SETS

6A

Q1- $A_1 = \{x : 2x + 3 = 11\}$

Ans- $\Rightarrow 2x + 3 = 11$

$\Rightarrow 2x = 11 - 3$

$\Rightarrow 2x = 8$

$\Rightarrow x = \frac{8}{2} \Rightarrow x = 4$ $\quad A_1 = \{4\}$

Q2- $A_2 = \{x : x^2 - 4x - 5 = 0$

Ans- $\Rightarrow x^2 - 4x - 5 = 0$

$\Rightarrow x^2 - 5x + x - 5 = 0$

$\Rightarrow x(x-5) + 1(x-5) = 0$

$\Rightarrow (x-5)(x+1) = 0$

$\therefore$ Either $x - 5 = 0$ or $x + 1 = 0$

$\Rightarrow x = 5$

$\Rightarrow x = -1$

Q3- $A_3 = \{x : x \in z, -3 \leq x < 4\}$

Ans $\Rightarrow -3 \leq x < 4$

$\Rightarrow x = -3, -2, -1, 0, 1, 2, 3$

$\therefore$ Given set is roster (Tabular) f

$A_3 = \{-3, -2, -1, 0, 1, 2, 3\}$

(iv) $A_4 = \{x : x$ is a two digit number and sum of digit of x is $7\}$

$\therefore$ x is a two digit number and sum of digit of x is 7

$\therefore$ x : 16, 25, 34, 43, 52, 61, 70

$\therefore$ Given set in roster ~~na~~ form is

$A_4 = \{16, 25, 34, 43, 52, 61, 70\}$

(v) $A_5 = \{x : x = 4n, n \in W$ and $n < 4\}$

$\because$ $x = 4n$

$\therefore$ when $n = 0$, $x = 4 \times 0$

$x = 0$

$\Rightarrow$ $n = 1$ = $x = 4 \times 1$

$x = 4$.

$\Rightarrow$ ~~when~~ $n = 2$ = $x = 4 \times 2$

$x = 8$

$\Rightarrow$ $n = 3$ = $x = 4 \times 3$

$x = 12$

= Given set in roster form is

$A_5 = \{0, 4, 8, 12\}$

(vi) $A_6 = \{x : x = \frac{n}{n+2}$; $n \in N$ and $n > 5\}$

$\therefore$ $x = \frac{n}{n+2}$

$\therefore$ when $n = 6$, $x = \frac{6}{6+2}$

$\Rightarrow$ $x = \frac{6}{8} \Rightarrow x = \frac{3}{4}$

when $n = 7$; $x = \frac{7}{7+2} \Rightarrow x = \frac{7}{9}$

when $n = 8$, $x = \frac{8}{8+2} \Rightarrow x = \frac{8}{10}$

$\Rightarrow x = \frac{4}{5}$

when $n = 9$, $x = \frac{9}{9+2} \Rightarrow x = \frac{9}{11}$

∴ Given set in roster ~~form~~ form is

$A_6 = \{\frac{3}{4}, \frac{7}{9}, \frac{4}{5}, \frac{9}{11} \ldots\}$

Q2:-

(i) $B_1 = \{6, 9, 12, 15 \ldots\}$

Ans $= \{x : x = 3n+3 ; n \in N\}$

(ii) $B_2 = \{11, 13, 17, 19\}$

Ans = $\{x : x$ is a prime number between 10 and 20$\}$

(iii) $B_3 = \{\frac{1}{3}, \frac{3}{5}, \frac{5}{7}, \frac{7}{9}, \frac{9}{11} \ldots\}$

Ans = $\{x : x = \frac{n^3}{n+2}$; where n is an odd natural no.$\}$

(iv) $B_4 = \{8, 27, 64, 125, 216\}$

Ans = $\{x : x = n^3 ; n \in N$ and $2 \leq n \leq 6\}$

(v) $B_5 = \{-5, -4, -3, -2, -1\}$

$= \{x ; x \in Z, -5 \leq x \leq -1\}$

(vi) $R_{\neq} = \{\ldots, -6, -3, 0, 3, 6 \ldots\}$

$= \{x : x = 3n, n \in Z\}$

3Q. Is $\{1, 2, 4, 16, 64\} = \{x : x$ is a factor of $32\}$? Give reason.

Ans NO. $\{1, 2, 4, 16, 64\} \neq \{x : x$ is factor of $32\}$
Because 64 is not a factor of 32.

(ii) yes. $\{x : x$ is a factor of $27\} = \{3, 9, 27, 54\}$
Because 54 is not a factor of 27

(iii) $1 \times 124 = 124$
$2 \times 62 = 124$
$4 \times 31 = 124$

factor of 124 = 1, 2, 4, 31, 62, 124
Set of even factors of 124 = {2, 4, 62, 124}

(iv) $1 \times 72 = 72$
$2 \times 36 = 72$
$3 \times 24 = 72$
$4 \times 18 = 72$
$6 \times 12 = 72$
$8 \times 9 = 72$
Factors of 72 = 1, 2, 3, 4, 6, 8, 9, 12, 18, 24, 36
72 set of odd factor of 72 = {1, 3, 9}

(v)

2	3234
3	1617
7	539
7	77
	11

$3234 = 2 \times 3 \times 7 \times 7 \times 11$

∴ Set of prime factors of 3234 = {2, 3, 7, 11}

(vi) $x^2 - 7x + 12 = 0$

$\Rightarrow x^2 - 4x - 3x + 12 = 0$

$\Rightarrow x(x-4) - 3(x-4) = 0$

$\Rightarrow (x-4)(x-3) = 0$

$\therefore x - 4 = 0$ or $x - 3 = 0$

$\Rightarrow x = 4 \Rightarrow x = 3$

$\therefore \{x : x^2 - 7x + 12 = 0\} = \{3, 4\}$ is true

(vii) $x^2 - 5x - 6 = 0$

$\Rightarrow x^2 - 5x - 6 = 0$

$\Rightarrow x^2 - 6x + x - 6 = 0$

$\Rightarrow x(x-6) + 1(x-6) = 0$

$\Rightarrow (x-6)(x+1) = 0$

∴ Either $x - 6 = 0$ or $x + 1 = 0$

i.e. $x = 6$ i.e. $x = -1$

$\{ = 6 \quad x = -1$

Q4 (i) Roster form of the set of letter in the word 'MEERUT' = {M, E, R, U, T}

(ii) Roster form of word 'UNIVERSAL' = {U, N, I, V, R, S, A, L}

(iii) $A = \{x : x = y + 3, y \in N \text{ and } y > 3\}$

when $y = 4$, $x = 4 + 3 = 7$

when $y = 5$, $x = 5 + 3 = 8$

when $y = 6$, $x = 6 + 3 = 9$

when $y = 7$, $x = 7 + 3 = 10$