Time – 90 Minutes   **Max Marks- 40**

General Instruction-

1.   This paper contains three sections,A, B and C.
2.   Section A has 20 question of MCQ type, attempt any 16 questions.
3.   Section B has 20 question of MCQ type, attempt any 16 questions.
4.   Section C has 10 question of MCQ type, attempt any 8 questions.
5.   Each question carry one marks.

SECTION – A (1x 20=20)

1. The number of non- empty subsets of the set {1,2,3,4} is
   (a) 2^n (b) $2^n -1$ (c) n^2 (d) 2^{2n}

2. The group of honest people in a city is
   (a) void set   (b) finite set   (c) infinite set   (d) not a set

3. Modulus of the complex number $z = (1 – i\sqrt{3})$ IS
   (a) 2   (b) 4   (c) 10   (d) 1

4. Value of x for which the points (x, -1) ,(2 , 1) and (4 , 5) are collinear
   (a) 3   (b) 1   (c) 6   (d) 10

5. Equation of the line passing through the points (- 1 ,1) and (2 , -4) is
   (a) 5x+3y + 2 = 0   (b) 3x + 5y +2 = 0   (c) 2x+3y + 2 =0   (d) 5x- 3y – 2 = 0

6. The equation of the right bisector of the line segment joining the points (3,4) and (-1 , 2) is
   (a) 2x- y =5   (b) 3x + y = 4   (c) x + 2y = 6   (d) 2x + y = 5

7. Evaluate $\lim_{x \to 1} \frac{x^{15} -1}{x^{10} -1}$
   (a) 2.5   (b) 1.5   (c) 7.5   (d) 3.5

8. Find $\lim_{x \to 1} \frac{\sin ax}{\sin bx}$
   (a) a/b   (b) b/a   (c) ab   (d) a+b

9. Mean deviation about the mean for the data is : 4, 7, 8, 9, 10, 12, 13, 17
   (a) 6   (b) 5   (c) 3   (d) 4

10. Area of the triangle formed by the lines y- x = 0 , x+ y = 0 , x- k = 0 is
    (a) k   (b) 2k   (c) k^2 (d) k^3

11. Range of the function $f(x) = \sqrt{(x - 1)}$ is
    (a) $(1 , \infty)$ (b) $[0 , \infty)$ (c) [-1 ,1]   (d) (-1 ,1)

12. Let A and B be two sets such that n(A) = 16,n(B) = 14, n (A ∪ B) = 25 , then n (A ∩ B) is
    (a) 30   (b) 50   (c) 10   (d) 5

13. The symmetric difference of A and B is
    (a) (A - B) ∩ (B - A)   (b) (A - B) ∪ (B – A}
    (c) (A∪ B) - (A ∩B)   (d) {(A ∪ B) – A} ∩ { (A ∪ B)– B}

14. The range of the function $f(x) = \frac{x}{1+ x^2}$ is
    (a) $[\frac{-1}{2} , \frac{1}{2}]$ (b) $[\frac{-1}{2} , \frac{1}{4}]$ (c) $[\frac{-1}{4} , \frac{1}{4}]$ (d) $(0 , \frac{1}{2})$

15. Let R be a relation defined by a relation on N by x + 2y = 8 , the domain of R is
    (a) {2, 4, 8 }   (b) { 2 ,4 ,6 ,8 }   (c) { 2 4 ,6 }   (d) { 1 , 2 ,3 ,4 }

16. Let A and B be two sets in the same universal set, then A - B is
    (a) A ∪B   (b) A∩B   (c) $(A \cap B')$ (d) $(A' \cap B)$

17. The middle term in the AP 20 , 16 , 12 ………- 180 is
    (a) -80   (b) -84   (c) -76   (d) -68

18 . If three positive number a , b ,c are in AP , with abc= 64 , then minimum value of b is
   (a) 4   (b) 3   (c) 2   (d) 1
19 . Sum of the series : $12 + 32 + 52 +$…….. up to 20 terms is
   (a) 2520   (b) 4040   (c) 2620   (d) 2720
20. For any set A , $(A^c)^c$ is equal to
   (a) A^C (b) A   (c) - A   (d) Ø

