Exercise 5.1

Sets:-

-> Collection of object

-> Denoted by A, B, C etc.

Example:-

$$A = \{ Eng, Urdu, Physics \}$$

$$N = \{1, 2, 3, 4, \dots\}$$

$$W = \{0, 1, 2, \dots\}$$

$$Z = \{0, \pm 1, \pm 2, \pm 3, \dots\}$$

$$E = \{0, \pm 2, \pm 4, \pm 6, \dots\}$$

Ex 5.1

If $X = \{1, 4, 7, 9\}$

$Y = \{2, 4, 5, 9\}$

Find

$X \cup Y$

$X \cup Y = \{1, 4, 7, 9\} \cup \{2, 4, 5, 9\}$

$= \{1, 2, 4, 5, 7, 9\}$

$X \cap Y$

$X \cap Y = \{1, 4, 7, 9\} \cap \{2, 4, 5, 9\}$

(iii) $Y \cup X$

$$Y \cup X = \{2,4,5,9\} \cup \{1,4,7,9\}$$

$$= \{1,2,4,5,7,9\}$$

(iv) $Y \cap X$

$$Y \cap X = \{2,4,5,9\} \cap \{1,4,7,9\}$$

$$= \{4,9\}$$

Q 2

if

X = Set of Prime Number less than or equal to 17

Y = Set of first 12 of Natural Numbers.

then find

(i) $X \cup Y$

$X = \{2, 3, 5, 7, 11, 13, 17\}$

$Y = \{1, 2, 3, -, -, -12\}$

$X \cup Y = \{2, 3, 5, 7, 11, 13, 17\} \cup \{1, 2, -, -, 12\}$

$X \cup Y = \{1, 2, 3, 4, -, -, 12, 13, 17\}$

(ii) $Y \cup X$

$$Y \cup X = \{1,2,3,\ldots,-12\} \cup \{2,3,5,\ldots,-17\}$$

$$= \{1,2,3,\ldots,\ldots,-12,13,17\}$$

(iii) $X \cap Y$

$$X \cap Y = \{2,3,5,7,11,13,17\} \cap \{1,2,3,\ldots,-12\}$$

$$= \{2,3,5,7,11\}$$

Q No3

$X = \phi$, $Y = Z^+$, $T = O^+$

Find

(i) $X \cup Y$

$X = \{\ \}$

$Z^+ = \{1, 2, 3, -, -, -\}$

$O^+ = \{1, 3, 5, 7, 9, -, -, -\}$

$X \cup Y = \{\ \} \cup \{1, 3, 5, -, -, -\}$

$= \{1, 3, 5, 7, -, -, -\}$

(ii) $X \cup T$

$$X \cup T = \{\} \cup \{1, 3, 5, 7, -, -\}$$

$$= \{1, 3, 5, 7, -, -, -\}$$

(iii) $Y \cup T$

$$Y \cup T = \{1, 2, 3, -, -, -\} \cup \{1, 3, 5, -, -\}$$

$$= \{1, 2, 3, -, -, -\}$$

(iv) $X \cap Y$

$$X \cap Y = \{\} \cap \{1, 2, 3, 4, -, -, -\}$$

$$= \{\}$$

if Q no 4

$$U = \{x / x \in N \wedge 3 < x \leq 25\}$$

$$X = \{x / x \text{ is prime} \wedge 8 < x < 25\}$$

$$Y = \{x / x \in W \wedge 4 \leq x \leq 17\}$$

$(X \cup Y)'$

$$U = \{4, 5, -, -, -25\}$$

$$X = \{11, 13, 17, 19, 23\}$$

$$Y = \{4, 5, 6, 7, -, -, -, -17\}$$

To Find $(X \cup Y)'$
we first find $X \cup Y$

$X \cup Y = \{11,13,17,19,23\} \cup \{4,5,6,7,8,-,-,-,-,-17\}$

In Union we write every Element together.

$= \{4,5,6,7,8,-,-,-,-,-17,19,23\}$

Now we find complement of $(X \cup Y)$

$(X \cup Y)' = U - (X \cup Y)$

$U - (X \cup Y) = \{4,5,6,7,8,9,-,-,-25\} - \{4,5,6,-,-,-,17,19,23\}$

In Compliment we write all the elements which are in 'U' but are not in

$(X \cup Y)$

$$= \{18, 20, 21, 22, 24, 25\}$$

(iv) $X' \cup Y'$

"In order to solve this we first find compliment of X and then compliment of Y then take union of both"

$$X' = U - X$$

$$U - X = \{4, 5, 6, \ldots, 25\} - \{11, 13, 17, 19, 23\}$$

"In Compliment we write all the elements which are in 'U' but are not in X"

$= \{4,5,6,7,8,9,10,12,14,15,16,18,20,21,22,24,25\}$

"Now we find compliment of Y"

$Y' = U - Y$

$U - Y = \{4,5,6,7,\ldots,25\} - \{4,5,6,7,\ldots,17\}$

$= \{18,19,20,21,22,23,24,25\}$

$$X' \cup Y' = \{4,5,6,7,8,9,10,12,14,15,16,18,20,21,22,24,25\} \cup \{18,19,20,-,-,-,25\}$$

$$= \{4,5,6,7,8,9,10,12,14,15,16,18,19,20,21,22,23,24,25\}$$