MATHS

BOOKS - MODERN PUBLICATION MATHS (KANNADA ENGLISH)

HYPERBOLA

Multiple Choice Questions Level I

1. The eccentricity of the hyperbola whose latus rectum is 8 and conjugate axis is equal to half of the distance between the foci is :

A. $\frac{4}{3}$

B. $\frac{4}{\sqrt{3}}$

C. $\frac{2}{\sqrt{3}}$

D. None of these

Answer: C

Watch Video Solution

2. The distance between the foci of a hyperbola is 16 and its eccentricity is $\sqrt{2}$. Its equation is :

A. $x^2 - y^2 = 32$

B. $\frac{x^2}{4} - \frac{y^2}{y} = 1$

C. $2x^2 - 3y^2 = 7$

D. None of these

Answer: A

Watch Video Solution

3. The length of the transverse axid , along x - axis with centre at origin of a hyperbola is 7 and it passes through the point (5,-2) . The equations of the hyperbola is :

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

B. $\frac{49}{4}x^2 - \frac{21}{196}y^2 = 1$

C. $\frac{4}{49}x^2 - \frac{51}{196}y^2 = 1$

D. None of these

Answer: C

Watch Video Solution

4. If (5,12) and (24,7) are the foci of a hyperbola passing through the origin , then the eccentricity of the hyperbola is :

A. $\frac{\sqrt{386}}{12}$

B. $\frac{\sqrt{386}}{38}$

C. $\frac{\sqrt{386}}{13}$

D. $\frac{\sqrt{386}}{25}$

Answer: A

Watch Video Solution

5. If e and e' be the eccentricities of a hyperbola and its conjugate , then $\frac{1}{e^2}+\frac{1}{e'^2}$ equals :

A. 0

B. 1

C. 2

D. None of these

Answer: B

Watch Video Solution

6. If e_1 and e_2 are eccentricities of two hyperbolas : $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ and $\frac{x^2}{b^2} - \frac{y^2}{a^2} = 1$, then :

A. $e_1 = e_2$

B. $e_1 e_2 = 1$

C. $e_1 = -e_2$

D. $\frac{1}{e_1^2} + \frac{1}{e_2^2} = 1.$

Answer: D

Watch Video Solution

7. If e and e' be the eccentricities of a hyperbolas $xy = c^2$ and $x^2 - y^2 = c^2$, then $e^2 + e'2$ equals :

A. 1

B. 4

C. 6

D. 8

Answer: B

Watch Video Solution

8. The latus - rectum of the hyperbola :

$9x^2 - 16y^2 - 18x - 32y - 151 = 0$ is :

A. $\frac{9}{4}$

B. 9

C. $\frac{3}{2}$

D. $\frac{9}{2}$

Answer: D

Watch Video Solution

9. The centre of the hyperbola :

$9x^2 - 36x - 16y^2 + 96y - 252 = 0$ is

A. $(2, 3)$

B. $(-2, -3)$

C. $(-2, 3)$

D. $(2, -3)$

Answer: A

Watch Video Solution

10. The equation of the hyperbola with vertices at $(\pm 5, 0)$ and foci at $(\pm 7, 0)$ is :

A. $-\frac{x^2}{25} + \frac{y^2}{24} = 1$

B. $\frac{x^2}{25} - \frac{y^2}{24} = 1$

C. $\frac{x^2}{24} - \frac{y^2}{25} = 1$

D. $-\frac{x^2}{24} + \frac{y^2}{25} = 1$

Answer: B

Watch Video Solution

11. If vertex and fous of a hyperbola are (2,3) and (6,3) respectively and eccentricity e of the hyperbola is 2, then equation of the hyperbola is :

