

Exercise - 1.1

① Which of the following are sets?

- (i) The collection of prime number upto 100.
- (ii) The collection of rich people in India.
- (iii) The collection of all rivers in India
- (iv) The collection of good Hockey players.

⇒ (i) we know that, prime numbers upto 100 are 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 87, 89, 97.

Now, This all elements are well-defined of objects.

∴ $A = \{x; x \text{ is prime number upto } 100\}$.

∴ A ~~set~~ is well-defined.

∴ A is a Set.

(ii) The collection of rich people in India

This is not well-defined.

So, This collection is not Set.

(iii) The collection of all rivers in India.

Now, India rivers are Ganga, ~~canvery~~,
Sindhu, Godavari, Yamuna, ... etc.

∴ This elements are well-defined.

$B = \{y; y \text{ is a river in India}\}$

∴ B ~~set~~ is well-defined.

So, B is a Set.

(iv) The collection of good Hockey players.

This is not well-defined.

So, The collection of good Hockey players
is not a Set.

② List the set of letters of the following words in Roster form.

(i) INDIA

(ii) PARALLELOGRAM

(iii) MISSISSIPPI

(iv) CZECHOSLOVAKIA

⇒ (i) INDIA Roster form

$$is = \{I, N, D, A\}$$

(ii) PARALLELOGRAM Roster form

$$is = \{P, A, R, L, E, O, G, M\}$$

(iii) MISSISSIPPI Roster form

$$is = \{M, I, S, P\}$$

(iv) CZECHOSLOVAKIA Roster form

$$is = \{C, Z, E, H, O, S, L, V, A, K, I\}$$

③ Consider the following sets $A = \{0, 3, 5, 8\}$,
 $B = \{2, 4, 6, 10\}$ and $C = \{12, 14, 18, 20\}$.

(a) state whether True or False:

(i) $18 \in C$ (ii) $6 \notin A$ (iii) $14 \notin C$ (iv) $10 \in B$

(v) $5 \in B$ (vi) $0 \in B$

(b) Fill in the blanks:-

(i) $3 \in \underline{\hspace{1cm}}$ (ii) $14 \in \underline{\hspace{1cm}}$ (iii) $18 \underline{\hspace{1cm}} B$ (iv) $4 \underline{\hspace{1cm}} B$

⇒ (a)

(i) Now, $18 \in C$,
it is True.

(ii) Now, $6 \notin A$
it is True.

(iii) $14 \notin C$.
it is False because $14 \in C$.
∴ It is False.

(iv) $10 \in B$,
It is True.

(v) $5 \in B$,
It is False because $5 \in A$.
 \therefore It is False.

(vi) $0 \in B$.
It is False because $0 \in A$.
It is False.

(b) (i) $3 \in A$

(ii) $14 \in C$

(iii) $18 \notin B$

(iv) $4 \in B$

④ Represent the following sets in Roster form.

(i) $A =$ The set of all even natural numbers less than 20.

(ii) $B = \{y : y = \frac{1}{2n}, n \in \mathbb{N}, n \leq 5\}$

(iii) $C = \{x : x \text{ is perfect cube}, 27 < x < 216\}$

(iv) $D = \{x : x \in \mathbb{Z}, -5 < x \leq 2\}$

\Rightarrow (i) Now, Set A Roster form

$$A = \{2, 4, 6, 8, 10, 12, 14, 16, 18\}.$$

(ii) Set B Roster form is

Now, $n = 1$ then, $y = \frac{1}{2 \cdot 1} = \frac{1}{2}$

$n = 2$ then, $y = \frac{1}{2 \cdot 2} = \frac{1}{4}$

$n = 3$ then, $y = \frac{1}{2 \cdot 3} = \frac{1}{6}$

$n = 4$ then, $y = \frac{1}{2 \cdot 4} = \frac{1}{8}$

$n = 5$ then, $y = \frac{1}{2 \cdot 5} = \frac{1}{10}$

$$\therefore B = \left\{ \frac{1}{2}, \frac{1}{4}, \frac{1}{6}, \frac{1}{8}, \frac{1}{10} \right\}.$$

(iii) Now, x is perfect cube, $27 < x < 216$.

$$\therefore x = 64, 125.$$

\therefore Set C Roster form is

$$C = \{64, 125\}$$

(iv) Now, $D = \{x : x \in \mathbb{Z}, -5 < x \leq 2\}$

Roster form

$$D = \{-4, -3, -2, -1, 0, 1, 2\}$$

This is Roster form of set D .

⑤ Represent the following sets in set builder form.

(i) $B =$ The set of all cricket players in India who scored double centuries in one day Internationals.

$$(ii) C = \left\{ \frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \dots \right\}$$

(iii) $D =$ The set of all tamil months in a year.

(iv) $E =$ The set of odd whole numbers less than 9.

\Rightarrow (i) $B =$ The set of all cricket players in India who scored double centuries in one day Internationals.

$$\therefore B = \left\{ x : x \text{ is an Indian player who scored double centuries in one day International} \right\}$$

$$(ii) C = \left\{ \frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \dots \right\}$$

$$\text{Now, } n=1, \text{ then, } \frac{1}{2} = \frac{n}{n+1}$$

$$n=2, \text{ then, } \frac{2}{3} = \frac{n}{n+1}$$

Similarly, \dots

$$\therefore E = \left\{ x : x = \frac{n}{n+1}, n \in \mathbb{N} \right\}$$

(iii) $D =$ The set of all tamil months in a year.

$$\therefore D = \{ x : x \text{ is a tamil month in a year} \}$$

(iv) $E =$ The set of odd whole numbers less than 9.

$$\therefore E = \{ x : x \text{ is an odd whole number less than 9} \}$$

⑥ Represent the following sets in descriptive form.

(i) $P = \{ \text{January, June, July} \}$

(ii) $Q = \{ 7, 11, 13, 17, 19, 23, 29 \}$

(iii) $R = \{ x : x \in \mathbb{N}, x < 5 \}$

(iv) $S = \{ x : x \text{ is a consonant in English alphabets} \}$

\Rightarrow (i) now, $P = \{ \text{January, June, July} \}$

$\therefore P =$ The set of English months name starting with letter 'J'

(ii) $Q = \{ 7, 11, 13, 17, 19, 23, 29 \}$

$Q =$ The set of all prime numbers between 5 and 31

(iii) $R = \{ x : x \in \mathbb{N}, x < 5 \}$

$R =$ The set of natural numbers less than 5.

(iv) $S = \{ x : x \text{ is a consonant in English alphabets} \}$

$S =$ The set of English consonant. ~~alphabets~~