**Practice Worksheet**

**Type – 1**

**One−Option−Correct Questions**

Q 1. The value of is

(a) 24n + 4n + 1Cn (b) 24n + 1 (c) 24n + 1 + 4n + 1Cn (d) 24n

Q 2. If a = {(x, y)| x2 + y2 ≤ 4} and B = {(x, y)| (x – 3)2 + y2 ≤ 4} and the point belongs to the set B – A then the set of possible real values of a is

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

Q 3. The graph of the x2 + y2 – 2xy – 8x – 8y + 32 = 0 falls wholly in

(a) the first quadrant (b) the second quadrant (c) the third quadrant (d) none of these

Q 4. If α, β be two angles belonging to the interval [0, 4π] such that sin α + cos β = 2 then the number of possible values of the pair (α, β) is

(a) 5 (b) 2 (c) 4 (d) 6

Q 5. If f(x) is a monotonic increasing function and ∈ R then

(a) f(a2 + a + 1) > f(1) (b) f(a2 + a + 1) < f(a2 + a) (c) f(a2 + a + 1+ > f(d) f(a2 + a + 1) < f(a + 1)

Q 6. The number of divisors of the form 2n 1 (n ≤ 2) of the number 2p 3q 4r 5s, where p, q, r, s belong to N, is

(a) qs + q + s + 1 (b) (p + 1)(q + 1) (r + 1) (s + 1) – 1 (c) qs + q + s (d) qs

Q 7. If the vertices of a triangle are such that the corrdinates of the orthocenter as well as the circumcentre are integers then the coordinates of centroid mush be

(a) integers (b) rational numbers (c) irrational numbers (d) none of these

Q 8. The number of sides of the quadrilateral whose joint equation is x2 y2 + 1 = x2 + y+2+ and which are touched by the circle x2 + y2 = 2x is

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

Q 9. sin8θ − 4sin6θ + 6sin4θ – 4sin2θ + 1 is equal to

(a) cos8θ (b) sin 8θ (c) cos 8θ (d) sin4θ. cos4θ

Q 10. A vertical wall running from south to north has the height a. A policeman of height b (< a) uis standing in front of the wall at a distance c from it on the eastern side. What should be the maximum distance of a crawling thief from the wall so that thief can hide from the view of the policeman if the thief is on the other side of the wall in the west of the policeman?

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

Q 11. If then

(a) a0 = 1, a1 = 0 (b) a0 = − 1, a1 = 0 (c) a0 = 0, a1 = 1 (d) a0 = 0, a1 = 0

Q 12. A batsman can score 0, 1, 2, 3, 4 or 6 runs from a ball. The number of different sequences in which he can score exactly 30 runs in an over of six balls is.

(a) 4 (b) 72 (c) 56 (d) 71

Q 13. If 2 = 1 + icot α, -< α < 0 then |z| is equal to

(a) cosec α (b) – cosec α (c) cosec α or - cosec α (d) none of these

Q 14. C1, C2, C3,... is a sequence of circles such that Cn + 1 is the director circle of Cn. If the radius of C1 is a then the area bounded by the circles Cn and Cn + 1 is

(a) π.2n. a2 (b) n. 22n - 2. a2 (c) π.2n - 1. a2 (d) none of these

Q 15. The value ofis

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

Q 16. y2 = 4x is a curve and P, Q, R are three points on it where P = (1, 2), Q = and the tangent to the curve at R is parallel to the chord PQ of the curve. Then the coordinates of R are

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

Q 17. If the real-valued function f(x) = x 3 + 3(a2 - 1)x + 1 be invertible then the set of possible real values of a is

(a) (– ∞, –1) (b) (−1, 1) (c) [–1, 1] (d) (–∞, – 1] ∪ (1, +∞)

Q 18. Let P(4,1, λ) and Q(2, -1, λ) be two points. A line having direction ratios 1, -1, 6 is perpendicular to the plane passing through the origin, P and Q. Then X equals

(a) – (b)  (c) 1 (d) none of these

Q 19. The slope of the tangent to the curve x = sec y at the point y = sec-1 (-2) is