A. $\frac{(x+2)^2}{9} - \frac{(y-3)^2}{27} = 1$

B. $\frac{(x+1)^2}{16} - \frac{(y-3)^2}{48} = 1$

C. $\frac{(x+2)^2}{16} - \frac{(y-3)^2}{48} = 1$

D. None of these

Answer: C

View Text Solution

12. The equation of the hyperbola with eccentricity $\frac{3}{2}$ and foci at $(\pm 2, 0)$ is

A. $\frac{x^2}{4} - \frac{y^2}{3} = \frac{4}{9}$

B. $\frac{x^2}{9} - \frac{y^2}{9} = \frac{4}{9}$

C. $\frac{x^2}{4} - \frac{y^2}{9} = 1$

D. None of these

Answer: A

Watch Video Solution

13. The equations $x = \frac{1}{2}\left(t + \frac{1}{t}\right), y = \frac{1}{2}\left(t - \frac{1}{t}\right), t \neq 0$, represent

A. a circle

B. a parabola

C. an ellipse

D. a hyperbola

Answer: D

Watch Video Solution

14. The equations $x = \frac{e^t + e^{-t}}{2}, y = \frac{e^t - e^{-t}}{2}, t \in R$ represent :

A. a circle

B. a parabola

C. an ellipse

D. a hyperbola

Answer: D

Watch Video Solution

15. The curve described parametrically by :

$x = t^2 + t + 1, y = t^2 - t + 1$ represents

A. a pair of st . Lines

B. an ellipse

C. a parabola

D. a hyperbola

Answer: C

Watch Video Solution

16. Let F_1 and F_2 be two fixed points and P be a point such that $||PF_1| - |PF_2|| = 2a$ where $a > \frac{1}{2}|F_1F_2|$. Then locus of P is

A. a hyperbola

B. an ellipse

C. a parabola

D. None of these

Answer: D

View Text Solution

17. If F_1 and F_2 are foci of the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ and P is any point on the hyperbola, then : $||PF_1| - |PF_2||$ is equal to :

A. $2a$

B. $2b$

C. $a + b$

D. $|a - b|$

Answer: A

View Text Solution

18. The equation of the normal to the hyperbola $\frac{x^2}{16} - \frac{y^2}{9} = 1$ at point $\left(8, 3\sqrt{3}\right)$ is :

A. $\sqrt{3}x + 2y = 25$

B. $x + y = 25$

C. $y + 2x = 25$

D. $2x + \sqrt{3}y = 25$

Answer: D

Watch Video Solution

19. If the normal at $\left(ct, \frac{c}{t}\right)$ on the curve $xy = c^2$ meets the curve again in $'t'$, then :

A. $t' = -\frac{1}{t^3}$

B. $t' = -\frac{1}{t}$

C. $t' = -\frac{1}{t^2}$

D. $t'^2 = -\frac{1}{t^2}$

Answer: A

Watch Video Solution

20. The st. line y = 4x + c touches the hyperbola $x^2 - y^2 = 1$ if .

A. c = 0

B. $c = \pm\sqrt{2}$

C. $c = \pm\sqrt{15}$

D. $c = \pm\sqrt{17}$

Answer: C

Watch Video Solution

21. The locus of the centre of the circle :

$x^2 + y^2 + 4x\cos\theta - 2y\sin\theta - 10 = 0$ is ,

A. a parabola

B. a hyperbola

C. an ellipse

D. None of these

Answer: C

Watch Video Solution

22. The locus of variable point whose distance from $(-2, 0)$ is $\frac{2}{3}$ times its distance from the line $x = -\frac{9}{2}$ is :

A. a circle

B. a parabola

C. a hyperbola

D. all ellipse

Answer: D

Watch Video Solution

23. Locus of the centre of a circle which touches given circle externally is :

A. an ellipse

B. a parabola

C. a hyperbola

D. None of these

Answer: C

Watch Video Solution

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

A. $4x - 4y = 3$

B. $3x - 4y = 4$

C. $3x - 4y = 2$

D. $3y - 4x + 4 = 0$

Answer: B

Watch Video Solution

25. If the polar of $y^2 = 4ax$ is always touching the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$, then the locus of the pole is :

A. a circle

B. a parabola

C. all ellipse

D. a hyperbola

Answer: C

Watch Video Solution

26. A point moves in a plane so that its distances PA and PB from two fixed points A and B in the plane satisfy the relation $PA - PB = (k \neq 0)$, then the locus of P is :

A. a parabola

B. an ellipse

C. a hyperbola

D. a branch of a hyperbola.

Answer: C

Watch Video Solution

27. A rectangular hyperbola whose centre is C is cut by any circle of radius r in four points P,Q,R and S . Then $CP^2 + CQ^2 + CR^2 + CS^2$ equals .

