ELLIPSE

SINGLE CORRECT OPTION TYPE

1. The area of an ellipse is 8π sq. units and the distance between the focii $4\sqrt{3}$. Then eccentricity of the ellipse is
(A) $\sin 30^0$ (B) $\sin 45^0$ (C) $\sin 60^0$ (D) $\sin 70^0$

2. Am ellipse is described by using an endless string which is passed over two pins. If the axes are 6cm and 4cm the necessary length of the string and the distance between the pins respectively in cms are
(A) 6, $2\sqrt{5}$ (B) 6, $\sqrt{5}$ (C) 4, $2\sqrt{5}$ (D) none of these

3. The foci of the ellipse $25(x + 1)^2 + 9(y + 2)^2 = 225$, are at
(A) (–1, 2) and (–1, –6) (B) (–2, 1) and (–2, 6)
(C) (–1, –2) and (–2, –1) (D) (–1, –2) and (–1, –6)

4. If $\frac{x^2}{f(4a)} + \frac{y^2}{f\left(a^2-5\right)}$ represents an ellipse with major axis as y-axis and f is a decreasing function, then
(A) $a \in (-\infty, 1)$ (B) $a \in (5, \infty)$ (C) $a \in (1, 4)$ (D) $a \in (-1, 5)$

5. The set of values of a for which $(13x – 1)^2 + (13y – 2)^2 = a(5x + 12y – 1)^2$ represents an ellipse, if
(A) $1 < a < 2$ (B) $0 < a < 1$ (C) $2 < a < 3$ (D) none of these

6. The eccentricity of the ellipse $ax^2 + by^2 + 2fx + 2gy + c = 0$ if axis of ellipse parallel to x-axis to
(A) $\sqrt{\left(\frac{b-a}{b}\right)}$ (B) $\sqrt{\left(\frac{a+b}{b}\right)}$ (C) $\sqrt{\left(\frac{a+b}{a}\right)}$ (D) none of these

7. Three points A, B, C are taken on the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ with eccentric angle θ, $\theta + \alpha$ and $\theta + 2\alpha$, then
(A) the area of ΔABC is independent of θ (B) the area of ΔABC is independent of α
(C) the maximum value of area is $\frac{\sqrt{3}}{4}ab$ (D) the maximum value of area is $\frac{3\sqrt{3}}{4}ab$

8. If α and β are eccentric angles of the ends of a focal chord of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, then $\tan\frac{\alpha}{2}\tan\frac{\beta}{2}$ is equal to
(A) $\frac{1-e}{1+e}$ (B) $\frac{e-1}{e+1}$ (C) $\frac{e+1}{e-1}$ (D) $\frac{e-1}{e+3}$

9. The radius of the circle passing through the foci of the ellipse $\frac{x^2}{16} + \frac{y^2}{9} = 1$, and having its centre (0, 3) is
(A) 4 (B) 3 (C) $\sqrt{12}$ (D) 7/2

10. Equation to the ellipse whose centre is (–2, 3) and whose semi-axes are 3 and 2 and major axis is parallel to the x-axis, is given by
(A) $4x^2 + 9y^2 + 16x – 54y – 61 = 0$ (B) $4x^2 + 9y^2 – 16x + 54y + 61 = 0$
(C) $4x^2 + 9y^2 + 16x – 54y + 61 = 0$ (D) none of these

11. Q is a point on the auxiliary circle corresponding to the point on $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$.If T is the foot of the perpendicular dropped from the focus S on to the tangent to the auxiliary circle at Q then the ΔSPT IS

(A) isosceles (B) equilateral (C) right angled (D) right isosceles

12. A point is such that ratio of its distance from a fixed point and line $x=\frac{9}{2}$ is always 2 : 3. Then locus of the point will be

(A) Hyperbola (B) Ellipse (C) Parabola (D) Circle

13. P and Q are corresponding points on an ellipse and the auxiliary circle respectively. The normal at P to the ellipse meets CQ in R, where C is the centre of the ellipse. Value of CR is –

(A) a + b (B) 2(a + b) (C) 2a + b (D) a + 2b

14. The eccentricity of an ellipse whose pair of a conjugate diameter are y = x and 3y = – 2x is-

(A) 2/3 (B) 1/3 (C) $\frac{1}{\sqrt{3}}$ (d) none of these

15. Point 'O' is the centre of the ellipse with major axis AB & mi nor axis CD. Point F is one focus of the ellipse. If OF = 6 & the diameter of the inscribed circle of triangle OCF is 2, t hen the product (AB) (CD) is -

(A) 64 (B) 12 (C) 65 (D) 3

16. The equation of the circle passing through the points of intersect ion of ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ and $\frac{x^2}{b^2}+\frac{y^2}{a^2}=1$ is

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

17. If maximum distance of any point on the ellipse $x^2+2y^2+2xy=1$ from its centre be *r*, then *r* is equal to

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

18. An ellipse of eccentricity $\frac{2\sqrt{2}}{3}$ is inscribed in a circle and a point within the circle is chosen at random. The probability that this point lies outside the ellipse is :

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

19. If the tangent at a point $(a\cos\theta,b\sin\theta)$ on the ellipse $x^2/a^2+y^2/b^2=1$ meets the auxillary circle in two points, the chord joining them substands a right angle at the centre; then the eccentricity of tthe ellipse is given by

(A) $\left(1+\cos^2\theta\right)^{-1/2}$ (B) $1+\sin^2\theta$ (C) $\left(1+\sin^2\theta\right)^{-1/2}$ (D) $1+\cos^2\theta$

20. If chords of contact of tangents from two points $(x_1,y_1)(x_2,y_2)$ to the ellipse $\frac{x^2}{52}+\frac{y^2}{13}=1$ are at right angles then ratio of the product of abscissa's & ordinates is

(A) $-16:1$ (B) $4:1$ (C) $16:1$ (D) –4 : 1

NUMERICAL BASED

21. A man running round a race course notes that the sum of the distances of two flag posts from him is always 10m and the distance between the flag posts is 8m. Then the area of the path he encloses is A, then $\frac{A}{3\pi} =$ _

22. The value of 'a' in the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1 (b<a)$, if the extremities of the latus rectum of the ellipse having positive y–co–ordinate lie on $x^2 = -2(y - 2)$, is

23. A variable point P on the ellipse of eccentricity e is joined to the foci S and S'. If the locus of the incentre of the triangle PSS' is a conic of eccentricity e_1, then $\frac{2}{e_1^2}-\frac{1}{e}$ equals to

24. If p is the length of the perpendicular from a focus upon the tangent at any point P of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ and r is the distance of P from the focus, then $\frac{2a}{r}-\frac{b^2}{p^2}$ is equal to

25. The length of the sides of square which can be made by four perpendicular tangents to the ellipse $\frac{x^2}{7}+\frac{2y^2}{11}=1$ is

KEY

1.	C	**2.**	A	**3.**	A	**4.**	D	**5.**	B
6.	A	**7.**	D	**8.**	B	**9.**	A	**10.**	C
11.	A	**12.**	B	**13.**	A	**14.**	C	**15.**	C
16.	D	**17.**	C	**18.**	B	**19.**	C	**20.**	A
21.	5	**22.**	2	**23.**	1	**24.**	1	**25.**	5

✻ *Wish You all the Best* ✻