**Miscellaneous Questions**

**Type – 1**

**Matching Questions**

Q 1. λx2 + 2(λ - 1)xy + y2 + 3x + 5y + 1 = 0 is the equation of

(i) a circle if λ is (a) 2

(ii) a parabola if λ is (b) (3 + )

(iii) an ellipse if λ is (c) 3

(iv) a hyperbola if λ is (d) 1

Q 2. Tangents to the parabola y2 = 4x at the points P and Q meet at R(-1, 0). Then

(i) the length of the chord PQ is (a) 

(ii) the sum of the lengths of the (b) 2

tangents PR and QR is

(iii) the inradius of the ΔPQR is (c) 4

(iv) the circumradius of the ΔPQR is (d) 2– 2

Q 3. (i) dx is equal to (a) 1

(ii) is (b) 2

equal to

(iii) If +1 = 0 then a is (c) 0

(iv) If y = |cos x| thenis (d) 

Q 4. (i) The maximum value of (a) 

(2sin x)(V5cos x + 2sin x) - 6 is

(ii) is equal to (b) 

(iii) is (c) -2

(iv) If x2 y + y3 = 2thenis (d) -1

5. (i) If x2 - ax + 1 - 2a2 ≥ 0 for all x ∈ R then (a) -5 < a < 3

(ii) If the difference between the roots of (b) -3 < a < -2

x2 + ax + 1 = 0 is less than 5 then

(iii) If the complex number a + 1 + 3i for (c) 

all a ∈ R is represented by an interior

point of the circle |z| = 5 then

(iv) If cos4x - (a + 2)cos2x - (a + 3) = 0 has (d) |a| < 3

real solutions for x then

6. (i) If cos θ - sin θ = cos α - sin a then the (a) 

minimum value of |θ + α| is

(ii) In a ΔABC, if A = 90o then (b) 

is

(iii) If x ∈ [0, π]and (c) 

Iog2 (tan x) + Iog2(tan 2x) = 0 then x is

(iv) In a ΔABC, if (d) 

then A is

Q 7. (i) f(x) = x |x – 2| (a) neither continuous nor differentiable at x = 2

(ii) g(x) = x2[x] (b) differentiable and continuous for all x

(iii) h(x) = (c) continuous but not differentiable at x = 2

(iv) φ(x) = (d) differentiable and continuous at x = 2

Q 8. (i) If nCr - 1 = 36, nCr = 84 and nCr+1 = 126 (a) 6

then r is

(ii) The number of real solutions of the (b) 2

equation 2x + x2 = 1 is

(iii) If the focus of the parabola (c) 4

x2 - ky + 3 = 0 (k ≠ 2) is (0, 2) then k is

(iv) The number of different ways in (d) 3

which the first twelve natural numbers can be

divided in three equal groups such that the

numbers in each group are in AP is

Q 9. (i) If z1, z2, z3, are unimodular complex (a) 

numbers such that |z1 - z2 + z3| = 4

thenis

(ii) The planes 2x - 3y - 7z = 0, (b) 3

λx - 14y - 13z = 0 and,

8x - 31y - 33z = 0 pass through the same

line if λ is

(iii) If tan–1: tan-1 x = a : 1 then a is (c) 2

(iv) In the ΔABC the median (d) 4

AD = and the median divides ∠A into

angles of 30° and 45°. The length of BC is

Q 10. (i) The linelies on (a) 3

the plane 2x - y + z - 5 = 0 if *l* is

(ii) The latus rectum of the rectangular (b) 1

hyperbola x – y2 = 1 is

(iii) The line cutting a positive (c) 4

intercept 1 on the y-axis will be at angent to

the curve y = 12x if its slope is

(iv) The lines  (d) 2

andare

intersecting lines if m is

Q 11. (i)  dt is equal to (a) 2

(ii) If f(x) is an even function then (b) 1

is equal to

(iii) If f(x)=  equals (c) 0

(iv) The value of b for which the area (d) 8

bounded by the parabolas

y = x - bx2 and y=x2(b > 0)is the maximum is

Q 12. (i) If f: [2,+∞) → X be a bijective, (a) R – [-2, 2]

where f(x) = 5 - 4x + x2, then X is

(ii) The domain of (b) [1, +∞)

φ(x) = is

(iii) The interval in which (c) (-2, -1)

f(x) = 2x2 - log x is monotonic increasing is

(iv) 4x3 + 9x2 + 6x + 3 = 0hasareal root lying in (d) 

