...College, J. Bad

Deptt — Mathematics

Topic — Objective questions on conic section (Analytical geometry of 2-D)

Date —

Class — B.Sc I (Sub)

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Objective questions → MCQ.

1. When the origin is shifted to (α, β), the new axes remaining parallel to the original axes then the point (x, y) changes to
   (i) $(x+\alpha, y+\beta)$ (ii) $(x+\beta, y+\alpha)$
   (iii) $(x-\alpha, y-\beta)$ (iv) $(x-\beta, y-\alpha)$

2. The co-ordinates of a point, when the axes are rotated through an angle θ without changing the position of origin and the angle between the axes, are
   (i) $(x_1\cos\theta - y_1\sin\theta,\ x_1\sin\theta + y_1\cos\theta)$
   (ii) $(x_1\cos\theta + y_1\sin\theta,\ x_1\sin\theta - y_1\cos\theta)$
   (iii) $(x_1\sin\theta + y_1\cos\theta,\ x_1\cos\theta - y_1\sin\theta)$
   (iv) $(x_1\sin\theta - y_1\cos\theta,\ x_1\cos\theta + y_1\sin\theta)$

3. If by change of axes without change of origin the expression $ax^2+2hxy+by^2$ becomes $a_1x_1^2 + 2hx_1y_1 + b_1y_1^2$ then
   (i) $a+b = a_1+b_1$ (ii) $ab = a_1b_1$
   (iii) $a-b = a_1-b_1$ (iv) $\frac{a}{b} = \frac{a_1}{b_1}$

4. The focus of the parabola $x^2 = 2ay$ is
   (i) $(a, 0)$ (ii) $(0, -\frac{a}{2})$
   (iii) $(0, \frac{a}{2})$ (iv) $(\frac{a}{2}, 0)$

5. The equation of directrix of the parabola $y^2=4a$? is
   (i) $x+a=0$ (ii) $x=a$ (iii) $x=0$ (iv) None of these

(6) The condition that the st. line $lx + my + n = 0$ touches the parabola $y^2 = 4ax$ is

(i) $an = m^2 l$ (ii) $am^2 = nl$ (iii) $al = nm^2$ (iv) none of these

(7) If the focus of a conic section does not lie on its directrix then the conic section will represent a parabola if

(i) $e = 1$ (ii) $e > 1$ (iii) $e < 1$ (iv) $e = 0$

(8) The Latus rectum of parabola $y^2 = 4ax$ is

(i) a (ii) $2a$ (iii) $4a$ (iv) $8a$

(9) The parametric equations of parabola $y^2 = 4ax$ are

(i) $x = 2at$, $y = at^2$ (ii) $x = at^2$, $y = 2at$ (iii) $x = at^2$, $y = 2a^2t$ (iv) $x = t^2$, $y = 2at$

(10) The condition that the line $y = mx + c$ may touch the parabola $y^2 = 4ax$ is

(i) $c = \frac{a}{m}$ (ii) $a = \frac{c}{m}$ (iii) $am + c = 0$ (iv) $cm + a = 0$

(11) The maximum number of normals that can be drawn from an external point to a parabola is

(i) 1 (ii) 2. (iii) 3 (iv) 4

(12) The Locus of the point of intersection of a pair of perpendicular tangents to a parabola $y^2 = 4ax$ is

(i) $x = a$ (ii) $x + a = 0$ (iii) $x = 0$ (iv) $y = 0$

(13) The Locus of middle points of a system of ~~parabola~~ parallel chords of the parabola $y^2 = 4a$ is

(i) $y = \frac{a}{m}$ (ii) $y = \frac{2a}{m}$ (iii) $y = \frac{m}{a}$ (iv) $y =$

where m is constant

(14) The standard Equation of an Ellipse is

(I) $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ (II) $y^2 = 4ax$ (III) $x^2 - y^2 = a^2 + b^2$