SECTION – B   (1 x 20 = 20)

21 .If the third term of GP is 4 , then the product of its 5 term is
   (a) 4^3 (b) 4^4 (c) 4^5 (d) none of these
22. If 9 times the 9th term of an AP is equal to 13 times the 13th term , then the 22nd term of the AP is
   (a) 0   (b) 22   (c)198   (d) 220
23. If a_n denotes the nth term of the series $2 + 3 + 6 + 11 + 18 +$ …..then a_{50} is
   (a) $49^2 - 1$ (b) 49^2 (c) $50^2 + 1$ (d) $49^2 + 2$
24. The conjugate of a complex number is $\frac{1}{i-1}$, then the complex number is

   (a) $\frac{1}{i-1}$ (b) $\frac{-1}{i-1}$ (c) $\frac{1}{i+1}$ (d) $\frac{-1}{i+1}$

25. Range of the function f(x) $= \frac{|x|}{x}$ is
   (a) { -1 1 }   (b) (-1 ,1)   (c) { -1 ,0 ,1 }   (d) [-1 ,1]
26. Variance ofthe 6, 7 10 , 12, 13 , 4 , 8 , 12 is
   (a) 3.25   (b) 7.25   (c) 8.25   (d) 9.25
27. Mean deviation about the median of numbers 36, 72, 46 , 42 , 60 , 45 , 53 , 46 , 51 , 49 will be
   (a) 7   (b) 8   (c) 11   (d) 9
28. Angle between the lines y- $\sqrt{3}x$-5= 0 and $\sqrt{3}y - x$ +6 = 0 will be
   (a) 30^0 (b) 50^0 (c) 60^0 (d) 45^0
29. Cartesian form of the z= $\sqrt{2}$ ($\cos \frac{-3\pi}{4}$ + i sin $\frac{-3\pi}{4}$) is
   (a) 1 + I   (b) 1 – I   (c) -1 - i   (d) -1 + i
30.If α and β are the roots of the ax2 + bx + c= 0, then
            $\alpha\beta^2 + \alpha^2\beta + \alpha\beta$ equals
   (a) $\frac{c(a-b)}{a^2}$ (b) 0   (c) bc   (d) abc
31.If p and q are the roots of the equation $x^2 + px + q = 0$, then
   (a) p= 1, q = -2   (b) p = 0 , q = 1   (c) p= -2 , q = 0   (d) p = -2 , q= 1
32.Value of the conjugate of $\frac{\sqrt{5+12i} + \sqrt{5-12i}}{\sqrt{5+12i} + \sqrt{5-12i}}$ is
   (a) -3i   (b) 3i   (c) 3i /2   (d) -3i / 2
33 Evaluate $\lim_{x\to 0} \frac{\log (1+x)}{x}$
   (a) 2   (b) 1   (c) -1   (d) 0
34. Evaluate $\lim_{x\to 0} \frac{e^{3x} - 1}{x}$
   (a) 3   (b) 2   (c) 1   (d) 0
35. Evaluate $\lim_{x\to -1}(1 + x + x^2 + \ldots\ldots + x^{10})$
   (a) -1   (b) 2   (c) 1   (d) 0

   Direction- In each of the following questions, a statement of assertion is given followed by a corresponding statement of reason just below it. Of the statements, select the correct answer
   (a) Both assertion and reason are true and reason is the correct explanation of assertion
   (b) Both assertion and reason are true, but reason is not correct explanation of assertion.

(c) Assertion is true, but reason is false.

(d) Assertion is false, but reason is true .

36. Assertion (A) -:Set of English alphabets is the universal set f or the set of vowels in English alphabets .

   Reason (R): The set of vowels is the subset of consonants in the English alphabets .

37. Assertion : The set A= {x: x is an even prime prime number greater than 2) is an empty set .}

   Reason: The set B = { x: $x^2 = 4$, x is odd } is not an empty set .