Q 13. (i) The focus of the parabola (a) (1, -2)

y2 - 2y + 8x - 23 = 0 is

(ii) The centre of the ellipse (b) 

9x2 + 5y2 - 30y = 0 is

(iii) The vertex of the parabola (c) (1, 1)

x2 + 2xy + x = -3 + y - y2 is

(iv) The tangents at the ends of the (d) (0, 3)

double ordinate through the focus

of x2 = 2(x + 2y) + 3 meet at

Q 14. (i) If a is a nonreal root of (a) 3

x3 - 3x2 + 3x - 2 = 0 then α6n + α-6n is equal to

(ii) The order of the differential (b) 4

equation whose general solution is

y = (c1 x + c2)eax + ,where c1, c2 , c3 , c4 are arbitrary constants and a, b are fixed constants, is

(iii) Let f(x + y)= f(x)+ f(y)and (c) 

f(1) = 1. If φ(x)= then φ’(2) is

(iv) Ifare three mutually (d) 2

perpendicular vectors where

 = 1 then

 is

Q 15. (i) If |z - 2i| ≤ 3 then the maximum (a) 3

value of |iz + 3| is

(ii) If the greatest coefficient in the (b) 5

expansion of (1 + x)n (n ∈ N) is

n(n - 1)(n - 2)(n - 3) then the value of n is

(iii) If (c) 4

 and  = 3

thenis

(iv) Let |f(x)| ≤ 1 for x ∈ [0,1) and (d) 8

|f(x)| ≤ 2 for x ∈ [1, 3] then the

greatest value of is

Q 16. In the parabola y2 + 4 = 4x, a chord passing through the point (2, 0) cuts the parabola at P and Q. If P = (5, 4) and the tangents at P and Q meet at R then match the following.

(i) The focus is (a) 

(ii) The centroid of the ΔPQR is (b) (2,0)

(iii) The circumcentre of the ΔPQR is (c) 

(iv) The orthocentre of the ΔPQR is (d) 

Q 17. (i) equals (a) 

(ii) Ifand (b) 

≠ 0 then  equals

(iii) Ifand (c) 0

then  equals

(iv) Ifare orthogonal unit vectors (d) 1

thenequals

Q 18. (i) Given a2 + a + 1 is divisible by 3. When (a) 2

a is divided by 3 the remainder will be

(ii) is (b) 3

(iii) If f(n + 1) = for all (c) 0

n ∈ N and f(n) > 0 for all n ∈ N then (c) 0

f(n) is

(iv) If = 1 then (d) 1

equals

Q 19. (i) An unbiased dice is thrown and the (a) 

number shown is put for p in x2 + px + 2 = 0.

The probability of the equation to have real roots is

(ii) are two unit vectors inclined at . Then (b) 

is

(iii) If f(x) is differentiable and (c) – 1

then fequals

Q 20. (i) Let (a) 0

f(x) = 2sin2β + 4cos(x + β). Sin x. sin β

+ cos 2(x + β).

Then the value of {fα)}2 + is

(ii) n is given a value from the set (b) 

{1,2,3, …, 12} at random. The probability of

the value of (1 + i)n being real is

(iii) If each of the

vectors being a nonzero vector, then equals

(iv) If+ cos x = 0, where y(0) = 1, (d) 

then yequals

Q 21. (i) If the vertices of a triangle are represented (a) right–angled

by the complex numbers 0, z1 and z2 such

that then the triangle is

(ii) If a vertex, the circumcentre and the (b) equilateral

centroid of a triangle be (0, 0), (3, 4) and

respectively, the triangle is

(iii) If in a ABC, sin A.cos B = 1 –  and (c) isosceles

tan A.cot B = ­– 1 then the triangleis

(iv) The triangle formed by the lines (d) isosceles right–angled

and is

Q 22. (i) If x2 – 4x – 2π ≤ sin−1 (sin 5 ) then x lies in (a) R − [−1, 1]

(ii) If (x) = x2 − 4 and g(x) = f(x) + 5 such that (b) R − (−1, 1)

f{g(x)} > 0 then x lies in

(iii) If 3sin θ + 4cos θ = has a real (c) [–4, 4]

solution for θ then a lies in

(iv) If 4x4 + 9y4 = 64 and z = xy then (d) [–1, 5]

z lies in

Q 23. (i) The number of sides of the quadrilateral (a) 1

formed by the lines x2y2 + 1 = x2 + 1 = x2 + y2

that touch the circle x2 + y2 – 2x = 0 is

(ii) are orthogonal unit vectors and (b) 0

Then equals

(iii) A line having direction ratios 1, −1, 5 is (c) 2

perpendicular to the plane OPQ, where

P= (λ, 2, 1), Q = (−2, μ, 1) and O is the origin.

