1. Equation of the tangent to the hyperbola $2x^2 – 3y^2 = 6$ which is parallel to the line $y = 3x + 4$ is
(a) $y = 3x + 5$ (b) $y = 3x – 5$
(c) $y = 3x + 5$ and $y = 3x – 5$ (d) None of these

2. If the tan gent on the point ($2 \sec \phi$, $e \tan \phi$) of the hyperbola $\frac{x^2}{4} - \frac{y^2}{9} = 1$ is parallel to $3x – y + 4 = 0$, then the value of ϕ is
(a) 45º (b) 60º (c) 30º (d) 75º

3. The angle between the tangents drawn from the origin to the parabola $y^2 = 4a (x – a)$ is
(a) 90° (b) 30° (c) $\tan^{-1}(1/2)$ (d) 45°

4. The normal drawn at a point $(at_1^2, 2at_1)$ of the parabola $y^2 = 4ax$ meets it again in the point $(at_2^2, 2at_2)$, then
(a) $t_1 = 2t_2$ (b) $t_1^2 = 2t_2$ (c) $t_1t_2 = –1$ (d) None of these

5. The slope of the normal at the point $(at^2, 2at)$ of the parabola $y^2 = 4ax$ is
(a) $1/t$ (b) t (c) $– t$ (d) $– 1/t$

6. The locus of the point of intersection of two normal to the parabola $y^2 = 4ax$ which are at right angles to one another is
(a) $y^2 = a(x – 2a)$ (b) $y^2 = a(x + 2a)$ (c) $y^2 = a(x – 3a)$ (d) $y^2 = a(x + 3a)$

7. The equation of normal at the point (0, 3) of the ellipse $9x^2 + 6y^2 = 45$ is
(a) $y – 3 = 0$ (b) $y + 3 = 0$ (c) x–axis (d) y–axis

8. Two tangents are drawn from the point (– 2, – 1) to the parabola $y^2 = 4x$. If α is the angle between them, then $\tan \alpha$ =
(a) 3 (b) 1/3 (c) 2 (d) 1/2

9. If the points $(au^2, 2au)$ and $(av^2, 2av)$ are the extremities of a focal chord of the parabola $y^2 = 4ax$, then
(a) $uv – 1 = 0$ (b) $uv + 1 = 0$ (c) $u + v = 0$ (d) $u – v = 0$

10. If the locus of the point of intersection of perpendicular tangents to the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ is a circle with centre at (0, 0), then the radius of the circle would be
(a) $a + b$ (b) ab (c) b/a (d) $\sqrt{(a^2 + b^2)}$

11. An equilateral triangle is inscribed in the parabola $y^2 = 4ax$ whose one vertex is at the vertex of the parabola, then the length of its side is equal to
(a) $8a$ (b) $8a\sqrt{3}$ (c) $a\sqrt{3}$ (d) None of these.

12. Tangents to the parabola at t_1 and t_2 are perpendicular then
(a) $t_1t_2 = 1$ (b) $t_1/t_2 = – 1$ (c) $t_1t_2 = – 1$ (d) None of these

13. In the parabola $y^2 = 4ax$, the length of the chord passing through the vertex and inclined to the x–axis at an angle $\pi/4$ is
(a) $4a\sqrt{2}$ (b) $4a/\sqrt{2}$ (c) $2a\sqrt{2}$ (d) None of these

14. The distance between the foci of a hyperbola is 16 and its eccentricity is $\sqrt{2}$. Its equation is
(a) $x^2 - y^2 = 32$ (b) $y^2 - x^2 = 32$ (c) $x^2 - y^2 = 16$ (d) $y^2 - x^2 = 16$

15. Length of the chord intercepted by the parabola $y^2 = x + 3x$ on the line $x + y = 5$ is
(a) $3\sqrt{(26)}$ (b) $2\sqrt{(26)}$ (c) $\sqrt{(26)}$ (d) None of these

16. If the normals at (x_r, y_r), $r = 1, 2, 3, 4$ on the rectangle hyperbola $x y = c^2$ meet in the point (α, β), then
(a) $x_1 + x_2 + x_3 + x_4 = \alpha$ (b) $x_1 + x_2 + x_3 + x_4 = \beta$
(c) $x_1 + x_2 + x_3 + x_4 = 1/\alpha$ (d) $x_1 + x_2 + x_3 + x_4 = 1/\beta$

17. Let P $(a \sec\theta, b \tan\theta)$ and Q $(a \sec\phi, b \tan\phi)$, where $\theta + \phi = \pi/2$, be two points on the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$. If (h, k) is the point of inter section of the normals at P and Q, then k is equal to
(a) $(a^2 + b^2)/a$ (b) $-(a^2 + b^2)/a$ (c) $(a^2 + b^2)/b$ (d) $-(a^2 + b^2)/b$