Exercise 1.3 (c)

Q) 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 subject 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 subsets of A?

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

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

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

(iv) $E = \{\}$

$\therefore E \subset A$

(An empty set is subset of every set)

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

$\therefore F \subset A$

$\because$ Every set is subset of it self.

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

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

(i) $P = \{2, 3, 4, 5\}$

(ii) $B = \{\}$, $C = \{23, 45\}$

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

$E = \{0\}$

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

4) If A = {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:

(i) $B \subset A$: It is true
(ii) $C \subseteq A$: It is false
(iii) $D \subset C$: It is false
(iv) $D \not\subset A$: It is false
(v) $E \supseteq B$: It is false
(vi) $A \supseteq B \supseteq E$: It is true

5) Given A = {a, c}
B = {p, q, r}
C = set of digits used to form number 1351.

(i) A = {a, c}
∴ Subsets are: { } or ϕ, {a}, {c} and {a, c}

(ii) B = {p, q, r}
∴ subsets are: { }
or ϕ, {p}, {q}, {r}, {p, q}
{p, r}, {q, r} and {p, q, r}

(iii) C = set of digits used in 135.
= {1, 3, 5}
∴ Subsets are = { }
or ϕ, {1}, {3}, {5}, {1, 3}, {1, 5},
{2, 5} and {1, 3, 5} A

6)(i) If $A = \{P, 9, \pi\}$ then number of subsets of $A = 2^3 = 2 \times 2 \times 2 = 8$

(ii) If $B = \{5, 4, 6, 8\}$ then number of 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 $C = \{0\}$
Then number of subsets of C
$= 2^1 = 2$

(iv) If $M = \{x : x \in N \text{ and } x < 3\}$ then M has $\{1, 2\}$ proper subsets.
$= 2^2 - 1 = 4 - 1 = 3$

(v)

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

(i) $A = \{\text{even numbers}\}$
$= \{4, 6, 8, 10, 12\}$

(ii) $B = \{\text{odd numbers greater than } 8\}$
$= \{9, 11, 13\}$

(iii) $C = \{\text{Prime numbers}\}$
$= \{5, 7, 11, 13\}$

(iv) $D = \{\text{even numbers less than } 10\}$
$= \{4, 6, 8\}$

$A' = \{5, 7, 9, 11, 13\}$

$B' = \{4, 5, 6, 7, 8, 10, 12\}$

$C' = \{4, 6, 8, 9, 10, 12\}$

and $D' = \{5, 7, 9, 10, 11, 12, 13\}$