A. $4r^2$

B. $3r^2$

C. $2r^2$

D. r^2

Answer: A

Watch Video Solution

28. The equation of the chord joining the points (x_1, y_1) and (x_2, y_2) on the rectangular hyperbola $xy = c^2$ is :

A. $\frac{x}{x_1+x_2}+\frac{y}{y_1+y_2}=1$

B. $\frac{x}{x_1-x_2}+\frac{y}{y_1-y_2}=1$

C. $\frac{x}{y_1+y_2}+\frac{y}{x_1+x_2}=1$

D. $\frac{x}{y_1-y_2}+\frac{y}{x_1-x_2}=1$

Answer: A

Watch Video Solution

29. If the foci of the ellipse $\frac{x^2}{16}+\frac{y^2}{b^2}=1$ and the hyperbola $\frac{x^2}{144}-\frac{y^2}{81}=\frac{1}{25}$ coincide then the value of b^2 is

A. 1

B. 5

C. 7

D. 9

Answer: C

Watch Video Solution

30. Which one of the following is independent of α in the hyperbola $\left(0 < \alpha < \frac{\pi}{2}\right) \frac{x^2}{\cos^2 \alpha} - \frac{y^2}{\sin^2 \alpha} = 1$

A. eccentricity

B. abscissa of foci

C. directrix

D. vertex

Answer: B

Watch Video Solution

31. $2x + \sqrt{6}y = 2$ touches the hyperbola $x^2 - 2y^2 = 4$, then the point of contact is :

A. $(-2, \sqrt{6})$

B. $(-5, 2\sqrt{6})$

C. $\left(\frac{1}{2}, \frac{1}{\sqrt{6}}\right)$

D. $(4, -\sqrt{6})$

Answer: D

Watch Video Solution

32. A circle touches the x - axis and also touches the circle with centre (0,3) and radius 2. The locus of the centre of the circle is :

A. a circle

B. an ellipse

C. a parabola

D. a hyperbola

Answer: C

Watch Video Solution

33. 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 ?

A. Directix

B. Abscissa of vertices

C. Abscissa of foci

D. Eccentricity

Answer: C

Watch Video Solution

Multiple Choice Questions Level Ii

1. The point of intersection of the curves whose parametric equations are $x = t^2 + 1, y = 2t$ and $x = 2s, y = \frac{2}{s}$ is given by :

A. $(1, -3)$

B. $(-2, 4)$

C. (1,2)

D. (2,2)

Answer: D

Watch Video Solution

2. The equation of the tangent to the hyperbola $2x^2 - 3y^2 = 6$, which is parallel to the line y = 3x + 4 is :

A. y = 3x + 5

B. y = 3x - 5

C. $y = 3x + 5$ and $y = 3x - 5$

D. None of these

Answer: C

Watch Video Solution

3. If the normal at P to the rectangular hyperbola $x^2 - y^2 = 4$ touches the exes of x and y in G and g respectively and O is the centre of the hyperbola, then 2PO equals :

A. PG

B. Pg

C. Gg

D. None of these

Answer: C

Watch Video Solution

4. The value of ' m ' for which $y = mx + 6$ is a tangent to the hyperbola $\frac{x^2}{100} - \frac{y^2}{49} = 1$ is :

A. $\sqrt{\frac{17}{20}}$

B. $\sqrt{\frac{20}{17}}$

C. $\sqrt{\frac{3}{20}}$

D. $\sqrt{\frac{20}{3}}$

Answer: A

Watch Video Solution

5. The equations to the common tangents to the two hyperbolas $\frac{x^2}{a^2} - \frac{v^2}{b^2} = 1$ and $\frac{v^2}{a^2} - \frac{x^2}{b^2} = 1$ are

