UNIT TEST-1(RELATIONS AND FUNCTIONS)
MATHEMATICS

CLASS: X **Marks: 50**

I. Choose the correct answer **5x1=5**

1. If n (A x B) = 6 and A= {1, 3} then n (B) is

a) 1 b) 2 c) 3 d) 6

2. Let *n (A) =m* = and *n* (*B*) = *n* then the total number of non-empty relations that can be defined from *A* to *B* is

a) m^n b)n^m c) $2^{mn} - 1$ d) 2^{mn}

3. If {(a, 8), (6, b)} represents an identity function, then the value of *a* and *b* are respectively

a) (8,6) b) (8,8) c) (6,8) d) (6,6)

4. If $f: A \longrightarrow B$ is a bijective function and if *n* (B) = 7, then *n* (A) is equal to

a) 7 b) 49 c) 1 d) 14

5. If $f(x) = (x+1)^3-(x-1)^3$represents a function which is

a) Linear b) cubic c) reciprocal d) quadratic

II. Answer the following questions (any 10) **10x2=20**

6. Let A = {1, 2, 3} and B={x | x is a prime number less than 10}. Find A x B and B x A.

7. If *A*×*B* = {(3,2), (3,4), (5,2), (5,4)} then find *A* and *B*.

8. Let *A* = {3, 4, 7, 8} and *B* = {1, 7, 10}. Which of the following sets are relations from *A* to *B*? R = {(3, 7), (4, 7), (7, 10), (8, 1)}

9. A Relation R is given by the set $\{(x, y)/y=x+3, x \in \{0, 1, 2, 3, 4\}\}$. Determine its domain and range.

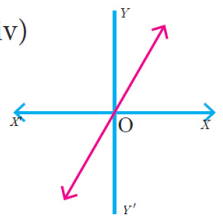
10. Let X={1, 2, 3, 4)and Y = {2,4,6,8,10}and R = {(1,2),(2,4),(3,6),(4,8)}. Show that R is a function and find its domain, co-domain and range?

11. Let *A* = {1,2,3} *B* = {4,5,6,7} and *f* = {(1,4)(2,5) (3,6)}be a function from *A* to *B*. Show that *f* is one – one but not onto function.

12. If *A* = {-2, -1, 0, 1, 2} f: $A \rightarrow B$ is an onto function defined by $f(x)=x^2+x+1$ then find *B*.

13. Determine whether the graph given below represent functions. Give reason for your answers concerning each graph.

(iv)



14. Let $A = \{-1, 1\}$ and $B = \{0, 2\}$ If the function $f: A \to B$ defined by $f(x) = ax + b$ an onto function? Find a and b.

15. Show that the function F: N⟶N defined by f(x) =2x-1 is one-one but not onto.

16. Find the value of k, such that f o g = g o f, f(x) =3x+2 and g(x) = 6x-k

17. Find k, if f(k)=2k-1 and f o f(k)=5

III. Answer the following questions (any 5) **5x5=25**

18. Let A= {x € N| 1< x < 4}, B = {x € W | 0≤ x <2} and C = {x € N| x < 3} then verify that i) A X (BUC) = (A X B) U (A X C) ii) A X (B∩C) = (A X B) ∩ (A X C)

19. Given the function f: x ⟶ x^2- 5x + 6, evaluate

i) f (-1) ii) f (2a) iii) f (2) iv) f (x-1)

20. A function f is defined by f(x) = 2x-3

i) find $\frac{f(0) + f(1)}{2}$

ii) find x such that f(x) =0

ii) find x such that f(x) =x

ii) find x such that f(x) =f(1-x)

21. Let $A = \{1, 2, 3, 4\}$ and $B = \{2, 5, 8, 11, 14\}$ be two sets. Let $f: A \to B$ be a function given by f(x) =3x-1. Represent this function

(i) by arrow diagram (ii) in a table form

(iii) as a set of ordered pairs (iv) in a graphical form

22. If the function f: R⟶ R is define by f(x) = $\begin{cases} 2x+7, & x< -2 \\ x^2-2, & -2\leq x <3 \\ 3x-2, & x\geq 3 \end{cases}$

i) f (4) ii f (-2) iii) f (4) + 2 f (1) iv) $\frac{f(1) - 3f(4)}{f(-3)}$

23. If f(x) = 2x+3, g(x) = 1-2x and h(x) = 3x prove that f o (g o h) = (f o g) o h

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