**Practice Worksheet**

**Type – 1**

**One−Option−Correct Questions**

Q 1. If f(a + x) = f(2a) for all x ∈ R and a is a positive constant then f(x) is

(a) a periodic function of the period a

(b) a periodic function of indeterminate period

(c) a nonperiodic function

(d) a monotonic function

Q 2. Le f(x) = max {x, 2-x} for all x ∈ R. Then

(a) fix) is not continuous everywhere

(b) f(x) is differentiable everywhere

(c) f(x) is continuous at x = 1 but not differentiable there

(d) f(x) is neither continuous nor differentiable at x = 1

Q 3. If y =then is equal to

(a) sin x (b)  (c) 2xsin x (d) none of these

Q 4. The coefficient of where |x| < 1, is

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

Q 5. If f(x) = (x2 - x + 2)(x2 - 4) then the set {x| f(x) > 0, x ∈ R} is equal to

(a) (–∞, −2) (b) (2, +∞) (c) (−2, 2) (d) none of these

Q 6. If Ar =then the value of is

(a) 2 (b) 0 (c) a function of n (d) 1

Q 7. Let P be a point whose coordinates differ by unity and the point does not lie on any of the axes of reference. If the parabola y2 = 4x + 1 passes through P then the ordinate of P may be

(a) 3 (b) -1 (c) 7 (d) 1

Q 8. Four vertices of a square are (±3, ±3). If (a, a) is a point inside the square but falls outside the circle x2 + y = 1 then the set of possible values of a is

(a)  (b)  (c)  (d) (−3, 3)

Q 9. In a right-angled isosceles triangle the ratio of the circumradius and inradius is

(a) 2(+ 1):1 (b) (+ 1) : 1 (c) 2 : 1 (d)  : 1

Q 10. If logsin x cos x = 1 + logsin xsin 2x then the values of x are (n being an integer)

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

Q 11. Ifand are two perpendicular unit vectors thenis equal to

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

Q 12. If z is a nonreal complex number then which of the following may not be real?

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

Q 13. If the difference of the number of arrangements of 3 things from a certain number of dissimilar things and the number of selections of the same number of things from them exceeds 100 then the least number of dissimilar things is

(a) 6 (b) 7 (c) 5 (d) 8

Q 14. If z = ω, ω2 , where co is a nonreal complex cube root of unity, are two vertices of an equilateral triangle in the Argand plane then the third vertex may be represented by

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

Q 15. The order and degree of the differential equation of the family of circles with centres on the y-axis are respectively

(a) 2,1 (b) 2,2 (c) 1,2 (d) 1,1

Q 16. The value ofdx is equal to

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

Q 17. Let f(x) be a periodic function of the period 1 and . Let φ(x) =  for all n ∈ N. Thenis equal to

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

Q 18. If(x) = (x - 1) + (x + 1) and g(x) = f{f(x)} then g'(3)

(a) equals 1 (b) equals 0 (c) equals 3 (d) does not exist

Q 19. The equation cos4 0 + sin2 8 + A = 0 admits of real solutions for θ if

(a) λ ≥ – 1 (b) λ ≤ – 1 (c)  (d) 

Q 20. The value ofis equal to

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

Q 21. If A + B =and cos A + cos B = 1 then cos(A - B)is

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

Q 22. If f(x) =dt then f(x) is

(a) even (b) odd (c) periodic (d) none of these

Q 23. The number of tangents to the curve y = e|x| at the point (0, 1) is

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

Q 24. The function f(x) = ax3 - 3x – 12x + 1 is monotonic decreasing in the open interval (-1, 2). Then one value of a is

(a) 2 (b) 12 (c) 1 (d) none of these

Q 25. The circles x2 + y2 - 2λx + c2 = 0 and x2 + y2 + 2λy = 0 will have three common tangents if |c : λ| is