Then λ + μ equals

(iv) If the projection of the vector (d) 3

on the vector be 

then a can have the value (a) 5

Q 24. (i) Let a + b + c + d = 8 and abcd = 16, where

a,b,c,d are positive numbers.

The value of a + b is

(ii) The total number of ways of selecting and (b) 3

odd number of things from (2n + 1) different

things is 1024. Then n is

(iii) If sin x + cos x – 2 = (y − 1)2 for 0 ≤ x (c) 6

8π then the number of values of the pair (x, y) is

(iv) f(x) = 2x3 − 3ax2 + a2 x + 1 (a > 0) (d) 4

attains its maximum and minimum at x = p and

x = p2, respectively. Then a equals

Q 25. If |z1| = 12 and |z2 – 3 – 4i| = 5 then the (a) 3

Minimum value of |z1 – z2| is

(ii) Ifis a (b) 1

nonzero finite number then the integer n is

(iii) If f(x) = for x > 0 then the (c) 2

minimum value of f{f(x)} + is

(iv) If z is a complex number satisfying (d) 4

z - 2(2 + ) + 3 = 0 then the greatest

value of |z| is

Q 26. (i) The domain of the real valued function (a) (1, ∞)

f(x) for which 4f(x) + 41- f(x) = 4x is

(ii) A point is moving along the curve (b) 

y3 = 27x. The interval of values of x in which

the ordinate changes faster than the abscissa is

(iii) The range of values of x for which (c) [1, ∞]

x2 - 1, 2x + 1 and x2 + x + 1 will be the lengths

of three sides of a triangleis

(iv) The equation sin-1x - 3sin-1 a = 0 (d) (-1, 1)

has real solutions for x if a belongs to

Q 27. (i) The total number of positive integral (a) 18

solutions of xyz = 18 is

(ii) In a ΔABC, the minimum value of (b) 

cosec+ cosec + cosec  is

(iii) If x2 + x + 1 = 0thevalueof (c) 15

(iv) The value ofdx is (d) 6

Q 28. If2n + 1 Cn + 1+ 2n+1Cn + 2 + 2n + 1 Cn + 3(a) 16

+…+2n + 1C2n + 1equals 1024 then

(ii) Let and AT A = I. (b) 1

Then the value of x2 + y2 + z2 is

(iii) In the expansion of (1 + x)47 the (c) 15

coefficients of (2r + 1)th term and the 16th

term are equal. Then r is

(iv) Let for x > 0. If dx (d) 5

equals {F(k) − F(1)} then k is

Q 29. (i) If Then  (a) 2

equals

(ii) The number of points (a + 1, a), where (b) 4

a ∈ Z, lying inside the region bounded by the

circles x2 + y2 – 2x – 1 = 0 and x2 + y2 – 2x –

17 = 0 is

(iii) The straight line joining the points (0, 3) (c) 3

and (5, − 2) is a tangent to the curve y = .

Then c is

(iv) A bag contains 8 balls of two colocurs: red (d) 5

And green. 3 balls are taken out at random. The

Probability of getting more red balls then green is

and that of getting more green balls than

red is .The number of green balls is

Q 30. (i) If exactly two real common tangents can be (a) 2

drawn to the circles x2 + y2 − 2x – 2y = 0 and

x2 + y2 – 8x – 8y + 6λ = 0 for λ ∈ Z then the

greatest possible value of λ equals

(ii) equals (b) 3

(iii) The slope of a curve at (x, y) is (c) 1

and it passes through the points

and (λ, 1) then one of the values of λ is

(iv) (λ, 6, 2) is a point on the plane passing (d) 16

Through the line and parallel

to the line of intersection of plane x – y – 5z = 6

and 3x + 5y + 3z = 4. Then λ is

**Answers**

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

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

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

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

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

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

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

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

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

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

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

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

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

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

15. (i) c (ii) d (iii) a (iv) a

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

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

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

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

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

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

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

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

24. (i) d (ii) a (iii) d (iv) c

25. (i) c (ii) a (iii) c (iv) a

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

27. (i) a (ii) d (iii) a (iv) b

28. (i) d (ii) b (iii) a (iv) a

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

30. (i) b (ii) d (iii) a (iv) b