CONIC SECTIONS

EE24BTECH11030 - J.KEDARANANDA

1) 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) $\frac{2b}{\sqrt{a^2-4b^2}}$

 c) $\frac{\sqrt{a^2-4b^2}}{2b}$

 b) $\frac{2b}{a-2b}$

 d) $\frac{b}{a-2b}$

2) 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

3) The equation of the common tangent to the curves $y^2 = 8x$ and $xy = -1$ is (2002S)

 a) $3y = 9x + 2$

 c) $2y = x + 8$

 b) $y = 2x + 1$

 d) $y = x + 2$

4) 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

 c) 27/2 sq.units

 b) 9 sq.units

 d) 27 sq.units

5) 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) $-1, 1$

 c) $-2, -1/2$

 b) $-2, 2$

 d) $2, -1/2$

6) 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

 c) eccentricity

 d) directrix

 b) abscissae of foci

7) 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) $\frac{1}{2x^2} + \frac{1}{4y^2}$

 c) $\frac{x^2}{2} + \frac{y^2}{4} = 1$

 b) $\frac{1}{4x^2} + \frac{1}{2x^2}$

 d) $\frac{x^2}{4} + \frac{y^2}{2} = 1$

8) 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) $\pi/2$

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

 a) $(-2, \sqrt{6})$

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

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

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

10) 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

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

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

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

11) 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) $(-6, -11)$ c) $(-10, -15)$

b) $(-9, -13)$ d) $(-6, -7)$

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

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

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

14) Let a and b be non-zero real numbers.Then,the equation $(ax^2 + by^2 + c)(x^2 - 5xy + 6y^2 = 0)$ 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

15) 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 latus rectum. 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) $\sqrt{\frac{3}{2}} + 1$

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