

ASSIGNMENT - 1

EE24BTECH11019 - Dwarak A

SECTION B — JEE MAIN/AIEEE

- 1) A parabola has the origin as its focus and the line $x = 2$ as the directrix. Then the vertex of the parabola is at (2008)
 - a) (0, 2)
 - b) (1, 0)
 - c) (0, 1)
 - d) (2, 0)
- 2) The ellipse $x^2 + 4y^2 = 4$ is inscribed in a rectangle aligned with the coordinate axes, which in turn is inscribed in another ellipse that passes through the point (4, 0). Then the equation of the ellipse is: (2009)
 - a) $x^2 + 12y^2 = 16$
 - b) $4x^2 + 48y^2 = 48$
 - c) $4x^2 + 64y^2 = 48$
 - d) $x^2 + 16y^2 = 16$
- 3) If two tangents drawn from a point **P** to the parabola $y^2 = 4x$ are at right angles, then the locus of **P** is (2010)
 - a) $2x + 1 = 0$
 - b) $x = -1$
 - c) $2x - 1 = 0$
 - d) $x = 1$
- 4) Equation of the ellipse whose axes are the axes of coordinates and which passes through the point $(-3, 1)$ and has eccentricity $\sqrt{\frac{2}{5}}$ is (2011)
 - a) $5x^2 + 3y^2 - 48 = 0$
 - b) $3x^2 + 5y^2 - 15 = 0$
 - c) $5x^2 + 3y^2 - 32 = 0$
 - d) $3x^2 + 5y^2 - 32 = 0$
- 5) Statement-1 : An equation of a common tangent to the parabola $y^2 = 16\sqrt{3}x$ and the ellipse $2x^2 + y^2 = 4$ is $y = 2x + 2\sqrt{3}$
 Statement-2 : If the line $y = mx + \frac{4\sqrt{3}}{m}$, ($m \neq 0$) is a common tangent to the parabola $y^2 = 16\sqrt{3}x$ and the ellipse $2x^2 + y^2 = 4$, then m satisfies $m^4 + 2m^2 = 24$ (2012)
 - a) Statement-1 is false, Statement-2 is true.
 - b) Statement-1 is true, Statement-2 is true; Statement-2 is a correct explanation for Statement-1.
 - c) Statement-1 is true, Statement-2 is true; Statement-2 is **not** a correct explanation for Statement-1.
 - d) Statement-1 is true, Statement-2 is false.
- 6) An ellipse is drawn by taking a diameter of the circle $(x - 1)^2 + y^2 = 1$ as its semi-minor axis and a diameter of the circle $x^2 + (y - 2)^2 = 4$ is semi-major axis. If the centre of the ellipse is at the origin and its axes are the coordinate axes, then the equation of the ellipse is : (2012)
 - a) $4x^2 + y^2 = 4$
 - b) $x^2 + 4y^2 = 8$
 - c) $4x^2 + y^2 = 8$
 - d) $x^2 + 4y^2 = 16$
- 7) The equation of the circle passing through the foci of the ellipse $\frac{x^2}{16} + \frac{y^2}{9} = 1$, and have a center at (0, 3) is (JEE M 2013)
 - a) $x^2 + y^2 - 6y - 7 = 0$
 - b) $x^2 + y^2 - 6y + 7 = 0$
 - c) $x^2 + y^2 - 6y - 5 = 0$
 - d) $x^2 + y^2 - 6y + 5 = 0$
- 8) Given : A circle, $2x^2 + 2y^2 = 5$ and a parabola, $y^2 = 4\sqrt{5}x$.
 Statement-1 : An equation of a common tangent to these curves is $y = x + \sqrt{5}$.
 Statement-2 : If the line, $y = mx + \frac{\sqrt{5}}{m}$ ($m \neq 0$) is their common tangent, then m satisfies $m^4 - 3m^2 + 2 = 0$. (JEE M 2013)
 - a) Statement-1 is true; Statement-2 is true; Statement-2 is a correct explanation for Statement-1
 - b) Statement-1 is true; Statement-2 is true; Statement-2 is **not** a correct explanation for Statement-1
 - c) Statement-1 is true; Statement-2 is false.

d) Statement-1 is false; Statement-2 is true.

- 9) The locus of the foot of perpendicular drawn from the centre of the ellipse $x^2 + 3y^2 = 6$ on any tangent to it is

(JEE M 2014)

- a) $(x^2 + y^2)^2 = 6x^2 + 2y^2$
- b) $(x^2 + y^2)^2 = 6x^2 - 2y^2$
- c) $(x^2 - y^2)^2 = 6x^2 + 2y^2$
- d) $(x^2 - y^2)^2 = 6x^2 - 2y^2$

- 10) The slope of the line touching both the parabolas $y^2 = 4x$ and $x^2 = -32y$ is

(JEE M 2014)

- a) $\frac{1}{8}$
- b) $\frac{2}{3}$
- c) $\frac{1}{2}$
- d) $\frac{3}{2}$

- 11) Let **O** be the vertex and **Q** be any point on the parabola, $x^2 = 8y$. If the point **P** divides the line segment **OQ** internally in the ratio 1 : 3, then locus of **P** is:

(JEE M 2015)

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

- 12) The normal to the curve, $x^2 + 2xy - 3y^2 = 0$, at (1, 1)

(JEE M 2015)

- a) meets the curve again in the third quadrant.
- b) meets the curve again in the fourth quadrant.
- c) does not meet the curve again.
- d) meets the curve again in the second quadrant.

- 13) The area (in sq. units) of the quadrilateral formed by the tangents at the end points of the latera recta to the ellipse $\frac{x^2}{9} + \frac{y^2}{5} = 1$, is :

(JEE M 2015)

- a) $\frac{27}{2}$
- b) 27
- c) $\frac{27}{4}$
- d) 18

- 14) Let **P** be the point on the parabola, $y^2 = 8x$ which is at a minimum distance from the centre **C** of the circle, $x^2 + (y + 6)^2 = 1$. Then the equation of the circle, passing through **C** and having its centre at **P** is :

(JEE M 2016)

- a) $x^2 + y^2 - \frac{x}{4} + 2y - 24 = 0$
- b) $x^2 + y^2 - 4x + 9y + 18 = 0$

c) $x^2 + y^2 - 4x + 8y + 12 = 0$

d) $x^2 + y^2 - x + 4y - 12 = 0$

- 15) The eccentricity of the hyperbola whose length of the latus rectum is equal to 8 and the length of its conjugate axis is equal to half of the distance between its foci, is :

(JEE M 2016)

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