EXERCISE

1. 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

2. Maximum number of common chords of a parabola and a circle can be equal to

(1) 2 (2) 4

(3) 6 (4) 8

3. A variable circle is drawn to touch the line $3x-4y=10$ and also the circle $x^2+y^2=1$ externally then the locus of its centre is -

(1) straight line

(2) circle

(3) pair of real, distinct straight lines

(4) parabola

4. The straight line $y=m(x-a)$ will meet the parabola $y^2=4ax$ in two distinct real points if

(1) $m\in R$ (2) $m\in[-1,1]$

(3) $m\in(-\infty,1]\cup[1,\infty)$ (4) $m\in R-\{0\}$

5. The equation of the circle drawn with the focus of the parabola $(x-1)^2-8y=0$ as its centre and touching the parabola at its vertex is :

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

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

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

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

6. Which one of the following equations represented 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) $x=\sqrt{1-\sin t}$; $y=\sin\frac{t}{2}+\cos\frac{t}{2}$

7. If a focal chord of $y^2=4x$ makes an angle $\alpha,\alpha\in\left(0,\frac{\pi}{4}\right]$ with the positive direction of x-axis, then minimum length of this focal chord is -

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

(3) 8 (4) 16

8. If (2,–8) is one end of a focal chord of the parabola $y^2=32x$, then the other end of the focal chord, is-

(1) (32,32) (2) (32,–32)

(3) (–2,8) (4) (2,8)

9. Minimum distance between the curves $y^2=x-1$ and $x^2=y-1$ is equal to

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

10. The length of a focal chord of the parabola $y^2=4ax$ at a distance b from the vertex is c, then

(1) $2a^2=bc$ (2) $a^3=b^2c$

(3) $ac=b^2$ (4) $b^2c=4a^3$

11. y-intercept of the common tangent to the parabola $y^2=32x$ and $x^2=108y$ is

(1) – 18 (2) – 12

(3) – 9 (4) – 6

12. The points of contact Q and R of tangent from the point P (2, 3) on the parabola $y^2=4x$ are

(1) (9, 6) and (1, 2)

(2) (1, 2) and (4, 4)

(3) (4, 4) and (9, 6)

(4) (9, 6) and $(\frac{1}{4},1)$

13. The equation of a straight line passing through the point (3,6) and cutting the curve $y=\sqrt{x}$ orthogonally is-

(1) $4x+y-18=0$ (2) $x+y-9=0$

(3) $4x-y-6=0$ (4) none

14. 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) $\sqrt{3}y = -(3x+1)$

15. If the ellipse $\frac{(x-h)^2}{M}+\frac{(y-k)^2}{N}=1$ has major axis on the line y = 2, minor axis on the line x =–1, major axis has length 10 and minor axis has length 4. The number h,k,M,N (in this order only) are-

(1) –1,2,5,2 (2) –1,2,10,4

(3) 1,–2,25,4 (4) –1,2,25,4

16. The y-axis is the directrix of the ellipse with eccentricity e = 1/2 and the corresponding focus is at (3, 0), equation to its auxiliary circle is

(1) $x^2 + y^2 - 8x + 12 = 0$

(2) $x^2 + y^2 - 8x - 12 = 0$

(3) $x^2 + y^2 - 8x + 9 = 0$

(4) $x^2 + y^2 = 4$

17. Imagine that you have two thumbtacks placed at two points, A and B. If the ends of a fixed length of string are fastened to the thumtacks and the string is drawn taut with a pencil, the path traced by the pencil will be an ellipse. The best way to maximise the area surrounded by the ellipse with a fixed length of string occurs when

I the two points A and B have the maximum distance between them.

II two points A and B coincide.

III A and B are placed vertically.

IV The area is always same regardless of the location of A and B .

(1) I (2) II (3) III (4) IV

18. The latus rectum of a conic section is the width of the function through the focus. The positive difference between the length of the latus rectum of $3y = x^2 + 4x - 9$ and $x^2 + 4y^2 - 6x + 16y = 24$ is-

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

19. Let S(5,12) and S'(–12,5) are the foci of an ellipse passing through the origin. The eccentricity of ellipse equals -

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

20. An ellipse is inscribed in a circle and a point within the circle is chosen at random. If the probability that this point lies outside the ellipse is 2/3 then the eccentricity of the ellipse is :

(1) $\frac{2\sqrt{2}}{3}$ (2) $\frac{\sqrt{5}}{3}$ (3) $\frac{8}{9}$ (4) $\frac{2}{3}$

21.(a) Which of the following is an equation of the ellipse with centre (–2,1), major axis running from (–2,6) to (–2,–4) and focus at (–2,5) ?

(1) $\frac{(x-2)^2}{25}+\frac{(y+1)^2}{16}=1$

(2) $\frac{(x+2)^2}{25}+\frac{(y-1)^2}{9}=1$

(3) $\frac{(x-2)^2}{9}+\frac{(y+1)^2}{25}=1$

(4) $\frac{(x+2)^2}{9}+\frac{(y-1)^2}{25}=1$

*(b) Which of the following statement(s) is/are correct for the ellipse of 21(a) ?

(1) auxiliary circle is $(x+2)^2 + (y-1)^2 = 25$

(2) director circle is $(x+2)^2 + (y-1)^2 = 34$

(3) Latus rectum $=\frac{18}{5}$

(4) eccentricity $=\frac{4}{5}$

22. The foci of a hyperbola coincide with the foci of the ellipse $\frac{x^2}{25}+\frac{y^2}{9}=1$. Then the equation of the hyperbola with eccentricity 2 is

(1) $\frac{x^2}{12}-\frac{y^2}{4}=1$ (2) $\frac{x^2}{4}-\frac{y^2}{12}=1$

(3) $3x^2 - y^2 + 12 = 0$ (4) $9x^2 - 25y^2 - 225 = 0$

23. The graph of the equation $x + y = x^3 + y^3$ is the union of -

(1) line and an ellipse (2) line and a parabola
(3) line and hyperbola (4) line and a point

24. The focal length of the hyperbola $x^2 - 3y^2 - 4x - 6y - 11 = 0$, is-

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

25. The equation $\frac{x^2}{29-p} + \frac{y^2}{4-p} = 1$ $(p \neq 4, 29)$ represents -

(1) an ellipse if p is any constant greater than 4

(2) a hyperbola if p is any constant between 4 and 29.

(3) a rectangular hyperbola if p is any constant greater than 29.

(4) no real curve is p is less than 29.

26. A tangent to the ellipse $\frac{x^2}{9} + \frac{y^2}{4} = 1$ with centre C meets its director circle at P and Q. Then the product of the slopes of CP and CQ, is -

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

27. Locus of the point of intersection of the tangents at the points with eccentric angles ϕ and $\frac{\pi}{2} - \phi$ on the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ is :

(1) $x = a$ (2) $y = b$ (3) $x = ab$ (4) $y = ab$

28. If $\frac{x^2}{\cos^2\alpha} - \frac{y^2}{\sin^2\alpha} = 1$ represents family of hyperbolas where 'α' varies then -

(1) distance between the foci is constant

(2) distance between the two directrices is constant

(3) distance between the vertices is constant

(4) distances between focus and the corresponding directrix is constant

* **Marked Question is multiple answer**

ANSWER KEY Exercise-I

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