38. Assertion: If 5th and 8th terms of GP be 48 and 384 respectively, then the common ratio of GP is 2.

   Reason: If 18,x, 14 are in AP , then x= 16.

39. Assertion :The domain of R is { 0, 1 ,2 ,3 ,4 ,5 }.

   Reason : The range of R is { 0 ,1,2,3,4,5}.

40. Assertion : If $z = i^9 + i^{19}$, then z is equal to 0 + 0i

   Reason : The value of $1 + i^2 + i^4 + i^6 + \ldots\ldots + i^{20}$ is equal to -1 .

SECTION – C (Case Study) 1 x 10 =10

" Mansi is doing a designing course . She is working on Cartesian Art now a days . For it she wants to take x – coordinate from the set A = { 0 , 1 ,2 ,3 ,5 } and y – coordinate from the set B ={ -3 ,-2 ,-1 ,0 ,1 , 2 ,3 ."

Based on above information answer the following questions :

41. How many ordered paired Mansi can make from A to B ?

   (a) 25   (b) 30   (c) 35   (d) 40

42. How many ordered pairs Mansi can make from B to A ?

   (a) 35   (b) 55   (c) 25   (d) 65

43. If a relation from A To B is defined as R = { (a , b): $a < b$, a ∈ A , b ∈ B }.

   Then how many elements are there in R

   (a) 6   (b) 8   (c) 12   (d) 20

44. How many total relations can be defined from the Set A to the set B?

   (a) 2^5 (b) 2^7 (c) 2^{12} (d) 2^{35}

45. Which of the following relation is true for R = { (a, b) : 3a< b , a ,b ∈ R }

   (a) (1,3) (-1 , 6) (1 ,1)   (b) (2 , 2/3) (3 ,7) (3 ,6)

   (c) (3 ,1) (9, 6) (24,7)   (d) (1, 5) (7 , 24) (19 , 76)

" Manas is trying to get the square root of a negative number,but he is confused.Someone tells him about imaginary numbers , which is also known as complex number .this number can be expressed as a + ib , where i is called iota and i $=\sqrt{-1}$." Based on this information answer these-

46. Value of $(\frac{2i}{1+i})^2$ is

   (a) I   (b) 2i   (c) 1 - i   (d) 1 – 2i

47. If $(\frac{1-i}{1+i})^{100} = a + i b$ then

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

48. Square root of (7 – 24 i) is

   (a) ±(3 – 5i)   (b) ± (3 + 4i)   (c) ±(3- 4i)   (d) ±(4- 3i)

49. Solution of $\sqrt{5}x^2 + 2x + \sqrt{5} = 0$

   (a $\pm \frac{\sqrt{19}}{5}$ i   (b) $\pm \frac{\sqrt{19}}{2}$ i   (c) $\pm \frac{-1\pm\sqrt{19}}{2\sqrt{5}}$ i   (d) $\pm \frac{-1\pm\sqrt{19}}{\sqrt{5}}$ i

50. If 4 x +i(3x - y) =3 + i (-6) , where x and y are real numbers then the value of x and y are

   (a) x=$\frac{3}{5}$,$y = \frac{33}{4}$ (b)x=$\frac{3}{4}$,$y = \frac{22}{3}$ (c) x=$\frac{3}{4}$, $y = \frac{33}{4}$ (d) x=$\frac{3}{4}$,$y = \frac{33}{5}$

CLASS – XI (MATHEMATICS) TERM -1 (2021-22)

ANSWER KEY- SET -A

1. b	2.d	3.a	4.b	5.a
6. d	7. b	8.a	9.c	10.c
11.b	12.d	13.b	14.a	15.c
16.c	17.a	18.a	19.b	20.b
21.c	22.a	23.d	24.d	25.a
26.d	27.a	28.a	29.c	30.a
31.a	32.c	33.b	34.a	35.c
36.c	37.c	38.b	39.a	40.c
41.c	42.a	43.a	44.d	45.d
46.b	47.b	48.c	49.c	50.c