

### Section-3

Ans 11

Since Do do not read any

$$n(S \cup J) = 450 - 80 = 370$$

(S = science Today J = Junior statesman)

By set theory

$$n(J \cup S) = n(J) + n(S) - n(J \cap S)$$

$$= 200 + 193 - 370 = 23$$

(ii) find the range of function

$$f(x) = 12 - \cos 3x$$

$$\text{let } y = \frac{12 - \cos 3x}{2 - \cos 3x}$$

$$= 2 - \cos 3x = \frac{1}{y} \text{ or } \cos 3x = 2 - \frac{1}{y}$$
$$= -1 \leq (2 - \frac{1}{y}) \leq 1 \quad (\because -1 \leq \cos 3x \leq 1)$$

$$= -1 \leq 2 - \frac{1}{y} \text{ and } 2 - \frac{1}{y} \leq 1$$

$$= y \geq \frac{1}{3} \text{ and } y \leq 1 \text{ i.e. } \frac{1}{3} \leq y \leq 1$$

$$= Rf = \text{Range } (f) = \left[ \frac{1}{3}, 1 \right]$$