9}{4}$ (2) 9 (3) $\frac{3}{2}$ (4) $\frac{9}{2}$

30. The co-ordinates of a focus of the hyperbola $9x^2-16y^2+18x+32y-151=0$ are
(1) (–1, 1), (4, 1) (2) (6, 1), (–6, 1) (3) (4, 1), (6, 1) (4) (– 6, 1), (4, 1)

31. The equation of the hyperbola with vertices (3, 0) and (–3, 0) and semi-latusrectum 4, is given by is $4x^2-3y^2=4k$, then k =
(1) 16 (2) 4 (3) 3 (4) 9

32. If the eccentricity of the hyperbola $x^2-y^2\sec^2\alpha=5$ is $\sqrt{3}$ times the eccentricity of the ellipse $x^2\sec^2\alpha+y^2=25$, then a value of α is
(1) π/2 (2) π/3 (3) π/4 (4) π/6

33. The length of the latus rectum of the hyperbola $\frac{x^2}{a^2}-\frac{y^2}{b^2}=-1$ is
(1) $\frac{2a^2}{b}$ (2) $\frac{a^2}{b}$ (3) $\frac{a^2}{2b}$ (4) $\frac{a}{2b^2}$

34. If hyperbola $\frac{x^2}{b^2}-\frac{y^2}{a^2}=1$ passes through the focus of ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ then eccentricity of hyperbola is.
(1) $\sqrt{3}$ (2) $\sqrt{2}$ (3) $\sqrt{5}$ (4) 2

35. The co-ordinates of the focii of the hyperbola $\frac{(x-1)^2}{9}-\frac{(y-2)^2}{16}=1$ are
(1) (6, 2) and (–6, 2) (2) (– 6, 2) and (4, 2) (3) (6, 2) and (– 4, 2) (4) (6, – 2) and (–4, 2)

36. The equation $x^2+4xy+y^2+2x+4y+2=0$

(1) An ellipse (2) A pair of straight lines (3) A hyperbola (4) None of these

37. A rectangular hyperbola circumscribe a triangle ABC, then it will always pass through its
(1) orthocenter (2) circumcentre (3) centroid (4) incentre

PART - II : MISCELLANEOUS QUESTIONS

Section (A) : ASSERTION/REASONING

DIRECTIONS :

Each question has 4 choices (1), (2), (3) and (4) out of which ONLY ONE is correct.
(1) Both the statements are true.
(2) Statement-I is true, but Statement-II is false.
(3) Statement-I is false, but Statement-II is true.
(4) Both the statements are false.

A-1. **STATEMENT-1 :** Normal chord drawn at the point (8, 8) of the parabola $y^2 = 8x$ subtends a right angle at the vertex of the parabola.
STATEMENT-2 : Every chord of the parabola $y^2 = 4ax$ passing through the point (4a, 0) subtends a right angle at the vertex of the parabola.

A-2. **Statement -1 :** The circle on any focal distance as diameter touches the director circle

Statement - 2 : If P be any point on the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ (a < b) with S & S' as its focii, then $\ell(SP) + \ell(S'P) = 2b$

$\ell(SP) + \ell(S'P) = 2b$

A-3. **STATEMENT-1 :** Total number of tangents of the hyperbola $\frac{x^2}{9} - \frac{y^2}{4} = 1$ that are perpendicular to the line $5x + 2y - 3 = 0$ is 2.

STATEMENT-2 : The equation of tangent to the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2}$ 1 in terms of its slope m is $y = mx \pm \sqrt{a^2m^2 - b^2}$, if $a^2 m^2 - b^2 > 0$.

Section (B) : MATCH THE COLUMN

B-1.

	Column - I		Column - II
(P)	Number of positive integral values of b for which tangent parallel to line y = x + 1 can be drawn to hyperbola $\frac{x^2}{5} - \frac{y^2}{b^2} = 1$ is	(1)	16
(Q)	The equation of the hyperbola with vertices (3, 0) and (–3, 0) and semi-latusrectum 4, is given by is $4x^2 - 3y^2 = 4k$, then k =	(2)	2
(R)	The product of the lengths of the perpendiculars from the two focii on any tangent to the hyperbola $\frac{x^2}{25} - \frac{y^2}{3} = 1$ is $\sqrt{k}$, then k is	(3)	4
(S)	An equation of a tangent to the hyperbola,	(4)	9

$16x^2 - 25y^2 - 96x + 100y - 356 = 0$ which makes an

angle $\frac{\pi}{4}$ with the transverse axis is $y = x + \lambda$, $(\lambda > 0)$, then 2λ is

Codes :

	P	Q	R	S
(1)	1	4	3	4
(2)	2	4	3	3
(3)	2	4	4	3
(4)	4	2	3	1

Section (C) : ONE OR MORE THAN ONE OPTIONS CORRECT

C-1. If one end of a focal chord of the parabola $y^2 = 4x$ is (1, 2), the other end lies on

(1) $x^2 y + 2 = 0$ (2) $xy + 2 = 0$ (3) $xy - 2 = 0$ (4) $x^2 + xy - y - 1 = 0$

C-2. The equation, $3x^2 + 4y^2 - 18x + 16y + 43 = C$.

(1) cannot represent a real pair of straight lines for any value of C

(2) represents an ellipse, if $C > 0$

(3) no locus, if $C < 0$

(4) a point, if $C = 0$

C-3. If the distance between the focii of an ellipse is equal to the length of its latus rectum, then eccentricity of the ellipse is :

(1) $\frac{\sqrt{5}+1}{2}$ (2) $\frac{\sqrt{5}-1}{2}$ (3) $\frac{\sqrt{5}-2}{2}$ (4) $\frac{2}{\sqrt{5}+1}$

C-4. The co-ordinates of a focus of the hyperbola $9x^2 - 16y^2 + 18x + 32y - 151 = 0$ are

(1) (–1, 1) (2) (6, 1) (3) (4, 1) (4) (– 6, 1)

Exercise-3

Marked Questions may have for Revision Questions.

