EXERCISE – I SINGLE CORRECT (OBJECTIVE QUESTIONS)

1. The eccentricity of the hyperbola $4x^2 - 9y^2 - 8x = 32$ is

(A) $\frac{\sqrt{5}}{3}$ (B) $\frac{\sqrt{13}}{3}$ (C) $\frac{\sqrt{13}}{9}$ (D) $\frac{3}{2}$

Sol.

2. The locus of the point of intersection of the lines $\sqrt{3}x - y - 4\sqrt{3}k = 0$ and $\sqrt{3}kx + ky - 4\sqrt{3} = 0$ for different values of k is

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

Sol.

3. If the latus rectum of an hyperbola be 8 and eccentricity be $\frac{3}{\sqrt{5}}$ then the equation of the hyperbola is

(A) $4x^2 - 5y^2 = 100$ (B) $5x^2 - 4y^2 = 100$

(C) $4x^2 + 5y^2 = 100$ (D) $5x^2 + 4y^2 = 100$

Sol.

4. If the centre, vertex and focus of a hyperbola be (0, 0), (4, 0) and (6, 0) respectively, then the equation of the hyperbola is

(A) $4x^2 - 5y^2 = 8$ (B) $4x^2 - 5y^2 = 80$

(C) $5x^2 - 4y^2 = 80$ (D) $5x^2 - 4y^2 = 8$

Sol.

5. The equation of the hyperbola whose foci are (6, 5), (−4, 5) and eccentricity 5/4 is

(A) $\frac{(x-1)^2}{16} - \frac{(y-5)^2}{9} = 1$ (B) $\frac{x^2}{16} - \frac{y^2}{9} = 1$

(C) $\frac{(x-1)^2}{16} - \frac{(y-5)^2}{9} = -1$ (D) none of these

Sol.

6. 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

(A) $\frac{x^2}{25}-\frac{y^2}{144}=1$ (B) $\frac{(x-5)^2}{25}-\frac{y^2}{144}=1$

(C) $\frac{x^2}{25}-\frac{(y-5)^2}{144}=1$ (D) $\frac{(x-5)^2}{25}-\frac{(y-5)^2}{144}=1$

Sol.

7. 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

(A) $\frac{4}{49}x^2-\frac{196}{51}y^2=1$ (B) $\frac{49}{4}x^2-\frac{51}{196}y^2=1$

(C) $\frac{4}{49}x^2-\frac{51}{196}y^2=1$ (D) none of these

Sol.

8. 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 eof α is

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

Sol.

9. AB is a double ordinate of the hyperbola $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$ such that ΔAOB (where 'O' is the origin) is an equilateral triangle, then the eccentricity e of the hyperbola satisfies

(A) $e>\sqrt{3}$ (B) $1<e<\frac{2}{\sqrt{3}}$ (C) $e=\frac{2}{\sqrt{3}}$ (D) $e>\frac{2}{\sqrt{3}}$

Sol.

10. The equation of the tangent lines to the hyperbola $x^2 - 2y^2 = 18$ which are perpendicular to the line $y = x$ are

(A) $y = x \pm 3$ (B) $y = -x \pm 3$

(C) $2x + 3y + 4 = 0$ (D) none of these

Sol.

11. The equation to the common tangents to the two hyperbolas $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ and $\frac{y^2}{a^2} - \frac{x^2}{b^2} = 1$ are

(A) $y = \pm x \pm \sqrt{b^2 - a^2}$ (B) $y = \pm x \pm (a^2 - b^2)$

(C) $y = \pm x \pm \sqrt{a^2 - b^2}$ (D) $y = \pm x \pm \sqrt{a^2 + b^2}$

Sol.

12. Locus of the feet of the perpendiculars drawn from either foci on a variable tangent to the hyperbola $16y^2 - 9x^2 = 1$ is

(A) $x^2 + y^2 = 9$ (B) $x^2 + y^2 = 1/9$

(C) $x^2 + y^2 = 7/144$ (D) $x^2 + y^2 = 1/16$

Sol.

13. The ellipse $4x^2 + 9y^2 = 36$ and the hyperbola $4x^2 - y^2 = 4$ have the same foci and they intersect at right angles then the equation of the circle through the points of intersection of two conics is

(A) $x^2 + y^2 = 5$ (B) $\sqrt{5}(x^2+y^2) - 3x - 4y = 0$

(C) $\sqrt{5}(x^2+y^2)+3x+4y=0$ (D) $x^2 + y^2 = 25$

Sol.

14. The equation of the common tangent to the parabola $y^2 = 8x$ and the hyperbola $3x^2 - y^2 = 3$ is
(A) $2x \pm y + 1 = 0$ (B) $x \pm y + 1 = 0$
(C) $x \pm 2y + 1 = 0$ (D) $x \pm y + 2 = 0$
Sol.

15. Equation of the chord of the hyperbola $25x^2 - 16y^2 = 400$ which is bisected at the point (6, 2) is
(A) $16x - 75y = 418$ (B) $75x - 16y = 418$
(C) $25x - 4y = 400$ (D) none of these

Sol.

16. The asymptotes of the hyperbola $xy-3x-2y=0$ are
(A) $x - 2 = 0$ and $y - 3 = 0$ (B) $x - 3 = 0$ and $y - 2 = 0$
(C) $x + 2 = 0$ and $y + 3 = 0$ (D) $x + 3 = 0$ and $y + 2 = 0$
Sol.

17. If the product of the perpendicular distances from any point on the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ of eccentricity $e = \sqrt{3}$ on its asymptotes is equal to 6, then the length of the transverse axis of the hyperbola is
(A) 3 (B) 6 (C) 8 (D) 12
Sol.

18. If the normal to the rectangular hyperbola $xy = c^2$ at the point 't' meets the curve again at 't_1' then t^3t_1 has the value equal to

(A) 1 (B) –1 (C) 0 (D) none

Sol.

19. Area of triangle formed by tangent to the hyperbola $xy = 16$ at (16, 1) and co-ordinate axes equals

(A) 8 (B) 16 (C) 32 (D) 64

Sol.

20. Locus of the middle points of the parallel chords with gradient m of the rectangular hyperbola $xy = c^2$ is

(A) $y + mx = 0$ (B) $y – mx = 0$

(C) $my – mx = 0$ (D) $my + x = 0$

Sol.