Class - 6 Ch - 5 Exercise - 5.2

Question 1.

State whether the following sets into empty, finite and infinite sets. In case of (non–empty) finite sets, mention the cardinal number.

(i) {all colours of a rainbow}

(ii) {x | x is a prime number between 7 and 11}

(iii) {multiples of 5}

(iv) {all straight lines drawn in a plane}

(v) {x | x is a digit in the numeral 550131527}

(vi) {x | x is a letter in the word 'SUFFICIENT'}

(vii) {x | x is a vowel in the word MATHEMATICS}

(viii) {x : x is an even whole number and $x \leq 20$}

(ix) {x : $x \in I$ and $-2 \leq x \leq 5$}

(x) {x : x is a prime number less than 25}

(xi) {x : x is a prime factor of 180}.

(xii) {x : $x \in N$ and x is a composite number < 12}

Solution:

(i) Let A = {all colours of a rainbow}

$\Rightarrow$ A = {Red, Orange, Yellow, Green, Blue, Indigo, Violet}

$\therefore$ the given set is finite $\therefore$ cardinal number = 7

(ii) Let {x | x is a prime number between 7 and 11}

$\Rightarrow$ B = {ϕ}

$\therefore$ the given set is empty

(iii) Let C = {multiples of 5}

$\Rightarrow$ C = {5, 10, 15, }

$\therefore$ the given set is infinite

(iv) The given set is infinite

(v) Let D = {x | x is a digit in the numeral 550131527}

$\Rightarrow$ D = {5, 0, 1, 3, 2, 7}, the given set is finite

$\therefore$ the cardinal number = 6

(vi) Let E = {x | x is a letter in the word 'SUFFICIENT'}

$\Rightarrow$ E = {S, U, F, I, C, E, N, T}, the given set is finite

$\therefore$ the cardinal number = 8

(vii) Let F = {x | x is a vowel in the word MATHEMATICS}

$\Rightarrow$ F = {A, E, I}, the given set is finite

$\therefore$ the cardinal number = 3

(viii)Let F = {x : x is an even whole number and $x \leq 20$}

$\Rightarrow$ F = {0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20}, the given set is finite

$\therefore$ the cardinal number = 11

(ix) $\{x : x \in I \text{ and } -2 \leq x \leq 5\}$

= {−2, −1, 0, 1, 2, 3, 4}

It is a finite set as it has countable element which are 5

(x) G = {x : x is a prime number less than 25}

$\Rightarrow$ G = {2, 3, 5, 7, 11, 13, 17, 19, 23}

$\therefore$ the given set is finite

$\therefore$ the cardinal number = 9

(xi) H = {x : x is a prime factor of 180}

⇒ H = {2, 3, 5}

the given set is finite the cardinal number = 3

(xii) {x: x e N and x is a composite number < 12}

{4, 6, 8, 9, 10} given set is finite cardinal number is = 5

Question 2.

State whether the following pairs of sets are equal or not:

(i) A = {2, 4, 6, 8, 10}, B = {even natural numbers}

(ii) A = {3, 5, 7, 9, 11, 13}, B = {odd numbers between 2 and 14}

(iii) A = {PUPPET}, B = {P, U, E, T}

(iv) A = {x | x is a letter in the word SOPHIA}

B = {x | x is a letter in the word MUMTAZ}

(v) A = {kids 5 metres tall}, B = {x : x ϵ N and 2x = 3}.

Solution:

(i) A = {2, 4, 6, 8, 10}

B = {0, 2, 4, 6, 8, 10, 12 .....}

∴ A ≠ B

(ii) A = {3, 5, 7, 9, 11, 13}

B = {odd numbers between 2 and 14}

⇒ B = {3, 5, 7, 9, 11, 13}

∴ A = B

(iii) A = {PUPPET}, B= {P, U, E, T}, then A = B because the elements in a set can be repeated or rearranged.

(iv) A = {x | x is a letter in the word SOPHIA}

$\Rightarrow$ A= {S, O, P, H, I, A}

B = {x |x is a letter in the word MUMTAZ}

$\Rightarrow$ B = {M, U, T, A, Z}

$\therefore$ A $\neq$ B

(v) A = {Kids 5 metres tall}

$\Rightarrow$ A = {} $\Rightarrow$ A is empty set

B = {x : x ϵ N and 2x = 3}

$\Rightarrow$ B = {} $\Rightarrow$ B is empty set

$\therefore$ A = B

Question 3.

Given that A = {2, 5, 7, 8, 10}, B = {5, 7, 2, x, 10} and A = B, write the value of x.

Solution:

A = {2, 5, 7, 8, 10}

B = {5, 7, 2, x, 10}

$\because$ A = B

$\therefore$ x = 8