**Miscellaneous Questions**

**Type – 1**

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

Q 1. equals

(a)  (b)  (c)  (d) tan 1

Q 2. If A be a 3 x 3 matrix and I be the unit matrix of that order such that A = A2 + I then A–1 is equal to

(a) A (b) A + I (c) 1 – A (d) A – I

Q 3. If w = and |w| = 1 then z lies on

(a) a circle (b) an ellipse (c) a parabola (d) a straight line

Q 4. The value of is,

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

Q 5. If a,b,c are in AP and x,y,z are finite numbers such that then x,y, z are in

(a) AP (b) GP (c) HP

(d) Arithmetio–geometric progression

Q 6. In a triangle ABC, a2 + b2 = c2. If R and r its circumradius and inradius respectively then R + r is equal to

(a) AM of a and b (b) AM of b and c (c) AM of c and a (d) perimeter

Q 7. Suppose f(x) is differentiable at x = 1 and . Then f’(1) equals

(a) 4 (b) 3 (c) 6 (d) 5

Q 8. If f is a real–valued differentiable function satisfying }f(x) – f(y)| ≤ (x – y)2 for all x,y ∈ R and f(0) = 0 then f(1) equals

(a) 0 (b) − 1 (c) 1 (d) 2

Q 9. If .f(t)dt = 1 − sin x then fis equal to

(a)  (b) – 3 (c) 3 (d) 

Q 10. If f(x) is a twice differentiable function for which f(1) = 1, f(2) = 4 and f(3) = 9 then

(a) f” (x) = 2 for all x ∈ (1, 3) (b) f” (x) = f’ (x) = 5 for some x ∈ (2, 3)

(c) f” (x) = 3 for all x ∈ (2, 3) (d) f” (x) = 2 for some x ∈ (1, 3)

Q 11. Let f be differentiable for all x. If f(1) = − 2 and f’ (x) ≥ 2 for x ∈ [1, 6] then the value of f(6) is

(a) less than 8 (b) greater than or equal to 8

(c) equal to 5 (d) less than 5

Q 12. The value of is equal to

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

Q 13. Let A and B be two events such that and = complementary of event A. Then A and B are

(a) equally likely but not independent (b) equally likely and mutually exclusive

(c) mutually exclusive and independent (d) independent but not equally likely

Q 14. Let and . Then depends on

1. only x (b) only y (c) neither x nor y (d) both x and y

Q 15. If and are three nonzero noncoplanar vectors and   

Then the set of orthogonal vectors is

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

Q 16. A six faced fair dice is thrown until 1 comes. The probability that 1 comes in even number of trials, is

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

Q 17. Four flats are available Krishna Apartment. Four persons visit the flats and each gives his choice to the promoter without consulting others. The probability that all will give different choice, is

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

Q 18. The are of the greatest rectangle that can be inscribed in the ellipse is

(a) ab (b) 2ab (c)  (d) 

Q 19. The value of is equal to

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

Q 20. The minimum are of the triangle formed by a tangent by a tangent to the ellipse and the coordinate axes, is

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

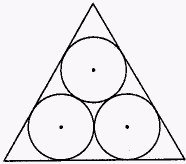
Q 21. If y is a function of x given by ydx + y2dy = xdy where y > 0 and y(1) = 1 then y(−3) is

(a) 3 (b) 2 (c) 1 (d) 5

Q 22. The function y = ||x| − 1| is differentiable for all x ∈ R except for the values

(a) 0, 1, −1 (b) ±1 (c) 1 (d) – 1

Q 23. 3 coins radii 1 unit are kept inside and equilateral triangle so that they touch each other and also the sides of the triangle. The are of the triangle is



(a) (4 + 2) unit2 (b) (6 + 4) unit2 (c) unit2 (d) unit2

Q 24. If a,b,c are integers not all equal and w = , (w ≠ 1)then the minimum value of |a + bw + cw2|is

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

Q 25. If both the roots of the quadratic equation x2 – 2kx + k – 5 =0 are less than 5 then k lies in the interval

(a) (6, ∞) (b) (5, 6] (c) [4, 5] (d) (−∞, 4)

Q 26. If a1, a2, a3, … , an, … are in GP then the determinant



is equal to

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

Q 27. A real valued function f(x) satisfies the functional equation f(x – y) = f(x) f(y) ­− (a − x) (a + y) where a is a given constant and f(0) = 1. Then f(2a − x) equals

