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 (2) 005]

(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 $\mathbf{G}$ 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) $\frac{5}{3}$