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

Q 26. Let the function f(x) be defined as follows

f(x) = where [ ] represents the greatest integer function. Then

(a) f(x) is continuous at x = 2 (b) f(x) is differentiable at x = 2

(c) f(x) is differentiable in [-2, 4] (d) f(x) is continuous in [-2, 4]

**One-or-More-Options-Correct Questions**

Q 27. A plane parallel to x + y + z = 3 and at distance from it has th equation

(a) x - 2y - z = 0 (b) x + y + z + 1 = 0 (c) 2x - y - z =  (d) x + y + z = 7

Q 28. Let(1 + x + x2 + x3 + x4)10 = a0 + a1 x + a2x2 +... + a40x40. Then

(a) a1 = 20 (b) a2 = 110 (c) a2 = 55 (d) a1 + a2 = 65

Q 29. In the ΔABC, 6 : c = 2 :1 and sin (B - C) = .Then

(a) ΔABC is right-angled (b) ΔABC is obtuse-angled

(c) a : c = 3 : 1 (d) a : c = : 1

Q 30. If f(x) = log then

(a) f(x) is odd (b) f(x) is even (c) f(x1) + f(x2) = f (d) f(x1) . f(x2) = f(x1 + x2)

**Comprehension-Type Questions**

It is known that= –1 is the equation of the conjugate hyperbola of the hyperbola  = 1. Also, the pair of lines= 0 are the asymptotes of the hyperbola=1.

Let the equation of a hyperbola be x 2 - 3y2 - 2x - 8 = 0.

Q 31. The equation of its conjugate hyperbola is

(a) x2 - 3y2 - 2x + 8 = 0 (b) 3x2 - y2 - 2y - 8 = 0 (c) x2 - 3y2 - 2x +10 = 0 (d) x2 - 3y2 = - 8

Q 32. The equation of the asymptotes of the hyperbola is

(a) x2 - 3y2 - 2x = 0 (b) x2 - 3y2 = 0 (c) 3x2 - y2 - 2y = 0 (d) x2 - 3y2 - 2x + 1 =0

Q 33. If (a - 1, 2) is a point interior to the hyperbola but exterior to its conjugate hyperbola then the number of positive integral values of a is

(a) 3 (b) 2 (c) 1 (d) 4

**Matching Questions**

**One or more may match with the same.**

Q 34. (i) In an acute-angled ΔABC, the minimum (a) 3

value of sec A + sec B + sec C is

(ii) when (x, y) -> (0, 0) along (b) 1

the curve y = x2 equals

(iii) Ifthen equals (c) 6

(iv) A plane exists which is perpendicular to (d) 2

the lineand passes through

the line. Then k is

Q 35. (i) If f(x) = sin x + cos x and g(x) = x2 - 1 then (a) 

g{f(x)} is invertible in the domain

(ii) If x2 + 2ax + 10 > 3a for all x ∈ R then a (b) (-5, 2)

belongs to

(iii) Let φ(x)  Then φ(x) is monotonic (c) 

Increasing in

(iv) The vertex of the parabola y2 = 2(2y + x) is (d) (-2,2)

**Complete the following statements.**

Q 36. The number of ways in which 25 identical things can be distributed among five persons when each gets odd number of things is

Q 37. A card from a pack of 52 cards is lost. From the remaining cards of the pack two cards are drawn at random and are found to be spades. The probability of the missing card being a spade is p. Then 50p is equal to

**Assertion-Reason Type**

Q 38. Let z1 = and z2 = , where r1 > 1, r2 > 1.

STATEMENT-1: .

because

STATEMENT-2: .

(a)Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1

(b) Statement-1 is True, Statement-2 is True; Statement-2 is Not a correct explanation for Statement-1

(c) Statement-1 is True, Statement-2 is False

(d) Statement-1 is False, Statement-2 is True

**Answers**

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

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

21a 22b 23a 24a 25b 26a 27bd 28cd 29ad 30ac

31c 32d 33b

34. (i) c (ii) d (iii) b (iv) b

35. (i) c (ii) b (iii) a (iv) d

36. 1001

37. 11

38. b