**Practice Worksheet**

**Type – 1**

**One−Option−Correct Questions**

Q 1. Let z, ω to be complex numbers such that and arg(zω) = π. Then arg z equals

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

Q 2. If |z2 - 1| = |z|2 +1 then z lies on

(a) the real axis (b) the imaginary axis (c) a circle (d) an ellipse

Q 3. Let A =. The only correct statement about the matrix A is

(a) A is a zero matrix (b) A = (-1)I3 (c) A-1 does not exist (d) A2 = I

Q 4. If (x + p - 1) is a factor of the expression x +px + 1 - p then the roots of the equationx + px + 1 = p are

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

Q 5. If f(x) =then the difference between the maximum and minimum values of {fix)}2 is given by

(a) 2(a2 + b2) (b)  (c) (a + b)2 (d) (a - b)2

Q 6. A point on the parabola y2 = 18x at which the ordinate increases at twice the rate of the abscissa is

(a) (2,4) (b) (2,-4) (c)  (d) 

Q 7. The normal to the curve x = a(1 + cos θ), y = a sin θ at the point 'θ' always passes through the fixed point

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

Q 8. Ifthen A is

(a) 0 (b) π (c) π/4 (d) 2π

Q 9. If f(x) =and then the value of I2/I1 is

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

Q 10. The differential equation for the family of curves x + y2 - 2ay= 0, where a is an arbitrary constant, is

(a) 2(x2 - y2)y' = xy (b) 2(x2 + y2)y' = xy (c) (x2 - y2)y' = 2xy (d) (x2 + y2)y'= 2xy

Q 11. The intercept on the line y = x by the circle x2 + y2 - 2x = 0, is AB. The equation of the circle on AB as a diameter, is

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

Q 12. If a circle passes through the point (a, b) and cuts the circle x2 + y2 = 4 orthogonally then the locus of its centre is

(a) 2ax + 2by + a2 + b2 + 4 = 0 (b) 2ax + 2by-(a2 + b2+ 4) = 0

(c) 2ax - 2by + a2 + b2 + 4 = 0 (d) 2ax - 2by - (a2 + b2 + 4) = 0

Q 13. The eccentricity of an ellipse with its centre at the origin is y .If one of the directrices is x = 4 then the equation of the ellipse is

(a) 3x2 + 4y2 = 1 (b) 3x2 + 4y2 =12 (c) 4x2 + 3y2 = 12 (d) 4x2 + 3y2 = 1

Q 14. A line with direction ratios 2, 1, 2 meets the lines x = y + a = z and x + a = 2y = 2z at P and Q, respectively. Then the length of PQ is

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

Q 15. The distance between the planes 2x + y + 2z = 8 and 4x + 2y + 4z + 5 = 0 is

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

Q 16. Ifand,where,thenis

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

Q 17. The unit vector which is orthogonal to the vectorand is coplanar with the vectorsandis

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

Q 18. If f(x) = sinx + cosx and g(x) = x2 - 1 then g{f(x)} is invertible in the domain

(a)  (b)  (c)  (d) [0, π]

Q 19. For all x e R,x2 + 2ax +10 - 3a > 0. The interval in which a lies is

(a) a < - 5 (b) -5 < a < 2 (c) a > 5 (d) 2 < a < 5

Q 20. If a1, a2,a3 ,... are in GP then the value of the determinant is

(a) 0 (b) 1 (c) log a1 (d) loga2 - loga1

Q 21. If the sides of a triangle are in the ratio 1: V3 :2 then the angles of the triangle are in the ratio

(a) 1:3:5 (b) 2 : 3 : 4 (c) 3 : 2 :1 (d) 1 : 2 : 3

Q 22. A question paper contains 10 questions divided in two equal groups. A candidate has to attempt 6 questions selecting not more than 4 questions ' from one group. The probability that the candidate will answer by selecting an equal number of questions from the two groups is

Q 23. If f(x) = then f(x) is

(a) continuous for all x but not differentiable at x = 0

(b) neither differentiable nor continuous at x = 0

(c) discontinuous everywhere

(d) continuous and differentiable for all x

Q 24. If f: R → R satisfies f(x + y) =f(x) + f(y) for all x, y ∈ R and f(1) = 7 then  is

