

Ex - 13C

1 Fill in the blanks

(i) If each element of set  $P$  is also an element of set  $Q$ , then  $P$  is said to be subset of  $Q$  and  $Q$  is said to be super set of  $P$ .

(ii) Every set is a subset of itself.

(iii) The empty set is a subset of every set.

(iv) If  $A$  is proper subset of  $B$ , then  $n(A)$  is less than  $n(B)$ .

2 If  $A = \{5, 7, 8, 9\}$ , then which of the following are subset of  $A$ ?

(i)  $B = \{5, 8\}$   
Ans  $B \subset A$

(ii)  $C = \{0\}$   
Ans  $C \not\subset A$

(iii)  $D = \{7, 9, 10\}$   
Ans  $D \not\subset A$

(iv)  $E = \{3\}$   
Ans  $E \subset A$

(v)  $F = \{8, 7, 9, 5\}$   
Ans  $F \subset A$

Hence (i), (iv) and (v) are subset of  $A$ .

3 If  $P = \{2, 3, 4, 5\}$ ; then which of the following are proper subset of  $P$ ?

Page \_\_\_\_\_

Ans:  $P = \{2, 3, 4, 5\}$

(i)  $A = \{3, 4\}$ ,

(ii)  $B = \{3\}$ ,

$C = \{2, 3, 4, 5\}$ ,

$D = \{6, 5, 4\}$  and

$E = \{0\}$

We see that only A and B are the proper subset of P.

4. If  $A = \{ \text{even numbers less than 12} \}$ ,  
 $B = \{2, 4\}$ ,  $C = \{1, 2, 3\}$ ,  $D = \{2, 6\}$  and  
 $E = \{4\}$

state which of the following statements are true:

Ans:  $A = \{ \text{even number less than 12} \} = \{2, 4, 6, 8, 10, 12\}$   
 $B = \{2, 4\}$ ,  $C = \{1, 2, 3\}$   
 $D = \{2, 6\}$  and  $E = \{4\}$

(i)  $B \subset A$

Ans True

(v)  $E \supset B$

Ans False

(ii)  $C \subset A$

Ans False

(vi)  $A \supset B \supset E$

Ans True

(iii)  $D \subset C$

Ans False

(iv)  $D \not\subset A$

Ans True

5. Given  $A = \{a, c\}$ ,  $B = \{p, q, r\}$  and  $C =$  set of digits used to form the number 1351. Write all the subsets of sets A, B, and C.

- Ans (i)  $A = \{a, c\}$   
 $\therefore$  subsets are:  $\{\}, \{a\}, \{c\}$  and  $\{a, c\}$
- (ii)  $B = \{p, q, r\}$   
 $\therefore$  subsets are:  $\{\}, \{p\}, \{q\}, \{r\}, \{p, q\}, \{p, r\}, \{q, r\}$  and  $\{p, q, r\}$
- (iii)  $C =$  set of digits used in 135,  $= \{1, 3, 5\}$   
 $\therefore$  subsets are:  $\{\}, \{1\}, \{3\}, \{5\}, \{1, 3\}, \{2, 5\}$  and  $\{1, 3, 5\}$ .

(i) If  $A = \{p, q, r\}$ , then number of subsets of A =

Ans If  $A = \{p, q, r\}$   
 then number of subsets of  $A = 2^3 = 2 \times 2 \times 2 = 8$

(ii) If  $B = \{5, 4, 6, 8\}$ , then number of subsets of B =

Ans If  $B = \{5, 4, 6, 8\}$ ,  
 then number of ~~subsets~~ proper subsets of  $B = 2^4 - 1 = 2 \times 2 \times 2 \times 2 - 1 = 16 - 1 = 15$

(iii) If  $C = \{0\}$ , then number of subsets of C =

Ans then if  $C = \{0\}$   
 then number of subsets of  $C = 2^1 = 2$

(iv) If  $M = \{x : x \in \mathbb{N} \text{ and } x < 3\}$ , then M has \_\_\_\_\_ proper subsets.

Ans If  $M = \{x : x \in N \text{ and } x < 3\} = \{1, 2\}$   
Then  $M$  has proper subsets =  $2^2 - 1 = 4 - 1 = 3$

7 For the universal set  $\{4, 5, 6, 7, 8, 9, 10, 11, 12, 13\}$ , find its subsets  $A, B, C$  and  $D$  such that:

(i)  $A = \{\text{even number}\}$

Ans  $\{4, 6, 8, 10, 12\}$

(ii)  $B = \{\text{odd number greater than 8}\}$

Ans  $\{9, 11, 13\}$

(iii)  $C = \{\text{Prime number}\}$

Ans  $\{5, 7, 11, 13\}$

(iv)  $D = \{\text{even numbers less than 10}\}$

Ans  $\{4, 6, 8\}$