(a) f(x) (b) − f(x) (c) f(− x) (d) f(a) + f(a − x)

Q 28. Let f: (–1, 1) → B be a function defined by f(x) = tan−1. Then f is both one−one and onto function when B is the interval

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

Q 29. The value of a for which the sum of the squares of the roots of the equation x -(a- 2)x -a -1=0 assume the least value is

(a) 0 (b) 1 (c) 2 (d) 3

Q 30. The system of equations αx + y + z = α - 1, x + αy + z = α - 1, x + y + αz = α - 1 has no solution if α is

(a) either-2 or 1 (b) – 2 (c) 1 (d) 2

Q 31. A circle is given by x + (y -1) =1. Then the locus of the centre of the circle touching the given circle and the x-axis, is

(a) {(x, y) |x2 = 4y} ∪ {(x, y) |y ≤ 0} (b) {(x, y) lx2 + (y - 1)2 = 4) ∪ {(x, y) ly ≤ 0}

(c) {(x, y) lx2 = 4y} (d) {(x, y)lx2 = 4y) ∪ {(0,y)l y ≤ 0}

Q 32. Let cos (α - β) = 1 and cos (α + β) = , where α, β, ∈ [-π, π] and e is the exponential number. The number of values of the pair (α, β) satisfying both the equations, is

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

Q 33. The value of is J {x + 3x \* + 3x + 3 + (x + 1) cos (x + 1)}dx is

(a) - 4 (b) 0 (c) 4 (d) 6

Q 34. Let α, β be roots of the equation ax2 + bx + c = 0 and Δ = b2 - 4ac. If α + β, α2 + β2, α3 + β3 are in GP then

(a) Δ ≠ 0 (b) b. Δ = 0 (c) c. Δ = 0 (d) Δ = 0

Q 35. The number of measures of the angle A for which cos A, cos 2A and cos 3A are in GP, is

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

Q 36. If z1 and z2 are two nonzero complex numbers such that |z1 + z2| + |z1| + z2| then arg z1 - arg z2 is equal to

(a) –π (b)  (c)  (d) 0

Q 37. If a2 + b2 + c2 + 2 = 0 and f(x)= then f(x) is a polynomial of degree

(a) 0 (b) 1 (c) 2 (d) 3

Q 38. Let a and B be the distinct roots of ax2 + bx + c = 0 then is equal to



is equal to

(a) 0 (b)  a2(α - β)2 (c) (α - β)2 (d) -a2(α - β)2

Q 39. If I1 =then

(a) I1 > I2 (b) I2 > I1 (c) I1 = I2 (d) I3 > I4

Q 40. The angle between the lines 2x = 3y = -z and 6x = -y = -4z is

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

Q 41. If the angle 0 between the line and the plane 2x - y + z + 4 = 0 is such that sin θ =then the value of λ is

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

Q 42. The tangent to the curve y = x2 + 6 at (1,7) touches the circle x2 + y2 + 16x + 12y + c = 0 at the point

(a) (-6,-11) (b) (-9,-13) (c) (-10,-1-5) (d) (-6,-7)

Q 43. The distance between the lineand the plane= 5 is

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

Q 44. Lf f(x) is continuous and differentiable function and= 0 for all n > 1 and n e I then

(a) f(x) = 0, x ∈ (0, 1] (b) f(0) = 0, f'(0) = 0

(c) f'(0) = 0 = f"(0), x ∈ (0, 1] (d) f(0) = 0 and f'(0) need not be zero

Q 45. If f(x) and g(x) are real functions defined by

f(x) = 0, x is rational g(x) = 0, x is irrational

and

x, x is irrational x, x is rational then (f - g)(x) is

(a) one-one and onto (b) neither one-one nor onto

(c) one-one but not onto (d) onto but not one-one

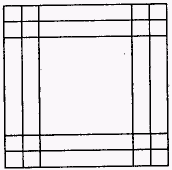
Q 46. The value of, a > 0 is

(a)  (b) aπ (c) 2π (d) 

Q 47. If the pair of lines ax2 + 2(a + b)xy + by = 0 lie along two diameters of the circle x2 + y = 4 such that the circle is divided into four sectors in which one sector has double the area of another sector then

