Mathematics Assignment 2(3)

Class XI

Miscellaneous Assignment

Chapter 1 &2– Sets &Relations and Functions

Multiple Choice Questions

1. In a group of 72 students, 47 have background is Electronics, 59 have background in Mathematics and 42 have background in both the subjects. How many students do not have background in any of the, subjects?

   A. 8

   B. 13

   C. 25

   D. 34

2. If A and B be sets, A^C, B^C denote the complements of the sets A and B, then set

$(A - B) \cup (B - A) \cup (A \cap B)$ is equal to

   A. $A \cup B$

   B. $A^c \cup B^c$

   C. $A \cap B$

   D. $A^C \cap B^C$

3. A partition of {1, 2, 3, 4, 5} is the family

   A. { (1, 2),(3, 4),(3,5)}

   B. { φ(1, 2),(3, 4),(5)}

   C. 1, 2, 3),(5)}

   D. { (1, 2,), (3, 4, 5)}

4. Which of the following relations may be characterised as a function defined on the set I = {1, 2, 3, 4, 5} ?

   A. { (x, y) I x, y ∈ I, X < Y }

   B. { (x, y) I x, y ∈ I, X > Y }

   C. {(x, y) I x, Y ∈ I, x = y/2}

   D. None of these

5. The number of functions f : (1, 2, 3,......., n), → (1, 2,..........., m), which are one-to-one is

   A. m^n

   B.   m (m - 1) (m - 2) ....(m - n + 1)

   C. n^m

   D. n (n - 1) (n - 2)..........(n - m + 1)

6. If R be a relation from A= {1, 2, 3, 4} to B = {1, 3, 5}. i.e. (a, b) ∈ R if a < b, then RoR-1 is

   A. {(1, 3); (1, 5), (2, 3), (2, 5), (3, 5), (4, 5)}

   B. {(3, 1), (5, 1) (3,2), (5,2), (5,3), (5,4)}

   C. {(3, 3), (3, 5), (5, 3), (5, 5)}

   D. {(3, 3), (3, 4), (4, 5)}

7. If x, y are real numbers such that ordered pairs (x + y, x -y) and (2x + 3y, 3x - 2y) are equal, then (x, y) is equal to

   A. (1, 1)

   B. (2, 3)

   C. (3, -2)

   D. (0, 0)

8. If Q be the set of non-zero rational numbers and the relation R be defined over the set Q by xRy if x = 1/y, x, y ∈ Q, then

   A. R is an equivalence relation

   B. R is reflexive

   C. R is symmetric

   D. R is transitive

9. Let R1 and R2 be two equivalence relations on a set. Consider following assertions :
I. R1 ∪ R2 is an equivalence relation.
II. R1 ∩ R2 is an equivalence relation.
Which of the following is correct ?

   A. Both assertions are true

   B. assertions I is true but II is not true

   C. assertions II is true but I is not true

   D. Both assertions are not true

10. With respect to the relation 'x divides y', which of the following sets are totally ordered ?

I. {36, 3, 9}

II. {7, 77, 11}

III. {3,6, 24,12}

IV. {1, 2, 3,......}

    A. I, II and III only

    B. II and III only

    C. I and III only

    D. All of these

11. Let P(S) denote the power set of set S. Which of the following is always TRUE ?

    A. $P(P(S)) = P(S)$

    B. $P(S) \cap S = P(S)$

    C. $P(S) \cap P(P(S)) = [\varphi]$

    D. $S \notin P(S)$

12. Number of bijective functions from set A to itself when A contains 106 elements, is

    A. 106

    B. 106^2

    C. 106!

    D. 2^{106}

13. If set A has 3 elements and set B has 4 elements, then number of Injections that can be defined from A into B is

    A. 144

    B. 12

    C. 24

    D. 64

14. The binary relation S = Φ (empty set) on set A = {1, 2,3} is

    A. neither reflexive nor symmetric
    B. symmetric and reflexive
    C. transitive and reflexive
    D. transitive and symmetric

15. The function $f : Z \rightarrow Z$ given by $f(x) = x^2$ is

    A. one-one

    B. onto

    C. one-one and onto

    D. None of these

16. The function $f : R - \{2\} \rightarrow R$ defined by $f(x) = (x2 + 2x)/(x -2)$ is

    A. Only one-one

    B. Only onto

    C. neither one-one nor onto

    D. Both one-one and onto

17. If $f : X \rightarrow Y$ and $a, b \subseteq X$, then $f (a \cap b)$ is equal to

    A. $f(a) - f(b)$
    B. $f(a) \cap f(b)$
    C. a proper subset of $f(a) \cap f(b)$
    D. $f(b) - f(a)$

18. The number of functions from an m element set to an n element set is

    A. m+n

    B. m^n

    C. n^m

    D. m*n

19. Let $f : A \rightarrow B$ be a function, and let E and F be subsets of A.
Consider following statements about images.

