

Chapter 1. SETS

Summary of the Lesson

- A Set is a well defined collection of distinct object. Each object is called elements of the set. Sets are usually denoted by capital letters and elements are denoted by small letters.
- A Set may be represented in two methods.
 - a) Roster/Tabular form Eg : $\{ 1,2,3,4,5,6\}$
 - b) Set-builder form Eg : $\{ x/ x \text{ is natural number } < 7\}$
- A set which does not contain any element is called empty set or Null set or Void set.
- A set which consists of a definite number of elements is called a finite set, otherwise, the set is called infinite set.
- A set which has only one element is called a singleton set.
- Two sets A and B are said to be equal if they have exactly the same elements.
- A set A is said to be a subset of a set B, if every element of A is also an element of B. The symbol 'C' stands for ' is a subset of ' .
- The collection of all subsets of a set A is called the power set of A and is denoted by P(A). If A is a set with $n(A)=m$, then $n(P(A)) = 2^m$.
- The union of two sets A and B is the set of all those elements which are either in A or in B.
- The intersection of two sets A and B is the set of all elements which are common.
- The difference of two sets A and B in this order is the set of elements which belongs to A but not to B.
- The complement of a subset A of a Universal set U is the set of all elements of U which are not the elements of A.
- For any two sets A and B, $(A \cup B)' = A' \cap B'$ and $(A \cap B)' = A' \cup B'$
- If A and B are finite sets such that $A \cap B = \phi$, then
 $n(A \cup B) = n(A) + n(B)$
 If $A \cap B \neq \phi$, then $n(A \cup B) = n(A) + n(B) - n(A \cap B)$

Objective Type Questions:

1. In a city 25 percent of the population travels by car, 45% travels by bus and 10% travels by both car and bus. Then persons travelling by car or bus is.
 - a) 80% b) 40% c) 60% d) 70%
2. If A and B are two sets, then $A \cap (A \cup B)'$ is equal to

- a) A b) B c) \emptyset d) None of these

3. If A and B are two sets. Then

- a) $A \cap B \subseteq A \cup B$ b) $A \cap B = A \cup B$
c) $A \cap B \supseteq A \cup B$ d) $A \cup B \subseteq A \cap B$

4. If A is any set , then

- a) $A \cap A' = U$ b) $A \cup A' = \phi$
c) $A \cap A' = U'$ d) $A \cup A' = U$

5. If A and B are any two sets , then $(A \cup B)'$ is equal to

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

6. If A and B be any two sets , then $(A \cap B)'$ is equal to

- a) $A' \cup B'$ b) $A \cap B$
c) $A' \cap B'$ d) None of these

7. If A and B are two sets , then $A \cup (A \cap B)$ is equal to

- a) B b) A
c) A' d) None of these

8. If $A \subseteq B$, then $A \cup B$ is equal to

- a) B b) A
c) A' d) None of these

9. If $A \subseteq B$, then $A \cap B$ is equal to

- a) B b) A
c) A' d) B'

10. Which of the following is a null set ?

- a) $\{ x : x^2 = 4 \text{ or } x = 1 \}$ b) $\{ 0 \}$
c) $\{ x : x > 0 \text{ or } x < 0 \}$ d) $\{ x : x^2 + 1 = 0, x \in \mathbb{R} \}$

11. Two sets A and B are disjoint iff :

- a) $A - B = A$ b) $A \cap B = \phi$
c) $A \cap B \neq \phi$ d) $A \cup B = \phi$

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21. If A and B are not disjoint, then $n(A \cup B)$ is equal to

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

22. The set of intelligent students in a class is

- a) a null set b) a singleton set
c) not a well defined collection d) a finite set

23. Let $A = \{1, 2, 3, 4\}$, then total number of subsets of A are given by

- a) 16 b) 12
c) 8 d) 0

24. If A and B be two sets such that $n(A) = 70$, $n(B) = 60$, and $n(A \cup B) = 110$. Then $n(A \cap B)$ is equal to

- a) 20 b) 130
c) 180 d) 170

25. Which set is the subset of all given sets?

- a) $\{a, b, c, d\}$ b) $\{a, b\}$
c) $\{a\}$ d) $\{\}$

Answers:

- | | | | | | | |
|-------|-------|-------|-------|-------|-------|-------|
| 1. c | 2. c | 3. a | 4. d | 5. c | 6. a | 7. b |
| 8. a | 9. b | 10. d | 11. b | 12. c | 13. c | 14. d |
| 15. c | 16. c | 17. c | 18. d | 19. b | 20. c | 21. c |
| 22. c | 23. a | 24. a | 25. d | | | |