**Application of dy/dx**

**Choose the most appropriate option (a, b, c or d).**

Q 1. If m be the slope of tangent to the curve ey = 1 + x2 then

(a) |m| > 1 (b) m < 1 (c) | m | < 1 (d) | m | ≤ 1

Q 2. If at each point of the curve y = x3 – ax2 + x + 1 the tangent is inclined at an acute angle with the positive direction of the x-axis then

(a) a > 0 (b) a ≤  (c) -≤ a ≤  (d) none of these

Q 3. The slope of the tangent to the curve y = x2 – x at the point where the line y = 2 cuts the curve in the first quadrant is

(a) 2 (b) 3 (c) -3 (d) none of these

Q 4. The slope of the tangent to the curve at the point where the ordinate the abscissa are equal, is

(a) -1 (b) 1 (c) 0 (d) none of these

Q 5. The slope of the tangent to the locus y = cos-1(cos x) at is

(a) 1 (b) 0 (c) 2 (d) -1

Q 6. The slope of the tangent to the curve at the point where x = 1 is

(a)  (b) 1 (c)  (d) none of these

Q 7. The equation of the curve is given by x = et sin t, y = et sin t. The inclination of the tangent to the curve at the point is

(a)  (b)  (c)  (d) 0

Q 8. The curve given by x + y = exy has a tangent parallel to the y-axis at the point

(a) (0, 1) (b) (1, 0) (c) (1, 1) (d) none of these

Q 9. P(2, 2) and are two points on the parabola y2 = 2x. The coordinates of the point R on the parabola, where the tangent to the curve is parallel to the chord PQ, is

(a)  (b) (2, -1) (c)  (d) none of these

Q 10. The number of tangent to the curve , where the tangents are equally inclined to the axes, is

(a) 2 (b) 1 (c) 0 (d) 4

Q 11. The point on the curve , where the tangent is equally inclined to the axes, is

(a) (a4, a4) (b) (0, 4a4) (c) (4a4, 0) (d) none of these

Q 12. The parabola x2 = 5 – 4y and y = x2 cut at the point (1, 1) at an angle

(a)  (b)  (c)  (d) none of these

Q 13. The angle between two tangents to the ellipse at the points where the line y = 1 cuts the curve is

(a)  (b)  (c)  (d) none of these

Q 14. The number of tangents to the curve y2 – 2x3 – 4y + 8 = 0 that pass through (1, 2) is

(a) 3 (b) 1 (c) 2 (d) 6

Q 15. The equation of a curve is . The tangents at (1, f(1)), (2, f(2)) and (3, f(3)) make angles respectively with the positive direction of the x-axis. Then the value of is equal to

(a)  (b)  (c) 0 (d) none of these

Q 16. The equation of the tangent to the curve y = e-|x| at the point where the curve cuts the line x = 1 is

(a) x + y = e (b) e(x + y) = 1 (c) y + ex = 1 (d) none of these

Q 17. The equation of the tangent to the curve y = bx-x/a where it cuts the y-axis is

(a)  (b)  (c)  (d) none of these

Q 18. If the tangent to the curve at any point on it cuts the axes OX and OY at P and Q respectively then OP + OQ is

(a) 2a (b) a (c)  (d) none of these

Q 19. If the line joining the point (0, 3) and (5, -2) is a tangent to the curve then the value of c is

(a) 1 (b) -2 (c) 4 (d) none of these

Q 20. The curve touches the line at the point

(a) (b, a) (b) (a, b) (c) (1, 1) (d) 

Q 21. The sum of the intercepts made on the axes of coordinates by any tangent to the curve is equal to

(a) 4 (b) 2 (c) 8 (d) none of these

Q 22. The area bounded by the axes of reference and the normal to y = loge x at the point (1, 0) is

(a) 1 unit2 (b) 2 unit2 (c) unit2 (d) none of these

Q 23. The normal to the curve 2x2 + y2 = 12 at the point (2, 2) cuts the curve again at

(a)  (b)  (c)  (d) none of these

Q 24. Two cyclists start from the junction of two perpendicular roads, their velocities being 3v metres/minute and 4v metres/minute. The rate at which the two cyclists are separating is

(a)  (b) 5v m/min (c) v m/min (d) none of these

Q 25. A stick of length a cm rests against a vertical wall and the horizontal floor. If the foot of the stick slides with a constant velocity of b cm/s then the magnitude of the velocity of the middle point of the stick when it is equally inclined with the floor and the wall, is

(a)  (b)  (c)  (d) none of these

Q 26. If dt then rate of change of y with respect to x when x = 1, is

(a)  (b)  (c)  (d) none of these

Q 27. On the curve x3 = 12y the abscissa change at a faster rate than the ordinate. Then x belongs to the interval

(a) (-2, 2) (b) (-1, 1) (c) (0, 2) (d) none of these

Q 28. A balloon is pumped at the rate of a cm3/minute. The rate of increase of its surface area when the radius is b cm, is

(a)  (b)  (c)  (d) none of these

Q 29. x and y are the sides of two squares such that y = x – x2. The rate of change of the area of the second square respect to that of the first square is

(a) 2(1 – x2)x (b) 2x2 – 3x + 1 (c) 2(2x2 – 3x + 1) (d) none of these

Q 30. Let the equation of a curve be x = a(θ + sin θ), y = a(1 – cos θ). If θ changes at a constant rate k then the rate of change of the slope of the tangent to the curve at is

(a)  (b)  (c) k (d) none of these

Q 31. If there is an error of k% in measuring the edge of a cube then the per cent error in estimating its volume is

(a) k (b) 3k (c)  (d) none of these

Q 32. If 1° = α radius then the approximate value of cos 60°1' is

(a)  (b)  (c)  (d) none of these

**Choose the correct options. One or more options may be correct.**

Q 33. Let the parabola y = x2 + ax + b and y = x(c - x) touches each other at the point (1, 0). Then

(a) a = -3 (b) b = 1 (c) c = 2 (d) b + c = 3

Q 34. Let y = f(x) be the equation of a parabola which is touched by the line y= x at the point where x = 1. Then

(a) f'(0) = f'(1) (b) f'(1) = 1 (c) f(0) + f'(0) + f"(0) = 1 (d) 2f(0) = 1 – f'(0)

Q 35. A point on the ellipse 4x2 + 9y2 = 36 where the tangent is equally inclined to the axes is

(a)  (b)  (c)  (d) none of these

Q 36. If the line ax + by + c = 0 is a normal to the rectangular hyperbola xy = 1 then

(a) a > 0, b > 0 (b) a > 0, b < 0 (c) a < 0, b > 0 (d) a < 0, b < 0

Q 37. A tangent to the curve dt, which is parallel to the line y = x, cuts off an intercept from the y-axis equal to

(a) 1 (b)  (c)  (d) -1

1d 2c 3b 4a 5d 6a 7d 8b 9c 10b

11a 12a 13b 14c 15a 16d 17a 18b 19c 20b

21a 22c 23a 24b 25a 26c 27a 28c 29b 30d

31b 32c 33ad 34bd 35abc 36bc 37bc