

**Department Of Computer Science**  
**MCA**  
**Subject: Mathematical Foundation**  
**Assignment-1 (Set Theory)**

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1. Define the following terms with example:

Null Set

Proper Subset

Cartesian Product

Union of Two sets

2. Let  $U = \{1,2,3,4,5,6,7,8,9,10\}$ ,  $A = \{1,2,3,4,5\}$ ,  $B = \{4,5,6,7,8\}$  then find  $A \cup B$ ,  $A \cap B$ ,  $A - B$ ,  $A \Delta B$ ,  $A'$ ,  $B'$ .
3. Give the power sets of following:
- (a)  $A = \{x: x \text{ is multiple of } 4, x \in \mathbb{N} \text{ and } x \leq 16\}$
- (b)  $B = \{x: x \text{ is a prime number and } x < 8\}$
4. If  $A = \{1,4\}$ ,  $B = \{4,5\}$ ,  $C = \{5,7\}$  then verify that  $A \times (B \cap C) = (A \times B) \cap (A \times C)$ .
5. If  $A = \{1,2\}$ ,  $B = \{2,3\}$ ,  $C = \{3,5\}$  then find  $(A \times B) \cup (A \times C)$ .
6. If  $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$ ,  $A = \{1, 3, 5, 7, 9\}$ ,  $B = \{1, 5, 6, 8\}$ ,  $C = \{1, 4, 6, 7\}$  then verify
- (a)  $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$
- (b)  $(A \cup B)' = A' \cap B'$
- (c)  $A - B = A \cap B'$
- (d)  $A \Delta B = B \Delta A$
- (e)  $A - C = A - (A \cap C)$ .
7. Prove the following statement using Venn diagram.
- (a)  $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$
- (b)  $(A - B) \cup (B - A) = (A \cup B) - (A \cap B)$
- (c)  $(A \cup B)' = A' \cap B'$
- (d)  $A - (B \cup C) = (A - B) \cap (A - C)$