*** Marked Questions may have more than one correct option.**

PART - I : JEE (MAIN) / AIEEE PROBLEMS (PREVIOUS YEARS)

1. Let P be the point (1, 0) and Q be a point on the curve $y^2 = 8x$. The locus of midpoint of PQ is **[AIEEE 2005 (3, –1), 225]**

(1) $x^2 - 4y + 2 = 0$ (2) $x^2 + 4y + 2 = 0$ (3) $y^2 + 2x + 2 = 0$ (4) $y^2 - 4x + 2 = 0$

2. An ellipse has OB as semi minor axis, F and F´ as foci and the angle FBF´ is a right angle. Then the eccentricity of the ellipse is : **[AIEEE 2005 (3, –1), 225]**

(1) $\frac{1}{\sqrt{3}}$ (2) $\frac{1}{4}$ (3) $\frac{1}{2}$ (4) $\frac{1}{\sqrt{2}}$

3. A focus of an ellipse at the origin. The directrix is the line x = 4 and eccentricity is $\frac{1}{2}$, then the length of the semi major axis is **[AIEEE 2005 (3, –1), 225]**

(1) $\frac{8}{3}$ (2) $\frac{2}{3}$ (3) $\frac{4}{3}$ (4) $\frac{5}{3}$

4. The locus of a point P(α,β) moving under the condition that the line y = αx + β is a tangent to the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ is : **[AIEEE 2005 (3, –1), 225]**

(1) a hyperbola (2) a parabola (3) a circle (4) an ellipse

5. The locus of the vertices of the family of parabolas $y = \frac{a^3x^2}{3} + \frac{a^2x}{2} - 2a$ is : **[AIEEE-2006 (3, –1), 165]**

(1) $xy = \frac{3}{4}$ (2) $xy = \frac{35}{16}$ (3) $xy = \frac{64}{105}$ (4) $xy = \frac{105}{64}$

6. In an ellipse, the distances between its foci is 6 and minor axis is 8. Then its eccentricity is : **[AIEEE 2006 (3, –1), 120]**

(1) $\frac{1}{2}$ (2) $\frac{4}{5}$ (3) $\frac{1}{\sqrt{5}}$ (4) $\frac{3}{5}$

7. The equation of a tangent to the parabola $y^2 = 8x$ is y = x + 2. The point on this line from which the other tangent to the parabola is perpendicular to the given tangent is **[AIEEE 2007 (3, –1), 120]**

(1) (–1, 1) (2) (0, 2) (3) (2, 4) (4) (–2, 0)

8. For the hyperbola $\frac{x^2}{\cos^2\alpha} - \frac{y^2}{\sin^2\alpha} = 1$, which of the following remains constant when α varies ? **[AIEEE 2007 (3, –1), 120]**

(1) Eccentricity (2) Directrix
(3) Abscissae of vertices (4) Abscissae of foci

9. The ellipse $x^2 + 4y^2 = 4$ is inscribed in a rectangle alingent with the coordinate axes, which in turn is inscribed in another ellipse that passes through the point (4, 0). Then the equation of the ellipse is : **[AIEEE 2009 (4, –1), 144]**

(1) $x^2 + 12y^2 = 16$ (2) $4x^2 + 48y^2 = 48$ (3) $4x^2 + 64y^2 = 48$ (4) $x^2 + 16y^2 = 16$

10*. Equation of the ellipse whose axes are the axes of coordinates and which passes through the point (–3, 1) and has eccentricity $\sqrt{\frac{2}{5}}$ is : **[AIEEE 2011, I, (4, –1), 120]**

(1) $3x^2 + 5y^2 - 32 = 0$ (2) $5x^2 + 3y^2 - 48 = 0$
(3) $3x^2 + 5y^2 - 15 = 0$ (4) $5x^2 + 3y^2 - 32 = 0$

11. The equation of the hyperbola whose foci are (–2, 0) and (2, 0) and eccentricity is 2 is given by : **[AIEEE 2011, II, (4, –1), 120]**

(1) $x^2 - 3y^2 = 3$ (2) $3x^2 - y^2 = 3$ (3) $-x^2 + 3y^2 = 3$ (4) $-3x^2 + y^2 = 3$

12. An ellipse is drawn by taking a diameter of the circle $(x - 1)^2 + y^2 = 1$ as its semi-minor axis and a diameter of the circle $x^2 + (y - 2)^2 = 4$ is semi-major axis. If the centre of the ellipse is at the origin and its axes are the coordinate axes, then the equation of the ellipse is : **[AIEEE-2012, (4, –1)/120]**

(1) $4x^2 + y^2 = 4$ (2) $x^2 + 4y^2 = 8$ (3) $4x^2 + y^2 = 8$ (4) $x^2 + 4y^2 = 16$

13. **Statement-1 :** An equation of a common tangent to the parabola $y^2 = x$ and the ellipse $2x^2 + y^2 = 4$ is $y = 2x + 2\sqrt{3}$ **[AIEEE - 2013, (4, – 1) 120]**

Statement-2 : If the line $y = mx + \frac{4\sqrt{3}}{m}$, $(m \neq 0)$ is a common tangent to the parabola $y^2 = 16\sqrt{3}\,x$ and the ellipse $2x^2 + y^2 = 4$, then m satisfies $m^4 + 2m^2 = 24$.

(1) Statement-1 is false, Statement-2 is true.
(2) Statement-1 is true, statement-2 is true; statement-2 is a correct explanation for Statement-1.
(3) Statement-1 is true, statement-2 is true; statement-2 is **not** a correct explanation for Statement-1.
(4) Statement-1 is true, statement-2 is false.

14. The equation of the circle passing through the foci of the ellipse $\frac{x^2}{16}+\frac{y^2}{9} = 1$, and having centre at (0, 3) is **[AIEEE - 2013, (4, – 1)]**

(1) $x^2 + y^2 - 6y - 7 = 0$ (2) $x^2 + y^2 - 6y + 7 = 0$
(3) $x^2 + y^2 - 6y - 5 = 0$ (4) $x^2 + y^2 - 6y + 5 = 0$

15. The locus of the foot of perpendicular drawn from the centre of the ellipse $x^2 + 3y^2 = 6$ on any tangent to it is:

(1) $(x^2 + y^2)^2 = 6x^2 + 2y^2$ (2) $(x^2 + y^2)^2 = 6x^2 - 2y^2$
(3) $(x^2 - y^2)^2 = 6x^2 + 2y^2$ (4) $(x^2 - y^2)^2 = 6x^2 - 2y^2$

16. The slope of the line touching both the parabolas $y^2 = 4x$ and $x^2 = -32y$ is : **[JEE(Main) 2014, (4, – 1), 120]**

(1) $\frac{1}{8}$ (2) $\frac{2}{3}$ (3) $\frac{1}{2}$ (4) $\frac{3}{2}$

17. The area (in sq.units) of the quadrilateral formed by the tangents at the end points of the latera recta to the ellipse $\frac{x^2}{9}+\frac{y^2}{5}=1$, is **[JEE(Main) 2015, (4, – 1), 120]**

(1) $\frac{27}{4}$ (2) 18 (3) $\frac{27}{2}$ (4) 27

18. Let O be the vertex and Q be any point on the parabola, $x^2 = 8y$. If the point P divides the line segment OQ internally in the ratio 1 : 3, then the locus of P is **[JEE(Main) 2015, (4, –1), 120]**

(1) $x^2 = y$ (2) $y^2 = x$ (3) $y^2 = 2x$ (4) $x^2 = 2y$

19. Let P be the point on the parabola, $y^2 = 8x$ which is at a minimum distance from the centre C of the circle, $x^2 + (y + 6)^2 = 1$. Then the equation of the circle, passing through C and having its centre at P is : **[JEE(Main) 2016, (4, – 1), 120]%**

