Arithematic Progressions Ex 19.7 Q5

There are 25 trees at equal distance of 5 m in a line with a well(w), and the distance of the well from the neareset tree = 10 m.

Thus,

The total distance travelled by gardener to tree 1 and back is 2×10 m = 20 m

Similarly for all the 25 trees.

The distance covered by gardener is

$$= 2\left[10+(10+5)+(10+2\times5)+(10+3\times5)+\ldots+(10+23\times5)\right] \quad \text{---(i)}$$

This forms a series of 1st term $a = 10$, common difference $d = 5$ and $n = 25$

$\therefore$ $10+(10+5)+(10+2\times5)+\ldots+(10+24\times5)$

$\Rightarrow$ $S_{25} = \frac{25}{2}\left[2\times10+(24)5\right] = 25\left[10+60\right] = 1750$ m $\quad$ ---(ii)

From (i) and (ii)

Total distance = 2×1750 m = 3500 m.

Arithematic Progressions Ex 19.7 Q6

The man counts at the rate of Rs 180 per minute for half an hour. After this he counts at the rate of Rs 3 less every minute than preceding minute.

Then, the amount counted in first 30 minute

= Rs 180×30 = Rs 5400 $\quad$ ---(i)

The amount left to be counted after 30 minute

= Rs 10710 – 5400 = Rs 5310 $\quad$ ---(ii)

ATQ

A.P formed is $(180-3)+(180-2\times3)+\ldots = 5310$

Let time taken to count 5310 be t

Then,

$$S_t = \frac{t}{2}\left[(180-3)+(t-1)(-3)\right]$$

$$5310 = \frac{t}{2}\left[200-3t\right]$$

or $t = 59$ minute

Thus, the total time taken by the man to count Rs 10710 is $(59+30) = 89$ minutes.

Arithematic Progressions Ex 19.7 Q7

The piece of equipment deprecites 15% in first year i.e., $\frac{15}{100}\times600,000$ = Rs 90,000

$\therefore$ Value after 1st year = 600,000 – 90,000

= Rs 510,000 $\quad$ ---(i)

The equipment deprecites at the rate 135% in 2nd year i.e., $\frac{135}{1000}\times600,000 = 81000$

$\therefore$ Value after 2nd year = 81000

The value after 3rd year = $\frac{12}{100}\times600000 = 72000$

The total depreciation in 10 years

$\Rightarrow$ $S_{10} = \frac{10}{2}\left[2\times81000+(9)(-9000)\right]$

$= 5\left[81000\right]$ $\quad$ $\left[\text{Using } S_n = \frac{n}{2}\left[2a+(n-1)d\right]\right]$

$= 405000$

$\therefore$ The cost of machine after 10 years = Rs 600000 – 405000

= 105000.

Arithematic Progressions Ex 19.7 Q8

Total cost of tractor

$$= 6000 + \left[(500 + 12\% \text{ of } 6000 \text{ for 1 year}) + (500 + 12\% \text{ of } 5500 \text{ 1 year}) + \ldots\ldots + 12 \text{ times}\right]$$

$$= 6000 + 6000 + \frac{12}{100}(6000 + 5500 + \ldots\ldots + 12 \text{ times})$$

$$= 12000 + \frac{12}{100}\left[\frac{12}{2}(6000 + 5000)\right]$$

$$= 12000 + \frac{12}{100} \times \frac{12}{2} \times 6500$$

$$= 12000 + (72 \times 65)$$

$$= 12000 + 4680$$

$$= 16680$$

Total cost of tractor = Rs. 16680

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