



Relations and Functions

Set-2

Objective Type Questions

1. Let $A = \{1, 2, 3\}$. The total number of distinct relations that can be defined over A is

- (a) 29 (b) 6 (c) 8 (d) None of these

2. The range of the function $f(x) = |x|$ is

- (a) $(0, \text{infinity})$ (b) $(-\text{infinity}, 0)$
(c) $[0, \text{infinity})$ (d) None of these

3. If $A = \{1, 2, 3, 4\}$, then which of the following are functions from A to itself?

- (a) $f_1 = \{(x, y) : y = x + 1\}$ (b) $f_2 = \{(x, y) : x + y > 4\}$
(c) $f_3 = \{(x, y) : y < x\}$ (d) $f_4 = \{(x, y) : x + y = 5\}$

4. Let $A = \{1, 2, 3\}$ and $B = \{a, b\}$. Which of the following subsets of $A \times B$ is a mapping from A to B ?

- (a) $\{(1, a), (3, b), (2, a), (2, b)\}$ (b) $\{(1, b), (2, a), (3, a)\}$
(c) $\{(1, a), (2, b)\}$ (d) None of the above

5. Let $A = \{1, 2, 3\}$ and $B = \{2, 3, 4\}$, then which of the following relations is a function from A to B ?

- (a) $\{(1, 2), (2, 3), (3, 4), (2, 2)\}$ (b) $\{(1, 2), (2, 3), (1, 3)\}$
(c) $\{(1, 3), (2, 3), (3, 3)\}$ (d) $\{(1, 1), (2, 3), (3, 4)\}$

6. If number of elements in sets A and B are m and n respectively, then the number of relations from A to B is

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

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7. If R is a relation from a set P to set Q, then

- (a) $R \subseteq P \times Q$ (b) $R \subseteq Q \times P$
(c) $R = P \times Q$ (d) $R = P \cup Q$

8. Let A be the set of first ten natural numbers and let R be a relation in A define by $(x, y) \in R$ if and only if $x + 2y = 10$. Which of the following is false?

- (a) $R = \{(2, 4), (4, 3), (6, 2), (8, 1)\}$ (b) Domain of R = $\{2, 4, 6, 8\}$
(c) Range of R = $\{1, 2, 3, 4\}$ (d) At least one is false

9. A relation is defined in the set Z of integers as follows $(x, y) \in R$ iff $x^2 + y^2 = 9$. Which of the following is false?

- (a) $R = \{(0, 3), (0, -3), (3, 0), (-3, 0)\}$ (b) Domain of R = $\{-3, 0, 3\}$
(c) Range of R = $\{-3, 0, 3\}$ (d) At least one if false

10. Let R be a relation in N defined by $R = \{(1+x, 1+x^2) : x \leq 5, x \in N\}$. Which of the following is false?

- (a) $R = \{(2, 2), (3, 5), (4, 10), (5, 17), (6, 25)\}$ (b) Domain of R = $\{2, 3, 4, 5, 6\}$
(c) Range of R = $\{2, 5, 10, 17, 26\}$ (d) At least one if false

11. Let $A = \{1, 2, 3\}$, $B = \{1, 3, 5\}$. If relation R from A to B is given by $\{(1, 3), (2, 5), (3, 3)\}$ then R^{-1} is

- (a) $\{(3, 3), (3, 1), (5, 3)\}$ (b) $\{(1, 3), (2, 5), (3, 3)\}$
(c) $\{(1, 3), (5, 2)\}$ (d) None of these

12. Let R be a relation in N defined by $R = \{(x, y) : x + 2y = 8\}$. The range of R is

- (a) $\{2, 4, 6\}$ (b) $\{1, 2, 3\}$
(c) $\{1, 2, 3, 4, 6\}$ (d) None of these

13. Let $A = \{a, b, c\}$ and $B = \{1, 2\}$. Consider a relation R defined from set A to set B. Then, R is equal to a subset of

- (a) A (b) B
(c) $A \times B$ (d) $B \times A$

14. $A = \{1, 2, 3\}$ and $B = \{3, 8\}$, then $(A \cup B) \times (A \cap B)$ is

- (a) $\{(3, 1), (3, 2), (3, 3), (3, 8)\}$ (b) $\{(1, 3), (2, 3), (3, 3), (8, 3)\}$
(c) $\{(1, 2), (2, 2), (3, 3), (8, 8)\}$ (d) $\{(8, 3), (8, 2), (8, 1), (8, 8)\}$

15. The domain of $\log(x^2 - 9)$ is

- (a) $(-\infty, 3) \cup (3, \infty)$ (b) $(-\infty, 3] \cup (3, \infty)$
(c) $(-\infty, 3] \cup [3, \infty)$ (d) None of these.

