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Questions:

5 Marks

1. 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
   iii. find x such that f(x) = x
   iv. find x such that f(x) = f(1 - x)

2. Let A = {1,2,3,4} and B = { 2, 5, 8, 11,14} be two sets. Let f: A ⟶ 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

3. Let A = {1, 2} and B = {1, 2, 3, 4}, C = {5, 6} and D = {5, 6, 7, 8}, Verify whether A x C is a subset of B x D?

4. If A = {1,2,3,4}, B = {2,4,5} , C = {2, 5} find (A - B) x (B - C)

2 Marks

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

6. Let f be a function f : N ⟶ N be defined by f(x) = 3x + 2, x ∈ N
   (i) Find the images of 1, 2, 3
   (ii) Find the pre-images of 29, 53
   (iii) Identify the type of function

7. The Cartesian product A x A has 9 elements among which (-1, 0) and (0, 1) are found. Find the set A and the remaining elements of A x A.

8. Write the domain of the following real functions
   h(x) = x + 6

9. Let f : R⟶R defined by $f(x) = \begin{cases} 3x-2, & x<0 \\ 1, & x=0 \\ 4x+1; & x>0 \end{cases}$ Find f(- 3), f(0) and f(5).

QB365 Study Material QUESTION BANK 365

Fill in the blanks

10. Is f : $A \to B$ is a constant function, then the range of f will have _____ elements.

Multiple Choice Question

11. If n(A x B) = 6 and A = {1,3} then n(B) is
    (a) 1 (b) 2 (c) 3 (d) 6

12. If A = {1, 2}, B = {1, 2, 3, 4}, C = {5, 6} and D = {5, 6, 7, 8} then state which of the following statement is true..
    (a) (A x C) ⊂ (B x D) (b) (B x D) ⊂ (A x C) (c) (A x B) ⊂ (A x D) (d) (D x A) ⊂ (B x A)

13. The range of the relation R = {(x, x^2) |x is a prime number less than 13} is
    (a) {2,3,5,7} (b) {2,3,5,7,11} (c) {4,9,25,49,121} (d) {1,4,9,25,49,121}

14. If the ordered pairs (a + 2, 4) and (5, 2a + b) are equal then (a, b) is
    (a) (2,-2) (b) (5,1) (c) (2,3) (d) (3,-2)

15. 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)

16. Let A = {1, 2, 3, 4} and B = {4, 8, 9, 10}. A function f: A ⟶ B given by f = {(1, 4), (2, 8), (3, 9), (4,10)} is a
    (a) Many-one function (b) Identity function (c) One-to-one function (d) Into function

17. If f: A ⟶ B is a bijective function and if n(B) = 7, then n(A) is equal to
    (a) 7 (b) 49 (c) 1 (d) 14

18. f(x) = $(x + 1)^3 - (x - 1)^3$ represents a function which is
    (a) linear (b) cubic (c) reciprocal (d) quadratic

19. Which of the following are functions?
    (a) $\{(x, y) : y^2 = x, x, y \in R\}$ (b) $\{(x, y) : y = |x|, x, y \in R\}$ (c) $\{(x, y) : x^2 + y^2 = 1, x, y \in R\}$ (d) $\{(x, y) : x^2 - y^2 = 1, x, y \in R\}$