(1) $x^2 + y^2 - x + 4y - 12 = 0$ (2) $x^2 + y^2 - + 2y - 24 = 0$
(3) $x^2 + y^2 - 4x + 9y + 18 = 0$ (4) $x^2 + y^2 - 4x + 8y + 12 = 0$

20. The eccentricity of the hyperbola whose length of the latus rectum is equal to 8 and the length of its conjugate axis is equal to half of the distance between its foci, is : **[JEE(Main) 2016, (4, – 1), 120]**

(1) $\frac{4}{\sqrt{3}}$ (2) $\frac{2}{\sqrt{3}}$ (3) $\sqrt{3}$ (4) $\frac{4}{3}$

21. The eccentricity of an ellipse whose centre is at the origin is $\frac{1}{2}$. If one of its directrices is x = – 4, then the equation of the normal to it at $\left(1, \frac{3}{2}\right)$ is **[JEE(Main) 2017, (4, – 1), 120]**

(1) $2y - x = 2$ (2) $4x - 2y = 1$ (3) $4x + 2y = 7$ (4) $x + 2y = 4$

22. A hyperbola passes through the point $P(\sqrt{2}, \sqrt{3})$ and has foci at (±2, 0). Then the tangent to this hyperbola at P also passes through the point : **[JEE(Main) 2017, (4, – 1), 120]**

(1) $(3\sqrt{2}, 2\sqrt{3})$ (2) $(2\sqrt{2}, 3\sqrt{3})$ (3) $(\sqrt{3}, \sqrt{2})$ (4) $(-\sqrt{2}, -\sqrt{3})$

23. If the tangent at (1, 7) to the curve $x^2 = y - 6$ touches the circle $x^2 + y^2 + 16x + 12y + c = 0$ then the value of c is : **[JEE(Main) 2018, (4, – 1), 120]**

(1) 85 (2) 95 (3) 195 (4) 185

24. Tangents are drawn to the hyperbola $4x^2 - y^2 = 36$ at the points P and Q. If these tangents intersect at the point T(0, 3) then the area (in sq. units) of ΔPTQ is : **[JEE(Main) 2018, (4, – 1), 120]**

(1) $60\sqrt{3}$ (2) $36\sqrt{5}$ (3) $45\sqrt{5}$ (4) $54\sqrt{3}$

25. Tangent and normal are drawn at P(16,16) on the parabola $y^2 = 16x$, which intersect the axis of the parabola at A and B, respectively. If C is the centre of the circle through the points P, A and B and ∠CPB = θ , then a value of tan θ is : **[JEE(Main) 2018, (4, – 1), 120]**

(1) 3 (2) $\frac{4}{3}$ (3) $\frac{1}{2}$ (4) 2

PART - II : JEE (ADVANCED) / IIT-JEE PROBLEMS (PREVIOUS YEARS)

1. The locus of the mid point of the line segment joining the focus to a moving point on the parabola $y^2 = 4ax$ is another parabola with directrix **[IIT-JEE 2002, Scr.(3, –1), 90]**

(A) $x = -a$ (B) $x = -\frac{a}{2}$ (C) $x = 0$ (D) $x = \frac{a}{2}$

2. The equation of the common tangent to the curves $y^2 = 8x$ and $xy = -1$ is : **[IIT-JEE 2002, Scr.(3, –1), 90]**

(A) $3y = 9x + 2$ (B) $y = 2x + 1$ (C) $2y = x + 8$ (D) $y = x + 2$

3. **(i)** The area of the quadrilateral formed by the tangents at the end points of latus rectum to the ellipse $\frac{x^2}{9} + \frac{y^2}{5} = 1$ is : **[IIT-JEE-2003, Scr.(3, –1) /84]**

(A) 27/4 sq. units (B) 9 sq. units (C) 27/2 sq. units (D) 27 sq. units

(ii) Tangent is drawn to ellipse $\frac{x^2}{27} + y^2 = 1$ at $\left(3\sqrt{3}\cos\theta, \sin\theta\right)$ where $\theta \in \left(0, \frac{\pi}{2}\right)$. Then the value of θ such that sum of intercepts on axes made by this tangent is minimum is : **[IIT-JEE-2003, Scr.(3, –1) /84]**

(A) $\frac{\pi}{3}$ (B) $\frac{\pi}{6}$ (C) $\frac{\pi}{8}$ (D) $\frac{\pi}{4}$

4. If tangents are drawn to the ellipse $x^2 + 2y^2 = 2$, then the locus of the mid-point of the intercept made by the tangents between the coordinate axes, is - **[IIT-JEE-2004, Scr.(3, –1) /84]**

(A) $\frac{1}{x^2} + \frac{1}{2y^2} = 1$ (B) $\frac{1}{4x^2} + \frac{1}{2y^2} = 1$ (C) $\frac{1}{2x^2} + \frac{1}{4y^2} = 1$ (D) $\frac{1}{2x^2} + \frac{1}{y^2} = 1$

5. A parabola has its vertex and focus in the first quadrant and axis along the line y = x. If the distances of the vertex and focus from the origin are respectively $\sqrt{2}$ and 2 $\sqrt{2}$, then an equation of the parabola is **[IIT-JEE 2006, (3, –1), 184]**

(A) $(x + y)^2 = x - y + 2$ (B) $(x - y)^2 = x + y - 2$

(C) $(x - y)^2 = 8(x + y - 2)$ (D) $(x + y)^2 = 8(x - y + 2)$

6. **STATEMENT - 1 :** The curve $y = \frac{-x^2}{2} + x + 1$ is symmetric with respect to the line x = 1.

because

STATEMENT - 2 : A parabola is symmetric about its axis. **[IIT-JEE 2007, Paper-2, (3, –1), 81]**

(A) Statement - 1 is True, Statement - 2 is True; Statement - 2 **is** a correct explanation for Statement - 1

(B) Statement - 1 is True, Statement - 2 is True; Statement - 2 is **NOT** a correct explanation for Statement - 1

(C) Statement - 1 is True, Statement - 2 is False

(D) Statement - 1 is False, Statement - 2 is True

Comprehension (7 to 9) **[IIT-JEE 2007, Paper-1, (4, –1), 81]**

Consider the circle $x^2 + y^2 = 9$ and the parabola $y^2 = 8x$. They intersect at P and Q in the first and the fourth quadrants, respectively. Tangents to the circle at P and Q intersect the x-axis at R and tangents to the parabola at P and Q intersect the x-axis at S.