16. If $f(x+1) = x^2 - 3x + 2$, then $f(x)$ is equal to:

- (a) $x^2 - 5x - 6$ (b) $x^2 + 5x - 6$
(c) $x^2 + 5x + 6$ (d) $x^2 - 5x + 6$

17. If $A \times B = \{(5, 5), (5, 6), (5, 7), (8, 6), (8, 7), (8, 5)\}$, then the value A .

- (a) $\{5\}$ (b) $\{8\}$
(c) $\{5, 8\}$ (d) $\{5, 6, 7, 8\}$

18. The relation R defined on the set of natural numbers as $\{(a, b) : a \text{ differs from } b \text{ by } 3\}$ is given

- (a) $\{(1, 4), (2, 5), (3, 6), \dots\}$ (b) $\{(4, 1), (5, 2), (6, 3), \dots\}$
(c) $\{(1, 3), (2, 6), (3, 9), \dots\}$ (d) None of these

19. A general election of Lok Sabha is a gigantic exercise. About 911 million people were eligible to vote and voter turnout was about 67%, the highest ever



Let I be the set of all citizens of India who were eligible to exercise their voting right in general election held in 2019. A relation 'R' is defined on I as follows:

$$R = \{(V1, V2) : V1, V2 \in I \text{ and both use their voting right in general election - 2019}\}$$

19 (i) Two neighbors X and $Y \in I$. X exercised his voting right while Y did not cast her vote in general election - 2019. Which of the following is true?

- a. $(X, Y) \in R$ (b) $(Y, X) \in R$
c. $(X, X) \notin R$ (d) $(X, Y) \notin R$

19 (ii) Mr. 'X' and his wife 'W' both exercised their voting right in general election -2019, Which of the following is true?

- a. both (X, W) and $(W, X) \in R$ (b) $(X, W) \in R$ but $(W, X) \notin R$
c. both (X, W) and $(W, X) \notin R$ (d) $(W, X) \in R$ but $(X, W) \notin R$

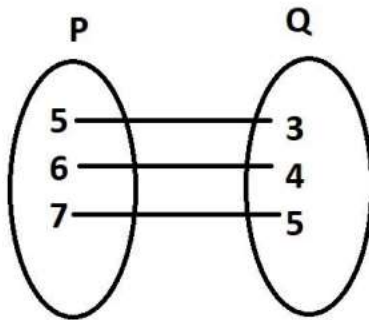
19 (iii) Three friends F1, F2 and F3 exercised their voting right in general election-2019, then which of the following is true?

- a. $(F1, F2) \in R, (F2, F3) \in R$ and $(F1, F3) \in R$ b. $(F1, F2) \in R, (F2, F3) \in R$ and $(F1, F3) \notin R$
 c. $(F1, F2) \in R, (F2, F2) \in R$ but $(F3, F3) \notin R$ d. $(F1, F2) \notin R, (F2, F3) \notin R$ and $(F1, F3) \notin R$

19 (iv) Mr. Shyam exercised his voting right in General Election – 2019, then Mr. Shyam is related to which of the following?

- a. All those eligible voters who cast their votes b. Family members of Mr. Shyam
 c. All citizens of India d. Eligible voters of India

20. Let $A = \{1, 2, 3, 4, 6\}$. Let R be the relation on A defined by $\{(a, b): a, b \in A, b \text{ is exactly divisible by } a\}$.



- (i) Write R in roster form
 (ii) Find the domain of R
 (iii) Find the range of R.

Answer Key :

1. (c) 2. (c) 3. (d) 4. (d) 5. (c)
 6. (b) 7. (a) 8. (d) 9. (a) 10. (a)
 11. (d) 12. (b) 13. (c) 14. (b) 15. (a)
 16. (d) 17. (c) 18. (a)

19. (i). (d) $(X, Y) \notin R$

(ii). (a) both (X, W) and $(W, X) \in R$

(iii). (a) $(F1, F2) \in R, (F2, F3) \in R$ and $(F1, F3) \in R$

(iv). (a) All those eligible voters who cast their votes

20. (i) $R = \{(1, 1), (1, 2), (1, 3), (1, 4), (1, 6), (2, 4), (2, 6), (2, 2), (4, 4), (6, 6), (3, 3), (3, 6)\}$

(ii) Domain of $R = \{1, 2, 3, 4, 6\}$

(iii) Range of $R = \{1, 2, 3, 4, 6\}$