(IV) $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

(15). The Condition that the line $y = mx + c$ may Touch the Ellipse

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1 \text{ is}$$

(I) $c^2 = a^2m^2 + b^2$ (II) $c^2 = a^2 + b^2m^2$ (III) $c^2m^2 = a^2 + b^2$

(IV) $c^2 = a^2m^2 - b^2$

(16) The parametric Equations of the ellipse

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1 \text{ are}$$

(I) $x = a\cos\varphi$, $y = b\sin\varphi$ (II) $x = a^2\sin\varphi$, $y = b^2\cos\varphi$

(III) $x = a^2\cos\varphi$, $y = b^2\sin\varphi$ (IV) $x = a\sin^2\varphi$, $y = b\cos^2\varphi$

Where φ is the parameter.

(17). If the focus of a Conic Section does not Lie on its directrix then Conic Section will represent an ellipse if

(I) $e = 1$ (II) $e > 1$ (III) $e < 1$ (IV) $e = 0$

Where e is the eccentricity of the Conic Section

(18) In case of an ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ Which of the following relations is correct?

(I) $b^2 = a^2(1+e^2)$ (II) $b^2 = a^2(1-e^2)$

(III) $b^2 = a^2(e^2-1)$ (IV) $a^2 = b^2(1-e^2)$

Where $a > b$

(19) The condition for two diameters $y = mx$ and $y = m_1 x$

of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ to be conjugate diameters is

(i) $mm_1 = \frac{b^2}{a^2}$ (ii) $mm_1 = \frac{a^2}{b^2}$ (iii) $mm_1 = -\frac{b^2}{a^2}$

(iv) $mm_1 = -\frac{a^2}{b^2}$

20. The difference of the eccentric angles of the extremities of a pair of conjugate diameters of an ellipse is

(i) $\frac{\pi}{3}$ (ii) $\frac{\pi}{6}$ (iii) $\frac{\pi}{4}$ (iv) $\frac{\pi}{2}$

21 The seem of squares of two conjugate semi-diameters of an ellipse

$\frac{x^2}{a^2} + \frac{y^2}{b^2}$ is

(i) $a+b$ (ii) a^3+b^3 (iii) a^2+b^2 (iv) $4a^2+4b^2$

22. The tangents at the extremities of a pair of conjugate diameters of an ellipse form a

(i) parallelogram (ii) square (iii) rectangle

(iv) trapezium

23. The equation

$12x^2 - 23xy + 10y^2 - 25x + 26y = 14$ represents

(i) a parabola (ii) a circle

(iii) an ellipse (iv) a hyperbola

24 The ~~condition~~ equation

$9x^2 - 24xy + 16y^2 - 18x - 101y + 19 = 0$ represents

(i) a pair of st-lines (ii) a parabola

(iii) an ellipse (iv) a hyperbola

(25) The Equation

$ax^2 + by^2 + 2gx + 2fy + c = 0$ will be a circle

if (i) $a > b$ (ii) $a < b$ (iii) $a = b$ (iv) $\frac{b}{a} = \frac{c}{b}$

(26). The Equation

$ax^2 + by^2 + 2hxy + 2gx + 2fy + c = 0$ represents

an ellipse if

(i) $ab = h^2$ (ii) $a = b$ (iii) $ab - h^2 > 0$ (iv) $ab - h^2 < 0$

(27) Which one of the following is the pair of tangents from (x', y') to the conic $S = 0$ under usual notations

(i) $SS' = T^2$ (ii) $S = S'T^2$ (iii) $SS' = T$ (iv) $S' = ST^2$

~~Write down~~ Fill up the blanks ______

28 The Equation of the normal to the parabola $y^2 = 4ax$ at the point $(at^2, 2at)$ is

______

29 The Equation of the Tangent to the parabola at the point $(at^2, 2at)$ is

______

30. The Equation of chord of contact of Tangents drawn from the point (x_1, y_1) to the parabola $y^2 = 4ax$ is

31. The Equation of the Tangents to the Ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ at the point $(a\cos\varphi, b\sin\varphi)$ is