7. The ratio of the areas of the triangles PQS and PQR is

(A) 1 : $\sqrt{2}$ (B) 1 : 2 (C) 1 : 4 (D) 1 : 8

8. The radius of the circumcircle of the triangle PRS is

(A) 5 (B) 3 $\sqrt{3}$ (C) 3 $\sqrt{2}$ (D) 2 $\sqrt{3}$

9. The radius of the incircle of the triangle PQR is

(A) 4 (B) 3 (C) $\frac{8}{3}$ (D) 2

10. A hyperbola, having the transverse axis of length 2 sin θ, is confocal with the ellipse $3x^2 + 4y^2 = 12$. Then its equation is **[IIT-JEE-2007, Paper-1(3, –1)/81]**

(A) $x^2 \operatorname{cosec}^2\theta - y^2 \sec^2\theta = 1$ (B) $x^2 \sec^2\theta - y^2 \operatorname{cosec}^2\theta = 1$

(C) $x^2 \sin^2\theta - y^2 \cos^2\theta = 1$ (D) $x^2 \cos^2\theta - y^2 \sin^2\theta = 1$

11. Consider the two curves $C_1 : y^2 = 4x$, $C_2 : x^2 + y^2 - 6x + 1 = 0$. Then,

[IIT-JEE 2008, Paper-1, (3, –1), 82]

(A) C_1 and C_2 touch each other only at one point

(B) C_1 and C_2 touch each other exactly at two points

(C) C_1 and C_2 intersect (but do not touch) at exactly two points

(D) C_1 and C_2 neither intersect nor touch each other

12. Consider a branch of the hyperbola $x^2 - 2y^2 - 2\sqrt{2}\,x - 4\sqrt{2}\,y - 6 = 0$

[IIT-JEE-2008, Paper-2(3, –1)/81]

with vertex at the point A. Let B be one of the end points of its latus rectum. If C is the focus of the hyperbola nearest to the point A, then the area of the triangle ABC is

(A) $1 - \sqrt{\frac{2}{3}}$ (B) $\sqrt{\frac{3}{2}} - 1$ (C) $1 + \sqrt{\frac{2}{3}}$ (D) $\sqrt{\frac{3}{2}} + 1$

13. Let (x, y) be any point on the parabola $y^2 = 4x$. Let P be the point that divides the line segment from (0, 0) to (x, y) in the ratio 1 : 3. Then the locus of P is **[IIT-JEE 2011, Paper-2, (3, –1), 80]**

(A) $x^2 = y$ (B) $y^2 = 2x$ (C) $y^2 = x$ (D) $x^2 = 2y$

14. Let P(6, 3) be a point on the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$. If the normal at the point P intersects the x-axis at (9, 0), then the eccentricity of the hyperbola is **[IIT-JEE 2011, Paper-2, (3, –1), 80]**

(A) $\sqrt{\frac{5}{2}}$ (B) $\sqrt{\frac{3}{2}}$ (C) $\sqrt{2}$ (D) $\sqrt{3}$

15. The ellipse E_1 : $\frac{x^2}{9} + \frac{y^2}{4} = 1$ is inscribed in a rectangle R whose sides are parallel to the coordinate axes. Another ellipse E_2 passing through the point (0, 4) circumscribes the rectangle R. The eccentricity of the ellipse E_2 is **[IIT-JEE 2012, Paper-1, (3, –1), 70]**

(A) $\frac{\sqrt{2}}{2}$ (B) $\frac{\sqrt{3}}{2}$ (C) $\frac{1}{2}$ (D) $\frac{3}{4}$

16. If a tangent to a suitable conic (Column 1) is found to be y = x + 8 and its point of contact is (8, 16), then which of the following options is the only CORRECT combination?

[JEE(Advanced) 2017, Paper-1,(3, –1)/61]

(A) (III) (i) (P) (B) (I) (ii) (Q) (C) (II) (iv) (R) (D) (III) (ii) (Q)

Answers

EXERCISE # 1

PARABOLA

Section (A)

A-1.	(4)	**A-2.**	(3)	**A-3.**	(4)	**A-4.**	(2)	**A-5.**	(2)	**A-6.**	(1)	**A-7.**	(1)
A-8.	(3)	**A-9.**	(3)	**A-10.**	(1)	**A-11.**	(4)	**A-12.**	(2)	**A-13.**	(2)	**A-14.**	(1)

Section (B)

B-1.	(2)	**B-2.**	(1)	**B-3.**	(1)	**B-4.**	(3)	**B-5.**	(1)	**B-6.**	(1)	**B-7.**	(2)

Section-(C)

C-1.	(1)	**C-2.**	(4)	**C-3.**	(4)	**C-4.**	(3)	**C-5.**	(4)	**C-6.**	(3)	**C-7.**	(1)
C-8.	(3)	**C-9.**	(1)										

Section-(D)

D-1.	(2)	**D-2.**	(1)	**D-3.**	(4)	**D-4.**	(3)	**D-5.**	(2)	**D-6.**	(4)	**D-7.**	(2)
D-8.	(2)	**D-9.**	(3)	**D-10.**	(2)	**D-11.**	(2)	**D-12.**	(3)	**D-13.**	(1)	**D-14.**	(2)
D-15.	(2)												

ELLIPSE

Section (A)

A-1.	(2)	**A-2.**	(1)	**A-3.**	(1)	**A-4.**	(4)	**A-5.**	(3)	**A-6.**	(3)	**A-7.**	(4)
A-8.	(2)	**A-9.**	(4)	**A-10.**	(3)	**A-11.**	(2)	**A-12.**	(2)	**A-13.**	(2)	**A-14.**	(3)
A-15.	(2)	**A-16.**	(4)	**A-17.**	(3)	**A-18.**	(1)						

Section (B) :

B-1.	(1)	**B-2.**	(3)	**B-3.**	(2)	**B-4.**	(4)	**B-5.**	(1)	**B-6.**	(3)	**B-7.**	(2)
B-8.	(3)	**B-9.**	(1)										

Section (C) :

C-1.	(1)	**C-2.**	(1)	**C-3.**	(2)	**C-4.**	(2)	**C-5.**	(2)	**C-6.**	(1)	**C-7.**	(3)
C-8.	(3)	**C-9.**	(3)	**C-10.**	(3)	**C-11.**	(2)	**C-12.**	(1)	**C-13.**	(1)		

HYPERBOLA

Section- (A) :

A-1.	(2)	**A-2.**	(3)	**A-3.**	(2)	**A-4.**	(3)	**A-5.**	(1)	**A-6.**	(3)	**A-7.**	(1)
A-8.	(2)	**A-9.**	(3)	**A-10.**	(2)	**A-11.**	(1)	**A-12.**	(2)	**A-13.**	(1)	**A-14.**	(1)
A-15.	(1)	**A-16.**	(4)	**A-17.**	(1)	**A-18.**	(2)	**A-19.**	(4)				

Section-(B)

B-1.	(1)	**B-2.**	(1)	**B-3.**	(1)	**B-4.**	(1)	**B-5.**	(4)	**B-6.**	(2)	**B-7.**	(2)
B-8.	(3)	**B-9.**	(1)	**B-10.**	(2)								

Section- (C):

C-1. (4) **C-2.** (4) **C-3.** (4) **C-4.** (1) **C-5.** (2) **C-6.** (4)

Section-(D):

