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

Q 1. If y = (1 + x)(1 + x2)(1 + x4) … (1 + ) then at x = 0 is

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

Q 2. If then at is

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

Q 3. The differential coefficient of f(logex) with respect to x, where f(x) = logex, is

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

Q 4. If f(x) = cos x. cos 2x cos 4x. cos 8x. cos 16x then is

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

Q 5. If y = then at is equal to

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

Q 6. If y = sec(tan-1x) then at x = 1 is equal to

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

Q 7. If xy = ex-y then at x = 1 is equal to

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

Q 8. If xexy – y = sin2x then at x = 0 is

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

Q 9. If then is

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

Q 10. If then is

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

Q 11. If f’(x) = and then at x = 1 is

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

Q 12. If then is equal to

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

Q 13. If then is equal to

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

Q 14. If xy . yx = 16 then at (2, 2) is

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

Q 15. If y = x1/x, the value of at x = e is

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

Q 16. The derivative of tan-1 with respect to sin-1 is

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

Q 17. Let the function y = f(x) be given by x = t5 – 5t3 – 20t + 7 and y= 4t3 – 3t2 – 18t + 3, where t ∈ (-2, 2). Then f’(x) at t = 1 is

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

Q 18. If , 1 < x < 2, and [x] = the greatest integer ≤ x, then is equal to

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

Q 19. If y = sin xo and x = cos x then is equal to

(a) –cosec x . cos x (b) 

(c)  (d) none of these

Q 20. The derivative of with respect to tan-1 x is

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

Q 21. The differential coefficient of cosec-1 with respect to at is

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

Q 22. If the prime sign(') represents differentiation w.r.t. x and f'(x) = sin x + sin 4x . cos x then is equal to

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

Q 23. If u = f(x3), v = g(x2), f'(x) = cos x and g'(x) = sin x then is

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

Q 24. If and then is

(a)  (b) 

(c)  (d) none of these

Q 25. If and then at is

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

Q 26. If and then at x = 2 is

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

Q 27. Let f(x) be a polynomial function of the second degree. If f(1) = f(-1) and a1, a2, a3 are in AP then f'(a1), f'(a1), f'(a3) are in

(a) AP (b) GP (c) HP (d) none of these

Q 28. If P(x) is a polynomial such that P(x2 + 1) = {P(x)}2 + 1 and P(0) = 0 then P'(0) is equal to

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

Q 29. If 5f(x) + 3f= x + 2 and y = xf(x) then is equal to

(a) 14 (b)  (c) 1 (d) none of these

Q 30. If for all x, y the function f is defined by

f(x) + f(y) + f(x) . f(y) = 1 and f(x) > 0 then

(a) f'(x) does not exist (b) f'(x) = 0 for all x (c) f'(0) < f'(1) (d) none of these

Q 31. There exists a function f(x) satisfying f(0) = 1, f'(0) = -1, f(x) > 0 for all x and

(a) f'(x) < 0 for all x (b) -1 < f"(x) < 0 for all x (c) -2 ≤ f"(x) ≤ -1 for all x (d) f"(x) ≤ -2 for all x

Q 32. If g is the inverse function of f and f'(x) = sin x then g'(x) is

(a) cosec {g(x)} (b) sin {g(x)} (c)  (d) none of these

Q 33. Let f(x) be a polynomial function of degree 2 and f(x) > 0 for all x ∈ R. If g(x) = f(x) + f'(x) + f"(x) then for any x

(a) g(x) < 0 (b) g(x) > 0 (c) g(x)= 0 (d) g(x) ≥ 0

Q 34. If = a polynomial of degree 3 then equals

(a) P"'(x) + P'(x) (b) P"(x) . P"'(x) (c) P(x) . P"'(x) (d) none of these

Q 35. Let ,

where p is a constant. Then at x = 0 is

(a) p (b) p + p2 (c) p + p3 (d) independent of p

Q 36. If y = sin 2x then at is equal to

(a) -64 (b) 0 (c) 64 (d) none of these

Q 37. x = t cos t, y = t + sin t then is equal to

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

Q 38. If y = at2, x = 2at, where a is a constant, then is

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

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

Q 39. Let f(x) = (ax + b)cos x + (cx + d)sin x and f'(x) = x cos x be an identity in x. Then

(a) a = 5 (b) b = 1 (c) c = 1 (d) d = -5

Q 40. Let f(x) = 2tan-1x + sin-1. Then

(a)  (b) f'(2) = 0 (c)  (d) 

Q 41. If f(x) = x3 + x2f'(1) + xf"(2) + f"'(3) for all x ∈ R then

(a) f(0) + f(2) = f(1) (b) f(0) + f(3) = 0 (c) f(1) + f(3) = f(2) (d) none of these

Q 42. If f(x – y), f(x) . f(y) and f(x + y) are in AP for all x, y, and f(0) ≠ 0, then

(a) f(2) = f(-2) (b) f(3) + f(-3) = 0 (c) f'(2)+ f'(-2) = 0 (d) f'(3) = f'(-3)

Q 43 Let f(-x) = f(x). Then f'(x) must be

(a) an even function (b) an odd function (c) a periodic function (d) neither even nor off

Q 44. If fn(x) = for all n ∈ N and then is equal to

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

Q 45. Let f(x) = x2 + xg'(1) + g"(2) and g(x) = f(1) . x2 + xf'(x) + f"(x) then

(a) f'(1) + f'(2) = 0 (b) g'(2) = g'(1) (c) g"(2) + f"(3) = 0 (d) none of these

**Answers**

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

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

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

31a 32a 33b 34c 35d 36b 37b 38a 39bc 40abc

41abc 42ac 43b 44ac 45abc