Exercise 11D

Question 11:
The given AP is 25, 20, 15, ...
∴ first term a = 25, common difference = 20 - 25 = - 5
Let for lowest value of n, n^{th} term is negative

$$a+(n-1)d<0$$

$$\text{or } 25+(n-1)(-5)<0$$

$$\Rightarrow 5(n-1)>25$$

$$\Rightarrow 5n>25+5=30$$

$$\Rightarrow n>6$$

So, the first negative term is the 7^{th} term

Question 12:
The given AP is 5, 7, 9, ... 201
last term l = 201, common difference d = 7 - 5 = 2
6^{th} term from the end = l - (n - 1)d
=201 - (6 - 1) x 2
= 201 - 10 = 191

Question 13:
Sum of n natural numbers = 1 + 2 + 3 + ... + n
Here a = 1, d = 2 - 1 = 1

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

$$\therefore \text{Sum of natural numbers}=\frac{n}{2}[2\times 1+(n-1)d]$$

$$=\frac{n}{2}[2+(n-1)]=\frac{n(n+1)}{2}$$

Question 14:
Sum of even natural numbers = 2 + 4 + 6 + ... to n terms
a = 2, d = 4 - 2 = 2

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

$$\therefore \text{Sum of even numbers}$$

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

$$=\frac{n}{2}[4+2n-2]$$

$$=\frac{n}{2}(2n+2)$$

$$=\frac{2n(n+1)}{2}$$

$$=n(n+1)$$

Question 15:

Sum of n odd natural numbers = 1 + 3 + 5 + ... to n terms
a = 1, d = 3 - 1 = 2

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

$\therefore$ Sum of n odd numbers

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

$$= \frac{n}{2} \times 2n = n^2$$

********** END **********