A. $y = \pm x \pm \sqrt{a^2 + b^2}$

B. $y = \pm x \pm (a^2 - b^2)$

C. $y = \pm x \pm \sqrt{a^2 - b^2}$

D. $y = \pm x \pm \sqrt{b^2 - a^2}$

Answer: C

Watch Video Solution

6. If the chords of contact of tangents from two points (x_1, y_1) and (x_2, y_2) to the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ are at right angles , then $\frac{x_1 x_2}{y_1 y_2}$ equals :

A. $\frac{-b^2}{a^2}$

B. $-\frac{a^2}{b^2}$

C. $-\frac{a^4}{b^4}$

D. $-\frac{b^4}{a^4}$

Answer: C

Watch Video Solution

7. If $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1(a > b)$ and $x^2 - y^2 = c^2$ cut at right angles , then :

A. $a^2 + b^2 = 2c^2$

B. $b^2 - a^2 = 2c^2$

C. $a^2 - b^2 = 2c^2$

D. $a^2b^2 = 2c^2$

Answer: C

Watch Video Solution

8. The angle between the asymptotes of $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ is equal to :

A. $2\tan^{-1}\left(\frac{b}{a}\right)$

B. $\tan^{-1}\left(\frac{a}{b}\right)$

C. $2\tan^{-1}\left(\frac{a}{b}\right)$

D. $\tan^{-1}\left(\frac{b}{a}\right)$

Answer: A

Watch Video Solution

9. If P is a point on the rectangular hyperbola $x^2 - y^2 = a^2$, C being the centre and S, S' are two foci , then S.P S'P equals

A. $(CP)^2$

B. $(CS)^2$

C. $(SS')^2$

D. 3

Answer: A

Watch Video Solution

10. If x = 9 is the chord of contact of the hyperbola $x^2 - y^2 = 9$, then the equation of the corresponding pair of tangents is :

A. $9x^2 - 8y^2 + 18x + 9 = 0$

B. $9x^2 - 8y^2 - 18x - 9 = 0$

C. $9x^2 - 8y^2 + 18x - 9 = 0$

D. $9x^2 - 8y^2 - 18x + 9 = 0$

Answer: D

Watch Video Solution

11. The equation of a tangent to the hyperbola $16x^2 - 25y^2 - 96x + 100y - 356 = 0$, which makes an angle of $\frac{\pi}{4}$ with the transverse axis is :

A. $y = x + 2$

B. $y = x + 3$

C. $x + y + 2 = 0$

D. $x = y + 2$

Answer: A

Watch Video Solution

12. The point of intersection of two tangents to the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$, the product of whose slopes is c^2 , lies on the curve.

A. $y^2 - a^2 = c^2\left(x^2 + b^2\right)$

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

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

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

Answer: C

Watch Video Solution

13. PM is perpendicular from a point on a rectangular hyperbola to its asymptotes , them the locus of the mid - point of PM is :

A. a circle

B. a parabola

C. an ellipse

D. a hyperbola

Answer: D

Watch Video Solution

Watch Video Solution

14. Product of lengths of perpendiculars drawn from the foci on any tangent to the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ is :

A. a^2

B. b^2

C. $\frac{a^2}{b^2}$

D. a^2b^2

Answer: B

Watch Video Solution

15. The equation of the tangent to the curve:

$x^2 - y^2 - 8x + 2y + 11 = 0$ at (2,1) is :

A. $x + 2 = 0$

B. $2x + 1 = 0$

C. $x - 2 = 0$

D. $x + y + 1 = 0$

Answer: C

Watch Video Solution

16. The equation of the common tangent to the curves $y^2 = 8x$ and $xy = -1$ is :

A. $3y = 9x + 2$

B. $y - 2x + 1$

C. $2y = x + 8$

D. $y = x + 2$

Answer: D

Watch Video Solution

Watch Video Solution

17. The locus of a point $P(\alpha, \beta)$ moving under the condition that the line $y = \alpha x + \beta$ is a tangent to the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ is :

