Assignment-01

EE24BTECH11036 - KRISHNA PATIL

SECTION B : JEE MAINS / AIEEE

1) Two common tangents to the circle $x^2 + y^2 = 2a^2$ and parabola $y^2 = 8ax$ are (2002)

a) $x = \pm(y + 2a)$ c) $x = \pm(y + a)$
b) $y = \pm(x + 2a)$ d) $y = \pm(x + a)$

2) The normal at a point $\left(bt_1^2, 2bt_1\right)$ on a parabola meets the parabola again in the point $\left(bt_2^2, 2bt_2\right)$,then (2003)

a) $t_2 = t_1 + \frac{2}{t_1}$ c) $t_2 = -t_1 + \frac{2}{t_1}$
b) $t_2 = -t_1 - \frac{2}{t_1}$ d) $t_2 = t_1 - \frac{2}{t_1}$

3) The foci of the ellipse $\frac{x^2}{16} + \frac{y^2}{b}$ and the hyperbola $\frac{x^2}{144} - \frac{y^2}{81} = \frac{1}{25}$ coincide. Then the value of b^2 is (2003)

a) 9 c) 5
b) 1 d) 7

4) If a $\neq$ 0 and the line $2bx + 3cy + 4d = 0$ passes through the points of intersection of the parabolas $y^2 = 4ax$ and $x^2 = 4ay$, then (2004)

a) $d^2 + (3b - 2c)^2 = 0$ c) $d^2 + (2b - 3c)^2 = 0$
b) $d^2 + (3b + 2c)^2 = 0$ d) $d^2 + (2b + 3c)^2 = 0$

5) The eccentricity of an ellipse, with its centre at the origin, is $\frac{1}{2}$ · If one of the directrices is $x = 4$, then the equation of the ellipse is: (2004)

a) $4x^2 + 3y^2 = 1$ c) $4x^2 + 3y^2 = 12$
b) $3x^2 + 4y^2 = 12$ d) $3x^2 + 4y^2 = 1$

6) Let **P** be the point $(1, 0)$ and **Q** a point on the locus $y^2 = 8x$. The locus of mid point of PQ is (2005)

a) $y^2 - 4x = 2$ c) $x^2 + 4y = 2$
b) $y^2 + 4x = 2$ d) $x^2 - 4y = 2$

7) The locus of a point **P** (α, β) moving under the condition that the line $y = \alpha x + \beta$ is a tangent to the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2}$ is (2005)

a) an ellipse c) a parabola
b) a circle d) a hyperbola

8) An ellipse has OB as semi minor axis, **F** and **F′** focii and the angle FBF' is a right angle · Then the eccentricity of the ellipse is (2005)

a) $\frac{1}{\sqrt{2}}$ c) $\frac{1}{4}$
b) $\frac{1}{2}$ d) $\frac{1}{\sqrt{3}}$

9) The locus of the vertices of the family of parabolas $y = \frac{a^3x^2}{3} + \frac{a^2x}{2} - 2a$ is (2006)

a) $xy = \frac{105}{64}$ c) $xy = \frac{35}{16}$
b) $xy = \frac{3}{4}$ d) $xy = \frac{64}{104}$

10) In an ellipse, the distance between its foci is 6 and minor axis is 8. Then it's eccentricity is (2006)

a) $\frac{3}{5}$ c) $\frac{4}{5}$
b) $\frac{1}{2}$ d) $\frac{1}{\sqrt{5}}$

11) Angle between the tangents to the curve $y = x^2 - 5x + 6$ at the points $(2, 0)$ and $(3, 0)$ is (2006)

a) π c) $\frac{\pi}{6}$
b) $\frac{\pi}{2}$ d) $\frac{\pi}{4}$

12) 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 = ? (2007)

a) abscissae of vertices
b) abscissae of foci
c) eccentricity
d) directrix

13) The equation of a tangent to the parabola $y^2 = 8x$ is $y = x + 2$ · The point on this line from which the other tangent to the parabola is perpendicular to the given tangent is (2007)

a) $(2, 4)$ c) $(-1, 1)$
b) $(-2, 0)$ d) $(0, 2)$

14) The normal to a curve at $\mathbf{P}(x, y)$ meets the x-axis at $\mathbf{G}$ · If the distance of G from the origin is twice the abscissa of $\mathbf{P}$, then the curve is (2007)

a) circle
b) hyperbola
c) ellipse
d) parabola

15) A focus of an ellipse is at the origin · The directrix is the line $x = 4$ and the eccentricity is $\frac{1}{2}$ · Then the length of the semi-major axis is (2008)

a) $\frac{8}{3}$
b) $\frac{2}{3}$
c) $\frac{4}{3}$
d) $\frac{5}{3}$