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

Q 20. is equal to

(a) e + 1 (b) e – 1 (c) e (d) none of these

Q 21. is equal to

(a) 1 (b)  (c) -1 (d) π

Q 22. If and are unit vectors and the angles between are and  and 

respectively thenis

(a) 3 (b) 4 + +  (c)  (d) none of these

Q 23. dx is equal to

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

Q 24. Five horses are in a race. A man selects two of them at random and bets on them. All the horses have equal chances of winning. The probability that the man selected the winning horse is

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

Q 25. If sin x + cos y =and cos x + sin y =then tanis equal to

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

Q 26. The term independent of a in the expansion of

(a) 30C20 (b) 0 (c) 30C10 (d) none of these

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

Q 27. If = a0n4 + a1n3 + a2n2 + a3n + a4 then

(a) a0 = (b) a1 =  (c) a3 =  (d) a4 = 0

Q 28. Ifthen is equal to

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

Q 29. A and B are two independent events such that P(A' ∩ B) = and P(A ∩ B') = . Then P(B) is equal to

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

Q 30. The centre of a circle which touches the line 2x - y = 1 at (1, 1) and also touches the line 2x + y = 4 is

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

**Comprehension-Type Questions**

The general solution of a differential equation of the form

 + ...+ any = 0 (ais,being constants) is given by the following rules.

(i) If the roots of the corresponding auxiliary equation

Dn + a1Dn-1 + a2Dn - 2+...+ an = 0

in D has unequal real roots α1, α2, α3,..., αn then the general solution will be

y = c where cis are arbitrary constants.

(ii) If the roots of the corresponding auxiliary equation has two equal roots (say, a1 = a2) and the rest are unequal real roots then the general solution will be

y = (c1 x + c2) .

(iii) If two roots of the corresponding auxiliary equation are α1 = α + iβ, α2 = α – iβ and the rest are real and unequal then the general solution will be

y = (Acos βx + Bsin βx) 

Q 31. The general solution of the equationis

(a) c1e2x + c2e-2x + c3e–3x (b) (c1x + c2)e2x + c3e3x

(c) (c1x + c2)e-3x + c3e2x (d) (Acosx + Bsinx) e2x + c3e3x

Q 32. y = (c1cos x + c2sin x) e-x + c3e x is the general solution of the equation

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

Q 33. The general solution of the equation+ y = 0 is

(a) ce-x  (b) 

(c) ,where  (d) none of these

**Matching Questions**

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

Q 34. (i) lf f(x) is continuous in R and (a) 3

f(x) + f(x + 1) = 1, where 0 ≤ x ≤ 1, then the

value ofdx is

(ii) In a triangle ABC, the scalar triple product (b) 4

[(tanA) (tan B) + (tan C) ]

is equal to

(iii) The intercept on the x-axis cut off by the (c) 1

normal to the parabola x2 = 4y passing through

(1,2) is

(iv) If f(x) is twice differentiable and (d) 2

λ2 f(x) - 2λf'(x) +f"(x) = 0 provides two equal

values of λ for all x, and f(0) = 1, f'(0) = 2

then f(loge2) is equal to

Q 35. (i) Letand f(0) = 0 (a) 1

Then

4x sin x + 4cos x - 2x2 cos x -f(x) sin f(x) - cos f(x)

equals

(ii) The number of real roots of the equation (b) 3

x + ex = 0 is

(iii) Ifthen the least (c) 6

possible value of n is

(iv) From a bag containing 2 white balls and (d) 4

1 black ball a ball is drawn at random and

returned to the bag. It is done n times. If the

probability of drawing a white ball three times

isthen n is

**Complete the following statements.**

Q 36. If (1 + x)n = nC0 + nC1x + nC2x2 + ...+nCnxn then the value of for all i ≤ j is

Q 37. The area enclosed by the tangents from P(6, 8) to the circle x2 + y2 = r2

and the chord of contact of tangents is the maximum when r is

**Assertion-Reason Type**

Q 38. Let the vectorsand represent the sides of a regular hexagon.

STATEMENT-1: 

because

STATEMENT-2: and .

(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**

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

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

21a 22c 23b 24c 25c 26b 27bcd 28ac 29ab 30ad

31b 32c 33a

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

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

36. 6560 37.5 38c