D-1. (1) **D-2.** (1) **D-3.** (4) **D-4.** (4) **D-5.** (4) **D-6.** (3) **D-7.** (4)

D-8. (1)

EXERCISE # 2

PART - I

1.	(1)	***2.***	(3)	**3.**	(1)	**4.**	(3)	**5.**	(4)	**6.**	(4)	**7.**	(3)
8.	(4)	**9.**	(1)	**10.**	(2)	**11.**	(1)	**12.**	(1)	**13.**	(1)	**14.**	(3)
15.	(1)	**16.**	(4)	**17.**	(1)	**18.**	(3)	**19.**	(3)	**20.**	(3)	**21.**	(2)
22.	(1)	**23.**	(1)	**24.**	(1)	**25.**	(4)	**26.**	(3)	**27.**	(1)	**28.**	(4)
29.	(4)	**30.**	(4)	**31.**	(4)	**32.**	(3)	**33.**	(1)	**34.**	(1)	**35.**	(3)
36.	(3)	**37.**	(1)										

PART - II

A-1. (3) **A-2.** (3) **A-3.** (3)

Section (B) :

B-1. (3)

Section (C) :

C-1. (1,2,4) **C-2.** (1,2,3,4) **C-3.** (2,4) **C-4.** (3,4)

EXERCISE # 3

PART - I

1.	(4)	**2.**	(4)	**3.**	(1)	**4.**	(1)	**5.**	(4)	**6.**	(4)	**7.**	(4)
8.	(4)	**9.**	(1)	**10.**	(1,2)	**11.**	(2)	**12.**	(4)	**13.**	(2)	**14.**	(1)
15.	(1)	**16.**	(3)	**17.**	(4)	**18.**	(4)	**19.**	(4)	**20.**	(2)	**21.**	(2)
22.	(2)	**23.**	(2)	**24.**	(3)	**25.**	(4)						

PART - II

1. (C) **2.** (D) **3.** **(i)** (D) **(ii)** (B) **4.** (C) **5.** (C) **6.** (A)

7. (C) **8.** (B) **9.** (D) **10.**(A) **11.** (B) **12.** (B) **13.** (C)

14. (B) **15.** (C) **16.** (A)

Additional Problems For Self Practice (APSP)

PART - I : PRACTICE TEST PAPER

This Section is not meant for classroom discussion. It is being given to promote self-study and self testing amongst the Resonance students.

Max. Marks : 120 **Max. Time : 1 Hr.**

Important Instructions :

1. The test is of **1 hour** duration and max. marks 120.

2. The test consists **30** questions, **4 marks** each.

3. Only one choice is correct **1 mark** will be deducted for incorrect response. No deduction from the total score will be made if no response is indicated for an item in the answer sheet.

4. There is only one correct response for each question. Filling up more than one response in any question will be treated as wrong response and marks for wrong response will be deducted accordingly as per instructions 3 above.

1. The equation of the conic with focus at (1,–1) , directrix along $x - y + 1 = 0$ and with eccentricity $\sqrt{2}$ is
(1) $x^2 - y^2 = 1$ (2) $xy = 1$
(3) $2xy - 4x + 4y + 1 = 0$ (4) $2xy + 4x - 4y - 1 = 0$

2. The length of latus rectum of a parabola whose directrix is $x + y - 2 = 0$ and focus is (3,–4) is
(1) $6\sqrt{2}$ (2) $3\sqrt{2}$ (3) $\frac{3}{\sqrt{2}}$ (4) $\frac{3}{2\sqrt{2}}$

3. The equation of parabola whose vertices is (–1,–2), axis is vertical and which passes through the point (3,6) is
(1) $x^2 + 2x - 2y - 3 = 0$ (2) $2x^2 = 3y$
(3) $x^2 - 2x - y + 3 = 0$ (4) $x^2 = 3y$

4. Equation of tangent to the parabola $x^2 = 4ay$ is
(1) $ty = x + at^2$ (2) $ty = -x + at^2$ (3) $tx + y = at^2$ (4) $tx - y = at^2$

5. If slope of the tangent to the parabola $y^2 = -8x$ is $\frac{1}{2}$ then equation of the tangent is
(1) $x + 2y + 8 = 0$ (2) $x - 2y + 8 = 0$ (3) $x - 2y - 8 = 0$ (4) $2x - y - 8 = 0$

6. The equation of the tangent to the parabola $y^2 = 16x$, which is perpendicular to the line $y = 3x + 7$ is
(1) $y - 3x + 4 = 0$ (2) $3y - x + 36 = 0$ (3) $3y + x - 36 = 0$ (4) $3y + x + 36 = 0$

7. Equation of the tangent common to the parabola $y^2 = 4x$ and $x^2 = -32y$ is
(1) $2x + y - 4 = 0$ (2) $x + 2y - 4 = 0$ (3) $x - 2y + 4 = 0$ (4) $x - 2y - 4 = 0$

8. Two perpendicular tangents to $y^2 = 4ax$ always intersect on the line-
(1) $x = a$ (2) $x + a = 0$ (3) $x + 2a = 0$ (4) $x + 4a = 0$

9. The equation of the normal at the point $\left(\frac{a}{4}, a\right)$ to the parabola $y^2 = 4ax$, is
(1) $4x + 8y + 9a = 0$ (2) $4x + 8y - 9a = 0$ (3) $4x + y - a = 0$ (4) $4x - y + a = 0$

10. Let P be the point on the parabola $y^2 = 8x$ which is at a minimum distance from centre C of the circle $x^2 + (y + 6)^2 = 1$ then the equation of the circle having end point of diameter as P and C is
(1) $x^2 + y^2 - 2x - 10y + 24 = 0$
(2) $x^2 + y^2 - 4x - 10y - 24 = 0$
(3) $x^2 + y^2 + 2x + 10y - 24 = 0$
(4) $x^2 + y^2 - 2x + 10y + 24 = 0$

11. The locus of the mid point of all chord parallel to the line $y = 2x + 3$ to the parabola $y^2 = 8x$ is
(1) $y = 2$ (2) $y = -2$ (3) $2y + 1 = 0$ (4) $y = 8$

12. If the latus rectum of an ellipse be equal to half of its minor axis, then its eccentricity is
(1) $\frac{1}{2}$ (2) $\frac{\sqrt{3}}{2}$ (3) $\frac{2}{3}$ (4) $\frac{\sqrt{2}}{3}$

13. The equation of the ellipse whose one of the vertex is (0,7) and the corresponding directrix is $y = 12$ is
(1) $95x^2 + 144y^2 = 4655$
(2) $144x^2 + 95y^2 = 4655$
(3) $144x^2 + 95y^2 = 4750$
(4) $95x^2 + 144y^2 = 13685$

14. Equation of the ellipse whose focii are (2,2) and (4,2) and the major axis is of the length 10 is
(1) $25 (x - 3)^2 + 24 (y - 2)^2 = 600$
(2) $25 (x + 3)^2 + 24 (y + 2)^2 = 600$
(3) $24 (x - 3)^2 + 25 (y - 2)^2 = 600$
(4) $24 (x + 3)^2 + 25 (y + 2)^2 = 600$

