CONIC SECTIONS

EE24BTECH11030 - J.KEDARANANDA

14. If a > 2b > 0 then the positive value of m for which $y = mx - b\sqrt{1+m^2}$ is a common tangent to $x^2 + y^2 = b^2$and $(x-a)^2 + y^2 = b^2$ is (2002S)
    a) $\frac{2b}{a^2-4b^2}$
    b) $\frac{\sqrt{a^2-4b^2}}{2b}$
    c) $\frac{2b}{a-2b}$
    d) $\frac{b}{a-2b}$
15. The locus of the mid-point of the line segment joining the focus to a moving point on the parabola $y^2 = 4ax$ is another parabola with directrix (2002S)
    a) $x = -a$
    b) $x = -a/2$
    c) $x = a$
    d) $x = a/2$
16. The equation of the common tangent to the curves $y^2 = 8x$ and $xy = -1$ is (2002S)
    a) $3y = 9x + 2$
    b) $y = 2x + 1$
    c) $2y = x + 8$
    d) $y = x + 2$
17. The area of the quadrilateral formed by the tangents at the end points of the latus rectum to the ellipse $\frac{x^2}{9} + \frac{y^2}{5} = 1$, is (2003S)
    a) $27/4 sq.units$
    b) $9 sq.units$
    c) $27/2 sq.units$
    d) $27 sq.units$
18. The focal chord to $y^2 = 16x$ is tangent to $(x-6)^2 + y^2 = 2$,then the possible values of the slope of this chord,are (2003S)
    a) $-1, 1$
    b) $-2, 2$
    c) $-2, -1/2$
    d) $2, -1/2$
19. For hyperbola $\frac{x^2}{\cos^2\alpha} - \frac{y^2}{\sin^2\alpha} = 1$ which of the following remains constant with change in 'α' (2003S)
    a) abscissae of vertices
    b) abscissae of foci
    c) eccentricity
    d) directrix
20. If tangents are drawn to ellipse $x^2+2y^2 = 2$,then the locus of the mid-point of the intercept made by the tangents between the coordinate axes is (2004S)
    a) $\frac{1}{2x^2} + \frac{1}{4y^2}$
    b) $\frac{1}{4x^2} + \frac{1}{2x^2}$
    c) $\frac{x^2}{2} + \frac{y^2}{4} = 1$
    d) $\frac{x^2}{4} + \frac{y^2}{2} = 1$
21. The angle between the tangents drawn from the point (1,4) to the parabola $y^2 = 4x$ is (2004S)
    a) $\pi/6$

b) $\pi/4$

c) $\pi/3$

d) $\pi/2$

22. If the line $2x + \sqrt{6}y = 2$ touches the hyperbola $x^2 - 2y^2 = 4$,then the point of contact is (2004S)
    a) $(-2, \sqrt{6})$

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

    c) $(\frac{1}{2}, \frac{1}{\sqrt{6}})$

    d) $(4, -\sqrt{6})$

23. The minimum area of the triangle formed by the tangent to the $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ & coordinate axes is (2005S)
    a) ab sq. units

    b) $\frac{a^2+b^2}{2}$ sq. units

    c) $\frac{(a+b)^2}{2}$ sq. units

    d) $\frac{a^2+ab+b^2}{3}$ sq. units

24. Tangent to the curve $y = x^2 + 6$ at a point (1,7) touches the circle $x^2 + y^2 + 16x + 12y + c = 0$ at a point Q.Then the coordinates of Q are (2005S)
    a) (-6,-11)

    b) (-9,-13)

    c) (-10,-15)

    d) (-6,-7)

25. The axis of the parabola is along the line y=x and the distance of its vertex and focus from origin are $\sqrt{2}$ and $2\sqrt{2}$ respectively.If the vertex and focus both lie in the first quadrant,then the equation of the parabola is (2006-3M,-1)
    a) $(x + y)^2 = (x - y - 2)$

    b) $(x - y)^2 = (x + y - 2)$

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

    d) $(x - y)^2 = 8(x + y - 2)$

26. A hyperbola, having the transverse axis of length $2\sin\theta$, is confocal with the ellipse $3x^2 + 4y^2 = 12$. Then its equation is (2007-3 marks)
    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) $x^2 \sin^2\theta - y^2 \cos^2\theta = 1$

    d) $x^2 \cos^2\theta - y^2 \sin^2\theta = 1$

27. Let a and b be non-zero real numbers.Then,the equation $(ax^2 + by2 + c)(x^2 - 5xy + 6y^2 = 0)$ represents (2008)
    a) four straight lines,when c=0 and a,b are of the same sign.

    b) two straight lines and a circle,when a=b,and c is of sign opposite to that of a

    c) two straight lines and a hyperbola,when a and b are of the same sign and c is of opposite to that of a

    d) a circle and a ellipse,when a and b are of the same sign and c is of sign opposite to that of a

28. Consider a branch of the hyperbola
    $x^2 - 2y2 - 2\sqrt{2}x - 4\sqrt{2}y - 6 = 0$
    with vertex at a point A.Let B be one of the end points of its latusrectum. If C is the focus of the hyperbola nearest to the point A,then the area of the triangle ABC is (2008)
    a) $1 - \sqrt{\frac{2}{3}}$

    b) $\sqrt{\frac{3}{2}} - 1$

    c) $1 + \sqrt{\frac{2}{3}}$

    d) $\sqrt{\frac{3}{2}} + 1$

29. The line passing through the extremity A of the major axis and extremity B of the minor

axis of the ellipse
$x^2 + 9y^2 = 9$
meets its auxillary circle at the point M. Then the area of the triangle with the vertices at A,M and the origin O is (2009)

a) $\frac{31}{10}$

b) $\frac{29}{10}$

c) $\frac{21}{10}$

d) $\frac{27}{10}$