Conic Section — Assignment No.8

1. The coordinates of the point on the parabola $y^2 = 8x$, where the ordinate is double the abscissa is
(a) (– 2, – 4) (b) (2, 4) (c) (– 2, 4) (d) (2, – 4)

2. The equation of the parabola with focus at S (3, 2) and with the line x = – 4 as directrix is
(a) $y^2 - 6y - 12 + 3 = 0$ (b) $y^2 - 6y - 12x - 3 = 0$
(c) $y^2 - 6y + 12x + 3 = 0$ (d) $y^2 - 6y + 12x + 3 = 0$

3. An arch is in the form of a parabola with its axis vertical. The arch is 10 m high and 5 m wide at the base. How high is it 2 m from the centre.
(a) 6.3 m (b) 3.6 m (c) 4.4 m (d) none of these

4. The equation of the directrix of the parabola $x^2 - 4x - 3y + 10 = 0$ is
(a) $y = \frac{5}{4}$ (b) $y = -\frac{5}{4}$ (c) $y = -\frac{3}{4}$ (d) $x = \frac{5}{4}$

5. The equation of the parabola whose vertex and focus lie on the axis of x at distance a and a_1 from the origin respectively, is
(a) $y^2 = 4(a_1 - a)x$ (b) $y^2 = 4(a_1 - a)(x - a)$
(c) $y^2 = 4(a_1 - a)(x - a_1)$ (d) none of these

6. If the focus and vertex of a parabola are the points (0, 2) and (0, 4) respectively, then its equation is
(a) $x^2 + 8y = 32$ (b) $y^2 = -8x + 32$
(c) $y^2 = 8x + 32$ (d) $x^2 - 8y = 32$

7. If the vertex of a parabola is the point (– 3, 0) and the directrix is the line x + 5 = 0, then its equation is
(a) $y^2 = 8(x + 3)$ (b) $x^2 = 8(y + 3)$
(c) $y^2 = -8(x + 3)$ (d) $y^2 = 8(x + 5)$

8. A variable circle is described to pass through (a, 0) and touch the line x + y = 0. Let S = 0 represent the locus of the centre of the circle. Then S = 0 represents
(a) an ellipse (b) a parabola
(c) a hyperbola (d) pair of parallel straight lines

9. If (2, 0) is the vertex and y–axis the directrix of a parabola then its focus is
(a) (4, 0) (b) (– 2, 0) (c) (2, 0) (d) (– 4, 0)

10. Locus of the middle points of all chords of the parabola $y^2 = 4x$ which are drawn through the vertex is
(a) $y^2 = 2x$ (b) $y^2 = 8x$ (c) $x^2 + 4y^2 = 16$ (d) $x^2 = 2y$

11. The focus of the parabola $y^2 - x - 2y + 2 = 0$ is
(a) (1/4, 0) (b) (1, 2) (c) (5/4, 1) (d) (3/4, 1)

12. The curve represented by x = 3 (cos t + sin t), y = 4 (cos t – sin t) is
(a) Ellipse (b) Parabola (c) Hyperbola (d) Circle

13. The angle made by a double ordinate of length 8a at the vertex of the parabola $y^2 = 4ax$ is
(a) $\pi/2$ (b) $\pi/3$ (c) $\pi/4$ (d) $\pi/6$

14. An equilateral triangle is inscribed in the parabola $y^2 = 4ax$ whose one vertex is at the vertex of the parabola. The length of its side is
(a) $4a\sqrt{3}$ (b) $8a\sqrt{3}$ (c) $16a\sqrt{3}$ (d) $2a\sqrt{3}$

15. The coordinates of a point on the parabola $y^2 = 8x$ whose focal distance is 4, are
(a) (1/2, $\pm$ 2) (b) (2, $\pm$ 4) (c) (1, $\pm 2\sqrt{2}$) (d) none of these

16. The value of m for which y = mx + 6 is a tangent to the hyperbola $\frac{x^2}{100} - \frac{y^2}{49} = 1$ is
(a) $\sqrt{17/20}$ (b) $\sqrt{13/20}$ (c) $\sqrt{11/20}$ (d) none of these

17. If y_1, y_2 are the ordinates of two points P and Q on the parabola and y_3 is the ordinate of the point of intersection of tangents at P and Q, then
(a) y_1, y_2, y_3 are in A.P. (b) y_1, y_3, y_2 are in A.P.
(c) y_1, y_2, y_3 are in G.P. (d) y_1, y_3, y_2 are in G.P.

18. The locus of the middle points of the focal chord of the parabola $y^2 = 4ax$ is
(a) $y^2 = 2a(x - a)$ (b) $y^2 = a(x - a)$ (c) $y^2 = 4a(x - a)$ (d) none of these

19. The length of a local chord of the parabola $y^2 = 4ax$ making an angle θ with the axis of the parabola is
(a) $a\,\text{cosec}^2\,\theta$ (b) $4a\sec^2\theta$ (c) $4a\,\text{cosec}^2\,\theta$ (d) None of these

20. If the tangents at P and Q on a parabola meet in T, then SP, ST and SQ are in
(a) G.P. (b) A.P. (c) H.P. (d) None of these

21. The point on the curve $y^2 = ax$, the tangent at which makes an angle of 45° with x–axis will be given by
(a) $\left(-\frac{a}{4}, \frac{a}{2}\right)$ (b) $\left(-\frac{a}{2}, \frac{a}{4}\right)$ (c) $\left(\frac{a}{2}, \frac{a}{4}\right)$ (d) $\left(\frac{a}{4}, \frac{a}{2}\right)$

22. If $2x + y + k = 0$ is a normal to the parabola $y^2 = -8x$, then the value of k is
(a) – 16 (b) – 8 (c) 24 (d) – 24

23. The equation of the ellipse having vertices at $(\pm 5, 0)$, foci at $(\pm 4, 0)$ is
(a) $9x^2 - 25y^2 - 225 = 0$ (b) $9x^2 + 25y^2 + 225 = 0$
(c) $9x^2 + 25y^2 = 225$ (d) None of these

24. The equation of the locus of all points the sum of whose distances from (3, 0) and (9, 0) is 12 is
(a) $3x^2 + 4y^2 - 36x = 0$ (b) $3x^2 - 4y^2 - 36x = 0$
(c) $3x^2 + 4y^2 + 36x = 0$ (d) $3x^2 + 36y^2 - 4y = 0$

25. The eccentricity of the ellipse if its latus rectum is equal to one–half of its minor axis is

(a) $e = \frac{2}{\sqrt{3}}$ (b) $e = \frac{\sqrt{3}}{2}$ (c) $e = \frac{1}{2}$ (d) None of these