



### Exercise 11C

Question 21:

Here  $a = 64$ ,  $d = 60 - 64 = -4$

Let the sum of  $n$  terms be 544, then

$$S_n = 544 \Rightarrow \frac{n}{2}[2a + (n-1)d] = 544$$

$$\Rightarrow \frac{n}{2}[2 \times 64 + (n-1)(-4)] = 544$$

$$\Rightarrow \frac{n}{2}[132 - 4n] = 544$$

$$\Rightarrow n(66 - 2n) = 544 \Rightarrow 2n^2 - 66n + 544 = 0$$

$$\Rightarrow n^2 - 33n + 272 = 0$$

$$\Rightarrow n^2 - 17n - 16n + 272 = 0$$

$$\Rightarrow n(n-17) - 16(n-17) = 0$$

$$\Rightarrow (n-17)(n-16) = 0$$

$$\Rightarrow n = 17 \text{ or } n = 16$$

Sum of first 16 terms = sum of first 17 terms = 544

This means that 17<sup>th</sup> term is zero.

Question 22:

Here  $a = 18$ ,  $d = 15 - 18 = -3$

Let the sum of  $n$  terms be 45, then

$$S_n = 45$$

$$\Rightarrow \frac{n}{2}[2a + (n-1)d] = 45$$

$$\Rightarrow \frac{n}{2}[2 \times 18 + (n-1)(-3)] = 45$$

$$\Rightarrow \frac{n}{2}[36 - 3n + 3] = 45$$

$$\Rightarrow n(39 - 3n) = 90 \Rightarrow n(13 - n) = 30$$

$$\Rightarrow n^2 - 13n + 30 = 0 \Rightarrow n^2 - 10n - 3n + 30 = 0$$

$$\Rightarrow n(n-10) - 3(n-10) = 0$$

$$\Rightarrow (n-10)(n-3) = 0$$

$$\Rightarrow n = 10 \text{ or } n = 3$$

Sum of first three terms = sum of first 10 terms = 45

This means the sum of all terms from 4<sup>th</sup> to 10<sup>th</sup> is zero.

Question 23:

nth term =  $(4n + 1)$  ----(1)

putting  $n = 1$  in (1), we get

$$T_1 = (4 \times 1 + 1) = 5$$

$\therefore$  first term = 5

putting  $n = 2$  in (1), we get  $T_2 = (4 \times 2 + 1)$

$$T_2 = 9$$

$$\therefore d = T_2 - T_1 \Rightarrow 9 - 5 = 4$$

$$a = 5, d = 4$$

$$\begin{aligned}\text{Sum of first 15 terms} &= \frac{n}{2} [2a + (n-1)d] \text{ where } n = 15 \\ &= \frac{15}{2} [2 \times 5 + (15-1) \times 4] \\ &= \frac{15}{2} [10 + 14 \times 4] \Rightarrow 15 \times 33 = 495\end{aligned}$$

$$\begin{aligned}\text{Sum of } n \text{ terms} &= \frac{n}{2} [2a + (n-1)d] \text{ where } a = 5, d = 4 \\ &= \frac{n}{2} [2 \times 5 + (n-1) \times 4] \\ &= \frac{n}{2} [10 + 4n - 4] = \frac{n}{2} (6 + 4n) \\ &= n(3 + 2n) = 2n^2 + 3n\end{aligned}$$

Hence the sum of 15 and  $n$  terms of AP are 495,  $(2n^2 + 3n)$  respectively.

Question 24:

$$S_n = (2n^2 + 5n) \text{ (given)}$$

$$\therefore S_{n-1} = [2(n-1)^2 + 5(n-1)] = (2n^2 + n - 3)$$

the  $n$ th term is given by

$$\begin{aligned}T_n &= (S_n - S_{n-1}) \\ &= (2n^2 + 5n) - (2n^2 + n - 3)\end{aligned}$$

$$T_n = 4n + 3$$

$$\therefore n^{\text{th}} \text{ term} = 4n + 3$$

Question 25:

$$S_n = (3n^2 - n) \text{ (given)}$$

$$\begin{aligned}\therefore S_{n-1} &= [3(n-1)^2 - (n-1)] \\ &= [3n^2 + 3 - 6n - n + 1] \\ &= [3n^2 - 7n + 4]\end{aligned}$$

(i) The nth term is given by

$$\begin{aligned}T_n &= (S_n - S_{n-1}) \\ &= [(3n^2 - n) - (3n^2 - 7n + 4)] \\ &= 6n - 4\end{aligned}$$

$$\therefore n^{\text{th}} \text{ term} = 6n - 4$$

(ii) Putting  $n = 1$  in (1), we get

$$T_1 = (6 \times 1 - 4) = 2$$

$\therefore$  First term = 2

(iii) Putting  $n = 2$  in (1), we get  $T_2 = (6 \times 2 - 4) = 8$

$$\therefore d = (T_2 - T_1) = 8 - 2 = 6$$

\*\*\*\*\* END \*\*\*\*\*