S1 : $f(E \cup F) = f(E) \cup f(F)$

S2 : $f(E \cap F) = f(E) \cap f(F)$ Which of the following is TRUE about S1 and S2?

    A. Only S1 is correct

    B. Only S2 is correct

    C. Both S1 and S2 are correct

    D. None of S1 and S2 are correct

20. If [x] denotes integer part of the real number, then the function f(x) = x - [x] is

    A. An even function

    B. An Odd function

    C. periodic function

    D. Constant function

21. Which of the following relations are functions? I. $N = \{(x, y)/y = x^2, x \in \{-1, 0, 1, 2, 3\}\}$,
II. $P = \{(x, y)/y^2 = x, x \in \{4, 9, 16\}\}$, III. $Q = \{(x, y)/y = 4x^2 - 14, x \in \{-1, 1, 2, 3\}\}$

    A. I only

    B. I and II only

    C. I and III only

    D. III only

22. Let x and y are sets and |x| and |y| are their respective cardinalities. It is given that there are exactly 97 functions from x to y. From this one can conclude that

    A. $|x| = 1, |y| = 97$

    B. $|x| = 97, |y| = 1$

    C. $|x| = 97, |y| = 97$

    D. none of these

23. If $|A| = m$ and $|B| = n$, then number of possible relations $R: A \rightarrow B$ is

    A. mn

    B. $(mn)^2$

    C. 2^{m+n}

    D. 2^{mn}

24. Given $f(x) = 3x - 5$, for what value of x does $2*[f(x)] - 1 = f(3x - 6)$

    A. 0

    B. 4

    C. 6

    D. 7

25. Given $f(x) = \frac{x}{x+1}$, for what value k does $f(fk)=\frac{2}{3}$?

    A. –2
    B. 5/3
    C. 1
    D. 2

26. The function f is defined for all positive integers n by the following rule. f(n) is the number of positive integers each of which is less than n and has no positive factor in common with n other than 1. If p is any prime, number then f(p)=

    A. p-1
    B. p-2
    C. (p+1)/2
    D. (p-1)/2

27. The function f is defined for all positive integers n by the following rule: f(n) is the product of the distinct prime factors of n. If f(n) < 100 and n is not prime, what is the greatest possible value of f(n)?

    A. 99
    B. 95
    C. 91
    D. 87

28. The function f is defined for all positive integers n as $f(n) = n/(n + 1)$. Then $f(1)*f(2) – f(2)*f(3) =$

    A. –1/6
    B. 1/5
    C. 1/4
    D. 1/3

29. For an integer n, the function f(n) is defined as the product of all integers from 1 to n, where n is greater than 10. Which of the following is NOT a factor of f(n)+1?

I. 2
II. 3
III. 10

    A. I, II and III
    B. II only
    C. I and II only
    D. I and III only

30. The function f(n) is defined as the product of all integers from 1 to n, inclusive, and the function g(n) is defined as the product of all odd integers from 1 to n, inclusive, where n is a positive integer. If p is a prime factor of {f(150)/g(150)} + 1, then which of the following must be true?

A. p < 10
B. 10 < p < 50
C. 50 < p < 75
D. p > 75

31. For every positive even integer n, the function h(n) is defined to be the product of all the even integers from 2 to n, inclusive. If p is the smallest prime factor of h(100) +1, then p is?

A. Between 2 and 20
B. Between 20 and 30
C. Between 30 and 40
D. Greater than 40

32. The function f(m) is defined for all positive integers m as the product of m + 4, m + 5, and m + 6. If n is a positive integer, then f(n) must be divisible by which one of the following numbers?

A. 4
B. 5
C. 6
D. 7

ANSWER

1. A	2. A	3. D	4. D	5. B	6. C	7. D	8. C
9. C	10. C	11. C	12. C	13. C	14. D	15. B	16. C
17. A	18. C	19. A	20. B	21. C	22. A	23. D	24. B
25. A	26. A	27. B	28. A	29. A	30. D	31. D	32. C