15. The equation of the tangent to the ellipse $x^2 + 16y^2 = 16$ making an angle of 60º with x-axis may be
(1) $y = \sqrt{3}x + \sqrt{47}$ (2) $y = \sqrt{3}x - \sqrt{13}$ (3) $y = \sqrt{3}x + 16$ (4) $y = \sqrt{3}x + 7$

16. Equations of the tangent lines of the ellipse $9x^2 + 16y^2 = 144$ which passes through the point (2,3) is
(1) $y = -3$ and $x + y = 5$
(2) $x - y = -1$ and $x + y = 5$
(3) $x - y = -1$ and $y = 3$
(4) $y = 3$ and $x + y = 5$

17. The angle between pair of tangents drawn to the ellipse $3x^2 + 2y^2 = 5$ from the point (1,2) is
(1) $\tan^{-1}\left(\frac{12}{5}\right)$ (2) $\tan^{-1}\left(\frac{12}{\sqrt{5}}\right)$ (3) $\tan^{-1}(6\sqrt{5})$ (4) $\tan^{-1}(12\sqrt{5})$

18. Equation of the normal at the point (2,3) on the ellipse $9x^2 + 16y^2 = 180$ is
(1) $3y = 8x - 10$ (2) $3y = 8x - 7$ (3) $3x + 8y - 30 = 0$ (4) $3x - 8y + 18 = 0$

19. For each point (x,y) on an ellipse , the sum of the distance from (x,y) to the points (2,0) and (–2,0) is 8. Then the positive value of x so that (α,3) lies on the ellipse is -
(1) 2 (2) $2\sqrt{3}$ (3) $\frac{1}{\sqrt{3}}$ (4) 4

20. An ellipse is described by using an endless string which is passed over two points. If the axes are 6 cm and 4 cm, the necessary length of the string and the distance between the pins respectively in cm, are
(1) $6, -2\sqrt{5}$ (2) $6 + 2\sqrt{5}, 2\sqrt{5}$ (3) $6, 2 + \sqrt{5}$ (4) $6, \sqrt{5}$

21. The line passing through the extremity A of the major axis and extremity B of the minor axis of the ellipse $x^2 + 9y^2 = 9$ meets its auxiliary circle at the point M, then the area of the triangle with vertices at A,M and the origin O is
(1) $\frac{31}{10}$ (2) $\frac{29}{10}$ (3) $\frac{21}{10}$ (4) $\frac{27}{10}$

22. If P is a point on the hyperbola $16x^2 - 9y^2 = 144$ whose focii are S_1 and S_2 then $|PS_1 - PS_2|$ is equal to
(1) 4 (2) 6 (3) 8 (4) 12

23. The locus of the point of intersection of the lines $bxt - ayt = ab$ and $bx + ay = abt$ is

(1) A parabola (2) An ellipse (3) A hyperbola (4) A straight line

24. The equation of the hyperbola in the standard form (with transverse axis along the x-axis) having the length of latus rectum = 9 units and eccentricity = $\frac{5}{4}$ is -

(1) $\frac{x^2}{64}-\frac{y^2}{36}=1$ (2) $\frac{x^2}{36}-\frac{y^2}{64}=1$ (3) $-\frac{x^2}{36}+\frac{y^2}{64}=1$ (4) $-\frac{x^2}{64}+\frac{y^2}{36}=1$

25. The locus of the centre of a circle, which touches externally the given two circle's is

(1) circle (2) parabola (3) ellipse (4) hyperbola

26. Let $16x^2 - 3y^2 - 32x - 12y - 44 = 0$ be a hyperbola, then which of the following does not hold

(1) Length of the transverse axis is $2\sqrt{3}$ (2) Length of latus rectum is $\frac{32}{\sqrt{3}}$

(3) Eccentricity is $\sqrt{\frac{19}{3}}$ (4) Equation of a directrix is x = $\frac{3}{\sqrt{19}}$

27. If PQ is a double ordinate of the hyperbola $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$ such that ΔOPQ is equilateral, O being the centre, then the eccentricity e satisfies

(1) $e \in \left(1, \frac{2}{\sqrt{3}}\right)$ (2) $e = \frac{11}{10}$ (3) $e = \frac{\sqrt{3}}{2}$ (4) $e > \frac{2}{\sqrt{3}}$

28. Equation of common tangent to the parabola $y^2 = 8x$ and hyperbola $3x^2 - y^2 = 3$ is/are

(1) $2x \pm y + 1 = 0$ (2) $2x \pm y - 1 = 0$ (3) $x \pm 2y + 1 = 0$ (4) $x \pm 2y - 1 = 0$

29. If the two tangents drawn on hyperbola $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$ in such a way that the product of their gradients is c^2, then they intersects on the curve

(1) $y^2 + b^2 = c^2 (x^2 - a^2)$ (2) $y^2 + b^2 = c^2 (x^2 + a^2)$

(3) $ax^2 + by^2 = c^2$ (4) $x^2 + y^2 = c^2 (y^2 + b^2)$

30. Let C be the centre of the hyperbola $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$. The tangents at any point P on this hyperbola meets the straight line bx – ay = 0 and bx + ay = 0 in the point Q and P respectively,then CQ . CR =

(1) $a^2 + b^2$ (2) $a^2 - b^2$ (3) $\frac{1}{a^2}+\frac{1}{b^2}$ (4) $\frac{1}{a^2}-\frac{1}{b^2}$

Practice Test (JEE-Main Pattern)

OBJECTIVE RESPONSE SHEET (ORS)

Que.	1	2	3	4	5	6	7	8	9	10
Ans.										
Que.	11	12	13	14	15	16	17	18	19	20
Ans.										
Que.	21	22	23	24	25	26	27	28	29	30
Ans.										

