Assignments:

(i) How many terms of the AP $-6, -\frac{11}{2}, -5, \ldots$ are needed to give a sum $-25$?

Ans) *Given*

$$a_1 = -6, d = -\frac{11}{2} - (-6) = \frac{1}{2}$$

*and* $S_n = -25$

*We have*

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

$$\Rightarrow -25 = \frac{n}{2}\left[2(-6) + (n-1)\left(\frac{1}{2}\right)\right]$$

$$-25 \times 4 = n(-24 + n - 1)$$

$$n^2 - 25n + 100 = 0$$

$$(n-5)(n-20) = 0$$

$$n = 5,\ n = 20$$

(ii) If the sum first p terms of an AP is equal to the sum first q terms. Then find the sum of first $p$+q terms.

Ans) Formula:

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

Sum of first p terms,

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

Sum of first q terms,

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

given,

$$S_p = S_q$$

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

$$p[2a + (p-1)d] = q[2a + (q-1)d]$$

$$2a(p-q) = -d(p-q)[p+q-1]$$

$$2a(p-q) + d(p-q)[p+q-1] = 0$$

$$(p-q)[2a + d(p+q-1)] = 0$$

$$p - q \neq 0 \Rightarrow [2a + d(p+q-1)] = 0$$

Now,

$$S_{p+q} = \frac{p+q}{2}[2a + (p+q-1)d]$$

$$= \frac{p+q}{2} \times 0$$

$$= 0$$

Therefore the sum of $(p+q)$ terms is $0$.