(a)  (b) 7n(n + 1) (c)  (d) 

Q 25. If =a3 +a2 (a ≠ 0)then f(2a)is

(a) a(2a +1) (b)2a(2a + 1) (c) 4a2 + 1 (d) 2a(a +1)

Q 26. The number of positive integral solutions of (x,y) when x2 - 4xy + 6y2 - 2x - 20y = 29 is

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

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

Q 27. The equation of a line which is parallel to x - y = 0 and touches the hyperbola x2 - 2y2 = 18 is

(a) y – x = 3 (b) x - y = 3 (c) y - x = 3 (d) y + 3 = x

Q 28. Let f(x) = 1 + |sin x|. Then

(a) f(x) is continuous nowhere (b) f(x) is continuous everywhere

(c) f(x) is differentiable nowhere (d) f(0) does not exist

Q 29. If |z1| = |z2| = 1 and amp z1 + amp z2 = 0 then

(a) z1z2 = 1 (b) z1 + z2 = 0 (c) z1 = z2 (d) z1 = z2

Q 30. A perpendicular PQ is dropped from the point P(1, 2, 3) to the plane x + y + z = 3, Q being the foot. Then

(a) PQ = 3 (b) PQ =  (c) Q = (0,1,2) (d) Q = (2,1,0)

**Comprehension-Type Questions**

Let f(x, y) - 0 be the equation of a curve. The length of the perpendicular OP from the point O to the tangent to the curve at P(x, y) is p and the distance of the point P(x, y) from O is r. Then the functional relation between p and r is called the pedal equation of the curve with regard to O. Also the locus of the foot P of the perpendicular from O is called the first positive pedal curve of the curve f(x, y) = 0 with regard to O.

Q 31. The pedal equation of a parabola y2 = Ax with regard to the focus is

(a) r2 = p (b) rp = 1 (c) p2 = r (d) p2 - 1 + r2

Q 32. The pedal equation of the circle x2 + y2 = 4 with regard to the point (2, 0) is

(a) r2 = 4 (b) 4p = r2 (c) p2 = 4r (d) p = 4r2

Q 33. The equation of the first positive pedal curve of the ellipse 3x2 + 4y2 =12 with regard to the focus whose abscissa is positive is

(a) x2 + y2 - 2x + 1 = 0 (b) x2 + y2 + 2x - 1 = 0 (c) x2 + y2 = 3 (d) z2 + y2 = 4

**Matching Questions**

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

Q 34. (i) Let f: R → R such that f(x+ y)= f(x) + f(y) for (a) 4

all x, y. If= 315 then equals

(ii) A line  cuts the (b) 8

yz-plane and the xy-plane at A and B respectively.

If AB subtends a right angle at the origin then k is

(iii) If 21og2log2A: + log1/2log22V2x = 1 for all x ∈ R (c) 7

then x equals

(iv) Let a, b and c be real numbers such that (d) 9

a + 2b+x = 4. Then the greatest value of ab **+** bc **+** ca is

Q 35. (i) If (4 – 2λ – sin α) + (λ2 – 1)  (a) 8

and, where are noncollinear, then λis

(ii) A coin whose two faces are marked 3 and 5 (b) 1

is tossed 4 times. The probability of getting a sum less

than 15 is λ. Then 16λ is equal to

(iii) is (c) 3

(iv) The greatest value off(x) = is (d) 5

**Complete the following statements.**

Q 36. The area bounded by the curve y = x(3 - x)2, the x-axis and the lines of ordinates of the maximum and minimum values of the curve is

Q 37. Let f(x) be a continuous function such that f(x + 4) =f(x + 2) –f(x) and . If φ(3) = 5 thenequals

**Assertion-Reason Type**

Q 38. Let 0 < α < β < .

STATEMENT-1: .

because

STATEMENT-2: If f"(x) > 0, x1 > x2 then f(x1) >f(x2).

(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**

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

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

21d 22a 23a 24c 25b 26a 27ad 28bd 29ac 30bc

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

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

36. 4

37. 5

38. c