PART - II : PRACTICE QUESTIONS

1. At any point P on the parabola $y^2 - 2y - 4x + 5 = 0$ a tangent is drawn which meets the directrix at Q. The locus of point R, which divides QP externally in the ratio $\frac{1}{2}$: 1 is
(1) $(x + 1)(y - 1)^2 + 4 = 0$ (2) $(x + 1)(y - 1)^2 + 2 = 0$
(3) $(x + 1)(y - 1)^2 - 4 = 0$ (4) $(x + 1)(y + 1)^2 - 4 = 0$

2. Let S be the focus of the parabola $y^2 = 8x$ and let PQ be the common chord of the circle $x^2 + y^2 - 2x - 4y = 0$ and the given parabola. The area of the triangle PQS is
(1) 2 (2) 4 (3) 6 (4) 8

3. The equation of the common tangent touching the circle $(x - 3)^2 + y^2 = 9$ and the parabola $y^2 = 4x$ above the x-axis is
(1) $\sqrt{3}y = 3x + 1$ (2) $\sqrt{3}y = -(x + 3)$ (3) $\sqrt{3}y = x + 3$ (4) $\sqrt{3}y = -(3x + 1)$

4. The equation of the directrix of the parabola $y^2 + 4y + 4x + 2 = 0$ is:
(1) $x = -1$ (2) $x = 1$ (3) $x = -3/2$ (4) $x = 3/2$

5. The locus of the mid point of the line segment joining the focus to a moving point on the parabola $y^2 = 4ax$ is another parabola with directrix
(1) $x = -a$ (2) $x = -\frac{a}{2}$ (3) $x = 0$ (4) $x = \frac{a}{2}$

6. The equation of the common tangent to the curves $y^2 = 8x$ and $xy = -1$ is
(1) $3y = 9x + 2$ (2) $y = 2x + 1$ (3) $2y = x + 8$ (4) $y = x + 2$

7. Normals are drawn from the point P with slopes m_1, m_2, m_3 to the parabola $y^2 = 4x$. If locus of P with $m_1 m_2 = \alpha$ is a part of the parabola itself then α =
(1) 0 (2) 1 (3) 2 (4) 3

8. Find the point on $x^2 + 2y^2 = 6$, which is nearest to the line $x + y = 7$
(1) (2, 1) (2) (–2, 1) (3) (–2, –1) (4) (2, –1)

9. Tangent is drawn to ellipse $\frac{x^2}{27} + y^2 = 1$ at $\left(3\sqrt{3}\cos\theta, \sin\theta\right)$ where $\theta \in \left(0, \frac{\pi}{2}\right)$. Then the value of θ such that sum of intercepts on axes made by this tangent is minimum is :
(1) $\frac{\pi}{3}$ (2) $\frac{\pi}{6}$ (3) $\frac{\pi}{8}$ (4) $\frac{\pi}{4}$

10. The normal at a point P on the ellipse $x^2 + 4y^2 = 16$ meets the x-axis at Q. If M is the mid point of the line segment PQ, then the locus of M intersects the latus rectum of the given ellipse at the points
(1) $\left(\pm\frac{3\sqrt{5}}{2}, \pm\frac{2}{7}\right)$ (2) $\left(\pm\frac{3\sqrt{5}}{2}, \pm\frac{\sqrt{19}}{4}\right)$ (3) $\left(\pm 2\sqrt{3}, \pm\frac{1}{7}\right)$ (4) $\left(\pm 2\sqrt{3}, \pm\frac{4\sqrt{3}}{7}\right)$

11*. In a triangle ABC with fixed base BC, the vertex A moves such that $\cos B + \cos C = 4\sin^2\frac{A}{2}$. If a, b and c denote the lengths of the sides of the triangle opposite to the angles A, B and C respectively, then
(1) b + c = 4a (2) b + c = 2a
(3) locus of points A is an ellipse (4) locus of point A is a pair of straight lines

12. The line 2x + y = 1 is tangent to the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$. If this line passes through the point of intersection of the nearest directrix and the x-axis, then the eccentricity of the hyperbola is

(1) 3/2 (2) 2 (3) 5/2 (4) 3

13. Tangents are drawn from any point on the hyperbola $\frac{x^2}{9} - \frac{y^2}{4} = 1$ to the circle $x^2 + y^2 = 9$. The locus of mid-point of the chord of contact is

(1) $x^2 + y^2 = 5$ (2) $x^2 - y^2 = 5$

(3) $\frac{x^2}{9} + \frac{y^2}{4} = \left(\frac{x^2 - y^2}{9}\right)^2$ (4) $\frac{x^2}{9} - \frac{y^2}{4} = \left(\frac{x^2 + y^2}{9}\right)^2$

14. The line passing through the extremity A of the major axis and extremity B of the minor axis of the ellipse $x^2 + 9y^2 = 9$ meets its auxiliary circle at the point M. Then the area of the triangle with vertices at A, M and the origin O is

(1) $\frac{31}{10}$ (2) $\frac{29}{10}$ (3) $\frac{21}{10}$ (4) $\frac{27}{10}$

15. The common tangents to the circle $x^2 + y^2 = 2$ and the parabola $y^2 = 8x$ touch the circle at the points P, Q and the parabola at the points R, S. Then the area of the quadrilateral PQRS is

(1) 3 (2) 6 (3) 9 (4) 15

COMPREHENSION

Comprehension # 1 (Q. 16 to 18)

Normals are drawn at point P, Q and R lying on the parabola $y^2 = 4x$ which intersect at (3, 0). Then

16. Area of ΔPQR is

(1) 2 (2) 3 (3) 5 (4) 5/2

17. Centroid of ΔPQR is

(1) (2, 0) (2) (2/3, 0) (3) (5/2, 0) (4) (0, 5/2)

18. Circumcentre of ΔPQR is

(1) (2, 0) (2) (2/3, 0) (3) (5/2, 0) (4) (0, 5/2)

Comprehension # 2 (Q.19 to 21)

Let ABCD be a square of side length 2 units. C_2 is the circle through vertices A, B, C, D and C_1 is the circle touching all the sides of the square ABCD. L is a line through A.

19. If P is a point on C_1 and Q is another point on C_2 then $\frac{PA^2 + PB^2 + PC^2 + PD^2}{QA^2 + QB^2 + QC^2 + QD^2}$ is equal to

(1) 0.75 (2) 1.25 (3) 1 (4) 0.5

20. A circle touch the line L and the circle C_1 externally such that both the circles are on the same side of the line, then the locus of centre of the circle is

(1) ellipse (2) hyperbola (3) parabola (4) parts of straight line

21. A line M through A is drawn parallel to BD. Point S moves such that its distances from the line BD and the vertex A are equal. If locus of S cuts M at T_2 and T_3 and AC at T_1, then area of $\Delta T_1T_2T_3$ is

(1) $\frac{1}{2}$ sq. units (2) $\frac{2}{3}$ sq. units (3) 1 sq. units (4) 2 sq. units

Comprehension # 3 (22-24)

Tangents are drawn from the point P(3, 4) to the ellipse $\frac{x^2}{9}+\frac{y^2}{4} = 1$ touching the ellipse at point A and B.

22. The coordinates of A and B are

(1) (3, 0) and (0, 2)
(2) $\left(-\frac{8}{5}, \frac{2\sqrt{161}}{15}\right)$ and $\left(-\frac{9}{5}, \frac{8}{5}\right)$
(3) $\left(-\frac{8}{5}, \frac{2\sqrt{161}}{15}\right)$ and (0, 2)
(4) (3, 0) and $\left(-\frac{9}{5}, \frac{8}{5}\right)$

23. The orthocentre of the triangle PAB is

(1) $\left(5, \frac{8}{7}\right)$ (2) $\left(\frac{7}{5}, \frac{25}{8}\right)$ (3) $\left(\frac{11}{5}, \frac{8}{5}\right)$ (4) $\left(\frac{8}{25}, \frac{7}{5}\right)$

24. The equation of the locus of the point whose distances from the point P and the line AB are equal, is

(1) $9x^2 + y^2 - 6xy - 54x - 62y + 241 = 0$
(2) $x^2 + 9y^2 + 6xy - 54x + 62y - 241 = 0$
(3) $9x^2 + 9y^2 - 6xy - 54x - 62y - 241 = 0$
(4) $x^2 + y^2 - 2xy + 27x + 31y - 120 = 0$

Comprehension # 4 (25-26)

The circle $x^2 + y^2 - 8x = 0$ and hyperbola $\frac{x^2}{9} - \frac{y^2}{4} = 1$ intersect at the points A and B.

