

22/6 Ex- 5.2 X

**Example 18** Choose the correct choice in the following and justify :

- (i) 30th term of the AP : 10, 7, 4, ..., is : (a) 97 (b) 77 (c) -77 (d) -87
- (ii) 11th term of the AP :  $-3, -\frac{1}{2}, 2, \dots$  is : (a) 28 (b) 22 (c) -38 (d)  $-48\frac{1}{2}$  [NCERT]

**Solution.** (i) Here,  $a = 10, d = 7 - 10 = -3$

$$\therefore a_{30} = a + 29d = 10 + 29 \times (-3) = 10 - 87 = -77 \Rightarrow \text{Option (c) is correct.}$$

(ii) Here,  $a = -3, d = -\frac{1}{2} - (-3) = \frac{5}{2}$

$$a_{11} = a + 10d = -3 + 10 \times \frac{5}{2} = -3 + 25 = 22 \Rightarrow \text{Option (b) is correct.}$$

**Solution.** Let  $a$  be the 1st term and  $d$  the common difference. Then

$$a_{11} = a + 10d = 38$$

$$a_{16} = a + 15d = 73$$

Subtracting (1) from (2), we get :  $5d = 35 \Rightarrow d = 7$

Putting  $d = 7$  in (1), we get

$$a + 10 \times 7 = 38$$

...(1)

...(2)

**Example 10** Fill in the blanks in the following table, given that  $a$  is the first term,  $d$  the common difference and  $a_n$  the  $n$ th term of the AP:

	$a$	$d$	$n$	$a_n$
(i)	7	3	8	...
(ii)	-18	...	10	0
(iii)	...	-3	18	-5
(iv)	-18.9	2.5	...	3.6
(v)	3.5	0	105	...

**Solution.** (i)  $a_n = a + (n-1)d \Rightarrow 7 + (8-1) \times 3 = 28$ .

(ii)  $a + (n-1)d = a_n \Rightarrow -18 + (10-1)d = 0 \Rightarrow d = 2$ .

(iii)  $a = a_n - (n-1)d \Rightarrow -5 - (18-1) \times (-3) = 46$ .

(iv)  $(n-1)d = a_n - a \Rightarrow (n-1) \times 2.5 = 3.6 - (-18.9) = 22.5$

$$\therefore n-1 = \frac{22.5}{2.5} = 9 \Rightarrow n = 10.$$

(v)  $a_n = 3.5 + (105-1) \times 0 = 3.5$ .

**Example 11** In the following APs, find the missing terms in the boxes:

(i) 2,  $\square$ , 26

(ii)  $\square$ , 13,  $\square$ , 3

(iii) 5,  $\square$ ,  $\square$ ,  $9\frac{1}{2}$

(iv) -4,  $\square$ ,  $\square$ ,  $\square$ , 6

(v)  $\square$ , 38,  $\square$ ,  $\square$ , -22

**Solution.** (i) Here,  $a_2 - 2 = 26 - a_2 \Rightarrow 2a_2 = 28 \Rightarrow a_2 = 14$ .

(ii) Here,  $13 - a_1 = a_3 - 13 = 3 - a_3 \Rightarrow 2a_3 = 16 \Rightarrow a_3 = 8$

Also,  $13 - a_1 = 8 - 13 \Rightarrow a_1 = 18$ .

(iii) Here,  $a_4 = a + 3d \Rightarrow \frac{19}{2} = 5 + 3d \Rightarrow 3d = \frac{19}{2} - 5 = \frac{9}{2}$

$$\therefore d = \frac{9}{2 \times 3} = \frac{3}{2}$$

$a_2 = a + d = 5 + \frac{3}{2} = 6\frac{1}{2}$  and  $a_3 = a_2 + d = \frac{13}{2} + \frac{3}{2} = 8$ .

(iv) Here,  $a_6 = a + 5d \Rightarrow 6 = -4 + 5d \Rightarrow d = 2$

$$\therefore a_2 = a + d = -4 + 2 = -2$$

$$a_3 = a_2 + d = -2 + 2 = 0$$

$$a_4 = a_3 + d = 0 + 2 = 2$$

$$a_5 = a_4 + d = 2 + 2 = 4$$

(v) Here,  $a_6 = a_2 + 4d \Rightarrow -22 = 38 + 4d \Rightarrow d = -15$

$$\therefore a_1 = a_2 - d = 38 - (-15) = 53$$

$$a_3 = a_2 + d = 38 + (-15) = 23$$

$$a_4 = a_3 + d = 23 + (-15) = 8$$

$$a_5 = a_4 + d = 8 + (-15) = -7$$