



# DOON INDIAN DEFENCE ACADEMY

## CLASS ASSIGNMENT – SETS, RELATIONS AND FUNCTION

Q 1. Let S be set of all distinct numbers of the form  $\frac{P}{Q}$ , where P, Q sets in [1,2,3,4,5,6]. What is Cardinality of the Set S?

- a. 21                                      b. 23                                      c. 32                                      d. 36

Q 2. In a class of 100 students, 70 have taken Science, 60 have taken mathematics, 40 have taken both science and Mathematics. The number of students who have not taken science or mathematics or both science and mathematics is equal to

- a. 90                                      b. 10                                      c. 30                                      d. 20

Q 3. If  $A = \{x \in R : x^2 + 6x - 7 < 0\}$  and  $B = \{x \in R : x^2 + 9x + 14\}$ , then which of the following is/are correct?

- $(A \cap B) = (-2, 1)$
- $(A - B) = (-7, -2)$ , Select the correct answer using the code given below:  
a. Only 1 is correct                      b. Only 2                                      c. Both 1 & 2                              d. Neither 1 nor 2

Q 4. In class of 60 Students, 45 students like music, 50 students like dancing, 5 students like neither. Then the number of students in class who like both music and dancing is?

- a. 35                                      b. 40                                      c. 50                                      d. 55

Q 5. If  $A = \{x : x \text{ is a multiple of } 3\}$  and  $B = \{x : x \text{ is a multiple of } 4\}$  and  $C = \{x : x \text{ is a multiple of } 12\}$ , then which of the following is null set?

- a.  $(A|B) \cup C$                               b.  $(A|B) | C$                               c.  $(A \cap B) \cap C$                               d.  $(A \cap B) | C$

Q 6. In a survey of 25 students, it was found that 15 had taken mathematics, 12 had taken Physics, and 11 had taken Chemistry, 5 had taken mathematics and chemistry, 9 had taken mathematics and physics, 4 had taken Physics and Chemistry and 3 had taken all the 3 subjects. Consider following statements

- The number of students who had taken only one subject is equal to number of student who have taken only 2 subjects
- The number of students who have taken at least 2 subjects is four times number of students who had taken all three subjects

Which of the above statement is correct?

- a. Only I                                      b. Only 2                                      c. Both 1 & 2                                      d. Neither I nor II

Q 7. 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

Q 8. 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}

Q 9. If  $A = \{1,2,3,4\}$  and  $B = \{5,6,7\}$ , then the number of relations from A to B is equal to

- a.  $2^4$                                       b.  $2^3$                                       c.  $2^7$                                       d.  $2^{12}$

Q 10. 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}



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Q 11. The Relation R on a set  $A = \{1,2,3,4\}$  is defined as  $R = \{1,1\}\{1,3\}\{2,2\}\{2,3\}\{3,1\}\{3,2\}$ . Then R is

- a. Reflexive                      b. Symmetric                      c. AntiSymmetric                      d. Transitive

Q 12. If A, B and C are non empty sets such that  $A \cap C = \phi$ , then what is  $(A \times B) \cap (C \times B)$  equal to?

- a.  $A \times C$                       b.  $A \times B$                       c.  $B \times C$                       d.  $\phi$

Q 13. If A and B are two disjoint sets, then which one of the following is correct?

- a.  $A - B = A - (A \cap B)$                       b.  $B - A' = B \cap A$                       c.  $A \cap B = (A - B) \cap B$                       d. All of these

Q 14. If A and B are finite sets, then which one of the following is the correct equations?

- a.  $n(A - B) = n(A) - n(B)$                       b.  $n(A - B) = n(B - A)$                       c.  $n(A - B) = n(A) - n(A \cap B)$                       d.  $n(A - B) = n(B) - n(A \cap B)$

Q 15. Which one of the following is correct?

The relation  $R = \{1,1\}\{2,2\}\{3,3\}$  on a set  $A = \{1,2,3\}$  is

- a. only reflexive                      b. only symmetric                      c. only transitive                      d. ref, sym, and transitive

Q 16. Let X be any non empty set containing n elements. Then what is the number of relation on X?

- a.  $2^{n^2}$                       b.  $2^n$                       c.  $2^{2n}$                       d.  $n^2$

Q 17. Let  $A = \{1,2,3\}$  and let  $R = \{1,2\}\{2,2\}\{3,1\}\{3,2\}$  then the domain and range of R Inverse is

- a.  $\{2,1\} \& \{1,2,3\}$                       b.  $\{1,2\} \& \{1,2,3\}$                       c.  $\{1,2,3\} \& \{2,3\}$                       d.  $\{2,3\} \& \{1,2\}$

Q 18. The order of a set A is 3 and that of a set B is 2. What is the numbers of relation from A to B?

- a. 4                      b. 6                      c. 32                      d. 64

Q 19. If A and B are any two sets, then what is value of  $A \cap (A \cup B)$ ?

- a. Complement of A                      b. complement of B                      c. B                      d. A

Q 20. Let  $A = \{x : x \text{ is a digit of number } 3591\}$ ,  $B = \{x : x \in \mathbb{N}, x < 10\}$ , which of the following is not correct?

- a.  $A \cap B = \{1,3,5,9\}$                       b.  $A - B = \phi$                       c.  $B - A = \{2,4,6,7,8\}$                       d.  $A \cup B = \{1,2,3,5,9\}$

Q 21. The relation R defined on set  $A = \{x: |x| < 3, x \in \mathbb{Z}\}$  by  $R = \{(x,y): y = |x|\}$  is

- a.  $\{-2,2\}\{-1,1\}\{0,0\}\{1,1\}\{2,2\}$                       b.  $\{-2,2\}\{-2,-2\}\{-1,1\}$                       c.  $\{0,0\}\{1,1\}\{2,2\}$                       d. None of these

Q 22. Which one of the following is not correct?

- a.  $(B' - A') \cup (A' - B') = (A \cup B) - (A \cap B)$                       b.  $(A - B) \cup (B - A) = (A' \cup B') - (A' \cap B')$   
c.  $(B' - A') \cap (A' - B') = (B - A) \cap (A - B)$                       d.  $(B' - A') \cap (A' - B') = (B - A') \cup (A' - B)$

Q 23 If  $A = \{1,2,3\}$ ,  $B = \{2,3\}$ ,  $C = \{3,4\}$ . What is the cardinality of  $(A \times B) \cap (A \times C)$ ?

- a. 1                      b. 2                      c. 3                      d. 4