25. Equation of a common tangent with positive slope to the circle as well as to the hyperbola is

(1) $2x - \sqrt{5}y - 20 = 0$
(2) $2x - \sqrt{5}y + 4 = 0$
(3) $3x - 4y + 8 = 0$
(4) $4x - 3y + 4 = 0$

26. Equation of the circle with AB as its diameter is

(1) $x^2 + y^2 - 12x + 24 = 0$
(2) $x^2 + y^2 + 12x + 24 = 0$
(3) $x^2 + y^2 + 24x - 12 = 0$
(4) $x^2 + y^2 - 24x - 12 = 0$

Comprehension # 5 (27-28)

Let PQ be a focal chord of the parabola $y^2 = 4ax$. The tangents to the parabola at P and Q meet at a point lying on the line $y = 2x + a$, $a > 0$.

27. Length of chord PQ is

(1) 7a (2) 5a (3) 2a (4) 3a

28. If chord PQ subtends an angle θ at the vertex of $y^2 = 4ax$, then tan θ =

(1) $\frac{2}{3}\sqrt{7}$ (2) $\frac{-2}{3}\sqrt{7}$ (3) $\frac{2}{3}\sqrt{5}$ (4) $\frac{-2}{3}\sqrt{5}$

Comprehension # 6 (29-30)

Let a, r, s, t be nonzero real numbers. Let P(at^2, 2at), Q, R (ar^2, 2ar) and (as^2, 2as) be distinct points on the parabola $y^2 = 4ax$. Suppose that PQ is the focal chord and lines QR and PK are parallel, where K is the point (2a, 0)

29. The value of r is

(1) $-\frac{1}{t}$ (2) $\frac{t^2+1}{t}$ (3) $\frac{1}{t}$ (4) $\frac{t^2-1}{t}$

30. If st = 1, then the tangent at P and the normal at S to the parabola meet at a point whose ordinate is

(1) $\frac{(t^2+1)^2}{2t^3}$ (2) $\frac{a(t^2+1)^2}{2t^3}$ (3) $\frac{a(t^2+1)^2}{t^3}$ (4) $\frac{a(t^2+2)^2}{t^3}$

Comprehension # 7 (31-33)

$y = x$ is tangent to the parabola $y = ax^2 + c$.

31. If $a = 2$, then the value of c is

(1) $\frac{1}{8}$ (2) $-\frac{1}{2}$ (3) $\frac{1}{2}$ (4) 1

32. If (1, 1) is point of contact then a is

(1) $\frac{1}{2}$ (2) $\frac{1}{3}$ (3) $\frac{1}{4}$ (4) $\frac{1}{6}$

33. If $c = 2$, then point of contact is

(1) (2, 2) (2) (4, 4) (3) (6, 6) (4) (3, 3)

Comprehension # 8 (34-36)

$\frac{(3x-4y+10)^2}{2} + \frac{(4x+3y-15)^2}{3} = 1$ is an ellipse

34. Major and minor axes of the ellipse are

(1) 6 and 4 (2) 150 and 100 (3) $10\sqrt{3}$ and $10\sqrt{2}$ (4) $\frac{2\sqrt{3}}{5}$ and $\frac{2\sqrt{2}}{5}$

35. Eccentricity of the ellipse is

(1) $\frac{1}{\sqrt{3}}$ (2) $\frac{\sqrt{3}}{5}$ (3) $\frac{\sqrt{2}}{5}$ (4) none of these

36. Centre of the ellipse is

(1) (0, 0) (2) $\left(\frac{6}{5},\frac{17}{5}\right)$ (3) $\left(\frac{\sqrt{2}}{5},\frac{\sqrt{3}}{5}\right)$ (4) none of these

Comprehension # 9 (37-38)

The general second degree equation represent a hyperbola if $h^2 - ab > 0$ and $\Delta \neq 0$ where $\Delta = \begin{vmatrix} a & h & g \\ h & b & f \\ g & f & c \end{vmatrix}$. Let H and H' be two hyperbolas. They are said to be conjugate to one another if the transverse and conjugate axes of one are respectively the conjugate and transverse axes of the other. Now answer the following questions.

37. Let P be any point on the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ and PN be the perpendicular on transverse axis. Let A and A' be the vertices of hyperbola, then $\frac{PN^2}{NA \cdot NA'} =$

(1) $\frac{a^2}{b^2}$ (2) $\frac{b^2}{a^2}$ (3) a^2 (4) b^2

38. The director circle of the hyperbola $x^2 - y^2 = a^2$ is

(1) $x^2 + y^2 = ax^2$ (2) $x^2 + y^2 = \frac{a^2}{2}$ (3) $x^2 + y^2 = a^2$ (4) none of these

APSP Answers

PART - I

1.	(3)	**2.**	(2)	**3.**	(1)	**4.**	(4)	**5.**	(3)	**6.**	(4)	**7.**	(3)
8.	(2)	**9.**	(2)	**10.**	(4)	**11.**	(1)	**12.**	(2)	**13.**	(2)	**14.**	(3)
15.	(4)	**16.**	(4)	**17.**	(2)	**18.**	(2)	**19.**	(1)	**20.**	(2)	**21.**	(4)
22.	(2)	**23.**	(3)	**24.**	(1)	**25.**	(4)	**26.**	(4)	**27.**	(4)	**28.**	(1)
29.	(1)	**30.**	(1)										

PART - II

1.	(1)	**2.**	(2)	**3.**	(3)	**4.**	(4)	**5.**	(3)	**6.**	(4)	**7.**	(3)
8.	(1)	**9.**	(2)	**10.**	(3)	**11.**	(2,3)	**12.**	(2)	**13.**	(4)	**14.**	(4)
15.	(4)	**16.**	(1)	**17.**	(2)	**18.**	(3)	**19.**	(1)	**20.**	(3)	**21.**	(3)
22.	(4)	**23.**	(3)	**24.**	(1)	**25.**	(2)	**26.**	(1)	**27.**	(2)	**28.**	(4)
29.	(4)	**30.**	**(2)**	**31.**	(1)	**32.**	(1)	**33.**	(2)	**34.**	(4)	**35.**	(1)
36.	(2)	**37.**	(1)	**38.**	(4)								