EXERCISE – I SINGLE CORRECT (OBJECTIVE QUESTIONS)

1. If distance between the directrices be thrice the distance between the foci, then eccentricity of ellipse is

(A) $\frac{1}{2}$ (B) $\frac{2}{3}$ (C) $\frac{1}{\sqrt{3}}$ (D) $\frac{4}{5}$

Sol.

2. If the eccentricity of an ellipse be 5/8 and the distance between its foci be 10, then its latus rectum is

(A) $\frac{39}{4}$ (B) 12 (C) 15 (D) $\frac{37}{2}$

Sol.

3. The curve represented by x = 3(cost + sint), y = 4(cost – sint), is

(A) ellipse (B) parabola (C) hyperbola (D) circle

Sol.

4. If the distance of a point on the ellipse $\frac{x^2}{6} + \frac{y^2}{2} = 1$ from the centre is 2, then the eccentric angle is

(A) $\pi/3$ (B) $\pi/4$ (C) $\pi/6$ (D) $\pi/2$

Sol.

5. An ellipse having foci at (3, 3) and (–4, 4) and passing through the origin has eccentricity equal to

(A) $\frac{3}{7}$ (B) $\frac{2}{7}$ (C) $\frac{5}{7}$ (D) $\frac{3}{5}$

Sol.

6. A tangent having slope of $-\frac{4}{3}$ to the ellipse $\frac{x^2}{18} + \frac{y^2}{32} = 1$ intersects the major & minor axes in points A & B respectively. If C is the centre of the ellipse then the area of the triangle ABC is

(A) 12 sq. units (B) 24 sq. units

(C) 36 sq. units (D) 48 sq. units

Sol.

7. The equation to the locus of the middle point of the portion of the tangent to the ellipse $\frac{x^2}{16} + \frac{y^2}{9} = 1$ included between the co-ordinate axes is the curve

(A) $9x^2 + 16y^2 = 4x^2y^2$ (B) $16x^2 + 9y^2 = 4x^2y^2$

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

Sol.

8. An ellipse is drawn with major and minor axes of lengths 10 and 8 respectively. Using one focus as centre, a circle is drawn that is tangent to the ellipse, with no part of the circle being outside the ellipse. The radius of the circle is

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

Sol.

9. Which of the following is the common tangent to the ellipses $\frac{x^2}{a^2+b^2} + \frac{y^2}{b^2} = 1$ & $\frac{x^2}{a^2} + \frac{y^2}{a^2+b^2} = 1$?

(A) $ay = bx + \sqrt{a^4 - a^2b^2 + b^4}$

(B) $by = ax - \sqrt{a^4 + a^2b^2 + b^4}$

(C) $ay = bx - \sqrt{a^4 + a^2b^2 + b^4}$

(D) $by = ax - \sqrt{a^4 - a^2b^2 + b^4}$

Sol.

10. Angle between the tangents drawn from point (4, 5) to the ellipse $\frac{x^2}{16} + \frac{y^2}{25} = 1$ is

(A) $\frac{\pi}{3}$ (B) $\frac{5\pi}{6}$ (C) $\frac{\pi}{4}$ (D) $\frac{\pi}{2}$

Sol.

11. The eccentricity of the ellipse $\frac{x^2}{4} + \frac{y^2}{3} = 1$ is decreasing at the rate of 0.1/second due to change in semi minor axis only. The time at which ellipse become auxiliary circle is

(A) 2 seconds (B) 3 seconds
(C) 4 seconds (D) 5 seconds

Sol.

12. The point of intersection of 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

(A) x = a/e (B) x = 0 (C) y = 0 (D) none

Sol.

13. Q is a point on the auxiliary circle of an ellipse. P is the corresponding point on ellipse. N is the foot of perpendicular from focus S, to the tangent of auxiliary circle at Q. Then

(A) SP = SN (B) SP = PQ

(C) PN = SP (D) NQ = SP

Sol.

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

(A) isosceles (B) equilateral

(C) right angled (D) right isosceles

Sol.

15. 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

(A) $x + ey + e^2a = 0$ (B) $x - ey - e^3a = 0$

(C) $x - ey - e^2a = 0$ (D) none of these

Sol.

16. 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

(A) $\frac{3\pi}{4}$ (B) $\frac{\pi}{4}$ (C) $\frac{\pi}{6}$ (D) $\tan^{-1} 2$

Sol.

17. PQ is a double ordinate of the ellipse $x^2 + 9y^2 = 9$, the normal at P meets the diameter through Q at R, then the locus of the mid point of PR is
(A) a circle (B) a parabola
(C) an ellipse (D) a hyperbola
Sol.

18. The equation of the chord of the ellipse $2x^2 + 5y^2 = 20$ which is bisected at the point (2, 1) is
(A) $4x + 5y + 13 = 0$ (B) $4x + 5y = 13$
(C) $5x + 4y + 13 = 0$ (D) $4x + 5y = 13$
Sol.

19. If F_1 & F_2 are the feet of the perpendiculars from the foci 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 $(S_1F_1) \cdot (S_2F_2)$ is equal to
(A) 2 (B) 3 (C) 4 (D) 5
Sol.

20. If $\tan\theta_1 . \tan\theta_2 = -\frac{a^2}{b^2}$ then the chord joining two points θ_1 & θ_2 on the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ will subtend a right angle at
(A) focus (B) centre
(C) end of the major axis (D) end of the minor axis
Sol.