A. a circle

B. an ellipse

C. a hyperbola

D. a parabola

Answer: C

Watch Video Solution

18. A hyperbola having the transversal axis of length $2\sin\theta$ is confocal with the ellipse $3x^2 + 4y^2 = 12$ Then its equations is :

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. $x^2 \sec^2\theta - y^2 \cos^2\theta = 1$

D. $x^2 \cos^2\theta - y^2 \sin^2\theta = 1$

Answer: A

Watch Video Solution

19. Consider a branch of the hyperbola $x^2 - 2y^2 - 2\sqrt{2}x - 4\sqrt{2}y - 6 = 0$ 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. $\sqrt{\frac{2}{3}} + 1$

Answer: B

Watch Video Solution

20. The locus of the orthocenter of the triangle formed by the lines $(1+p)x - py + p(1+p) = 0, (1+q)x - qy + q(1+q) = 0$ and $y = 0$, where $p \neq q$, is

A. a hyperbola

B. a parabola

C. an ellipse

D. a straight line

Answer: D

Watch Video Solution

Latest Questions From Aieee Jee Examinations

1. The equation of the hyperbol whose foci are (-2,0) and (2,0) and eccentricity is 2 is given by :

A. $x^2 - 3y^2 = 3$

B. $3x^2 - y^2 = 3$

C. $-x^2 + 3y^2 = 3$

D. $-3x^2 + y^2 = 3$

Answer: B

Watch Video Solution

2. Tangents are drawn to the hyperbol $\frac{x^2}{9} - \frac{y^2}{4} = 1$,parallel to the straight line 2x - y = 1 . The points of contacts of the tangents of the hypebola are :

A. $\left(\frac{9}{2\sqrt{2}}, \frac{1}{\sqrt{2}}\right)$

B. $\left(-\frac{9}{2\sqrt{2}}-\frac{1}{\sqrt{2}}\right)$

C. $(3\sqrt{3},\ -2\sqrt{2})$

D. $(-3\sqrt{3}, 2\sqrt{2})$

Answer: A::B

Watch Video Solution

Recent Competitive Questions

1. The distance of the focus of $x^2-y^2=4$, from the directrix , which in near to it is :

A. $\sqrt{2}$

B. $2\sqrt{2}$

C. $8\sqrt{2}$

D. $4\sqrt{2}$

Answer: A

Watch Video Solution

2. If the focii of $\frac{x^2}{16}+\frac{y^2}{4}=1$ and $\frac{x^2}{a^2}-\frac{y^2}{3}$=1 coincide, then value of a is

A. $\sqrt{3}$

B. $\frac{1}{\sqrt{3}}$

C. 2

D. 3

Answer: D

Watch Video Solution

3. The equation of a hyperbola whose asymtotes are 3x $\pm$ 5y=0 and vertices are $(\pm 5, 0)$ is

A. $3x^2 - 5y^2 = 0$

B. $5x^2 - 3y^2 = 25$

C. $25^x - 9y^2 = 225$

D. $9x^2 - 25y^2 = 225$

Answer: D

Watch Video Solution

4. If the foci of the ellipse $\frac{x^2}{16} + \frac{y^2}{b^2} = 1$ and the hyperbola $\frac{x^2}{144} - \frac{y^2}{81} = \frac{1}{25}$ coincide then the value of b^2 is

A. 25

B. 9

C. 16

D. 4

Answer: C

Watch Video Solution

5. If the ecentricity of the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1 is \frac{5}{4}$ and $2x + 3y - 6 = 0$ is focal chord of the hyperbola , then the length of tranverse axis is equal to _____.

A. $\frac{12}{5}$

B. $\frac{24}{5}$

C. $\frac{6}{5}$

D. $\frac{5}{24}$

Answer: B

Watch Video Solution