

## Relation and Function

1. If  $A \times B = \{(1,1), (1, 2), (1, 3), (2, 1), (2, 2), (2,3)\}$ , then A is equal to  
 (a)  $\{1, 2\}$       (b)  $\{1, 2, 3\}$   
 (c) 2, 3      (d) None of these
2. If  $A = \{1, 2, 3\}$  and  $B = \{3,4\}$ , then  $(A \cup B) \times (A \cap B)$  is  
 (a) (3, 3)  
 (b)  $\{(1, 3), (2, 3), (3, 3), (1, 4), (2, 4), (3, 4)\}$   
 (c)  $\{(1, 3), (2, 3), (3, 3)\}$   
 (d)  $\{(1, 3), (2, 3), (3, 3), (4,3)\}$
3. If  $A = \{1, 2, 3, 4\}$  and  $B = \{5, 6, 7\}$ , then number of relations from A to B is equal to  
 (a)  $2^4$       (b)  $2^8$   
 (c)  $2^7$       (d)  $2^{12}$
4. If  $\phi$  is a null set, then which one of the following is correct?  
 (a)  $\phi = 0$       (b)  $\phi = \{0\}$   
 (c)  $\phi = \{\phi\}$       (d)  $\phi = \{\}$
5. If  $A = \{a, b, c\}$ , then what is the number of proper subsets of A?  
 (a) 5      (b) 6  
 (c) 7      (d) 8
6. If  $A = \{1,2,5,6\}$  and  $B = \{1,2,3\}$ , then what is  $(A \times B) \cap (B \times A)$  equal to?  
 (a)  $\{(1, 1), (2, 1), (6, 1), (3, 2)\}$   
 (b)  $\{(1, 1), (1, 2), (2, 1), (2, 2)\}$   
 (c)  $\{(1, 1), (2, 2)\}$   
 (d)  $\{(1, 1), (1, 2), (2, 5), (2, 6)\}$
7. If a set A contains 3 elements and another set B contains 6 elements, then the number of elements in  $A \cup B$  would be  
 (a) 9  
 (b) either 8 or 9  
 (c) either 7 or 8 or 9  
 (d) either 6 or 7 or 8 or 9
8. Let  $A = \{-1,2,5, 8\}$ ,  $B = \{0,1,3, 6, 7\}$  and R be the relation 'is one less than' from A to B, then how many elements will R contain?  
 (a) 2      (b) 3  
 (c) 5      (d) 9
9. If  $n(A) = 115$ ,  $n(B) = 326$ ,  $n(A - B) = 47$ , then what is  $n(A \cup B)$  equal to?  
 (a) 373      (b) 165  
 (c) 370      (d) 394
10. If P(A) denotes the power set of A and A is the void set, then what is number of elements in  $P\{P\{P\{P(A)\}\}\}$ ?  
 (a) 0      (b) 1  
 (c) 4      (d) 16
11. If A, B and C are three sets and U is the universal set such that  $n(U) = 700$ ,  $n(A) = 200$ ,  $n(B) = 300$  and  $n(A \cap B) = 100$ , then what is the value of  $(A' \cap B')$ ?  
 (a) 100      (b) 200  
 (c) 300      (d) 400

12. Let  $A = \{x : x \text{ is a square of a natural number and } x \text{ is less than } 100\}$  and  $B$  is a set of even natural numbers." What is the cardinality of  $A \cap B$ ?

- (a) 4                      (b) 5  
 (c) 9                      (d) None of these

Directions (Q. Nos. 13-16) Consider a relation  $R$  is defined from a set  $A = \{2, 3, 4, 5\}$  to a set  $B = \{3, 6, 7, 10\}$  as follows  $(x, y) \in R \Leftrightarrow x$  divides  $y$ .