(a) a = 2b (b) 2a = b (c) a = b (d) a + b + 1 = 0

Q 48. A rectangle with side lengths 1m - 1 and 2n - 1 is divided into unit squares by drawing parallel lines as shown in the diagram. Then the number of rectangles possible with odd side lengths is



(a) (m + n + 1)2 (b) 4m+ n – 1 (c) m2n2 (d) mn(m + 1)(n + 1)

Q 49. Let A = {x| x ∈ N, x ≤ 15}. If 3m + 3n is divisible by 5 where (m, n) ∈ A ×x A then the number of possible values of the ordered pair (m, n) is

(a) 32 (b) 56 (c) 28 (d) 64

Q 50. If z1, z2 be two nth roots of unity such that they represent two points A, B in the Argand plane where ∠AOB = 60° and O is the origin than the positive integer n is of the form

(a) 4k, k ∈ N (b) 4k + 3, ∈ E N (c) 6k, k ∈ N (d) 6k + 5, K ∈ N

Q 51. If the circle passing through the points (0, 0), (1, 0) and (0,1) also passes through the pointthen λ is

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

Q 52. If in a ΔABC, tan A + tan B + tan C has the value 9 then the value of cot A .cot B. cot C is equal to

(a) 9 (b) 1 (c)  (d) none of these

Q 53. The number of negative integral solutions of the equation x1 + x2 + x3 + x4 + 15 = 0 is

(a) 364 (b) 15C3 (c) 14C4 (d) none of these

Q 54. Which of the following is equal to ?

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

Q 55. The number of values of a for which (x2 + x + 1)a2 - (x2 + 2)a - 3(2x2 + 3x + 1) = 0 will be an identity in x is

(a) one (b) zero (c) three (d) two

Q 56. If α, β are two values of θ satisfying the equation sec2θ + ptan θ + q = 1 then

(a) then (α + β) =  (b) tan (α − β) =  (c) tan (α + β) =  (d) tan (α – β) = 

Q 57. The set of values of a for which the graph of the function f(x) = a(x +1) + x is always above the x-axis is

(a)  (b)  (c)  (d) (0, +∞)

Q 58.  is equal to

(a) -1 (b) 1 (c) 0 (d) 3

Q 59. Three particles A, B and C start to move from three vertices of a triangle with the same uniform speed along the sides of the triangle at random. The probability that they will collide is

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

Q 60. is equal to

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

Q 61. The four common tangents to the ellipses and form

(a) a rectangle of area 13 unit

(b) a square of area 26 unit

(c) a parallelogram which is neither a square nor a rectangle

(d) a rhombus

Q 62. A bag contains 12 tickets numbered 1, 2, 3,..., 12. Five of them are drawn at random and arranged in the ascending order of their numbers. What is the probability that the third in the order is 5? -

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

Q 63. The linesand

(a) are three concurrent lines

(b) are three lines of which at least two are skew lines

(c) are coplanar lines forming a triangle of area 2 unit2

(d) form a triangle of area  unit2

Q 64. If(1 - y)m . (1 + y)n = 1 + a1y + a2y2 +...+ am + n y"' + n, where m ∈ N, n ∈ N and a1 = a2 = 10, then (m, n) is

(a) (20, 45) (b) (35, 20) (c) (45, 35) (d) (35, 45)

Q 65. If (a,a2) falls inside the angle made by the lines y =x(x > 0) and y = 3x (x > 0) then a belongs to

(a)  (b) (3, +∞) (c)  (d) 

Q 66. If = ao + a1x a2x2 + ... then an equals

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

Q 67. The locus of vertices of the family of parabolas where a is a parameter, is

(a) a circle (b) an ellipse (c) a parabola (d) a rectangular hyperbola

Q 68. Let Ec denote the complement of an event. Let E, F, G be pairwise independent events with P(G)>0 and P(En FnG) = 0. Then P(Ec n F0| G) equals

(a) P(Ec) + P(Fc) (b) P(Ec) - P(Fc) (c) P(EC) - P(F) (d) P(E) - P(FC)

**Answers**

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

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

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

31d 32c 33c 34c 35a 36d 37c 38b 39a 40a  
 41b 42d 43a 44b 45a 46a 47c 48c 49b 50c

51a 52c 53a 54b 55a 56a 57a 58a 59c 60a

61b 62a 63d 64d 65c 66d 67d 68c