13. Express  $R$ , as a set of ordered pairs is

- (a)  $\{(2, 4), (2, 3)\}$   
 (b)  $\{(3, 2), (3, 7), (3, 9)\}$   
 (c)  $\{(2, 6), (2, 10), (3, 3), (3, 6), (5, 10)\}$   
 (d) None of the above

14. The domain of  $R$  is

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

15. The range of  $R$  is

- (a)  $\{3, 6, 10\}$         (b)  $\{1, 2\}$   
 (c)  $\{2, 3\}$               (d)  $\{1, 3\}$

16. The inverse relation  $R^{-1}$  is

- (a)  $\{(6, 2), (10, 2), (3, 3), (6, 3), (10, 5)\}$   
 (b)  $\{2, 4\}$   
 (c)  $\{(3, 2), (1, 3), (4, 5)\}$   
 (d) None of the above

Directions (Q. Nos. 17-20) Consider the universal set  $S = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9\}$  and  $A = \{1, 2, 3, 4\}$ ,  $B = \{2, 3, 5, 6\}$ ,  $C = \{2, 3, 7\}$ , then

17. The value of  $A'$  is

- (a)  $\{0, 5, 6, 7, 8, 9\}$     (b)  $\{2, 3\}$   
 (c)  $\{5, 6\}$                       (d)  $\{7, 8\}$

18. The value of  $(A - B)$  is

- (a)  $\{0, 2, 3, 5, 6, 7, 8, 9\}$   
 (b)  $\{1, 2, 5\}$   
 (c)  $\{2, 6, 7, 8, 9\}$   
 (d) None of these

19. The value of  $A \cap B$  is

- (a)  $\{2, 3\}$                       (b)  $\{5, 6\}$   
 (c)  $\{1, 3\}$                       (d)  $\{1, 4\}$

20. The value of  $B' - A'$  is

- (a)  $\{1, 4\}$                       (b)  $\{2, 3\}$   
 (c)  $\{6, 5\}$                       (d)  $\{4, 2\}$

Directions (Q. Nos. 21-23) In a city, 25% of the families have phone, 15% of the families have car, 65% of the families have neither phone nor car and 2000 families have both phone and car.

21. Percentage of families having both phone and car, is

- (a) 5%                          (b) 10%  
 (c) 20%                        (d) 25%

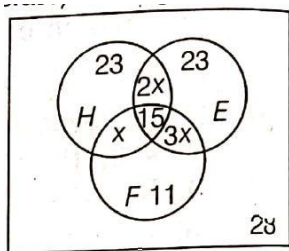
22. Percentage of families having either phone or car, is

- (a) 10%                        (b) 30%  
 (c) 35%                        (d) 40%

23. What is the number of families in the city?

- (a) 30000                      (b) 40000  
 (c) 20000                      (d) 10000

Directions (Q. Nos. 24-28) In a class, 3 languages are offered mainly Hindi, English and French. The total number of students learning French is 46. In  $x$  denotes the number of students learning Hindi and French but not English, then answer the following using adjacent Venn diagram.



24. How many students learn precisely two languages?

- (a) 55            (b) 40  
(c) 30            (d) 13

25. How many students learn atleast two languages?

- (a) 15            (b) 30  
(c) 45            (d) 55

26. What is the total strength of the class?

- (a) 124            (b) 100  
(c) 96            (d) 66

27. How many students learn English and French?

- (a) 30            (b) 43  
(c) 45            (d) 73

28. How many students learn atleast one language?

- (a) 45            (b) 51  
(c) 96            (d) None of these

Directions (Q. Nos. 29-30) Read the following information carefully to answer the questions that follow. In a survey of 25 students, it was found that 15 have taken Mathematics, 12 have taken Physics and 11 have taken Chemistry, 5 have taken Mathematics and Chemistry, 9 have taken Mathematics and Physics, 4 have taken Physics and Chemistry and 3 have taken all the three subjects.

29. The number of students who have taken only Physics, is

- (a) 2            (b) 3  
(c) 5            (d) 6

30. The number of students who have taken only two subjects, is dit

- (a) 7            (b) 8  
(c) 9            (d) 10