Exercise 11A

Question 16:
In the given AP, let the first term = a, and common difference = d
Then, $T_n = a + (n-1)\,d$
$\Rightarrow T_7 = a + (7 - 1)d$, and $T_{13} = a + (13 - 1)d$
$\Rightarrow T_7 = a + 6d$, $T_{13} = a + 12d$
Now, $T_7 = -4 \Rightarrow a + 6d = -4$ - - - (1)
$T_{13} = -16 \Rightarrow a + 12d = -16$ - - - (2)
Subtracting (1) from (2), we get
$\Rightarrow 6d = -12 \Rightarrow d = -2$
Putting d = -2 in (1), we get
$a + 6\ (-2) = -4$
$\Rightarrow a - 12 = -4$
$\Rightarrow a = 8$
Tthus, a = 8, and d = -2
So the required AP is 8, 6, 4, 2, 0.....

Question 17:
In the given AP let the first term = a, And common difference = d
Then, $T_n = a + (n-1)\,d$
$\Rightarrow T_{10} = a + (10 - 1)d$, $T_{17} = a + (17 - 1)d$, $T_{13} = a + (13 - 1)d$
$\Rightarrow T_{10} = a + 9d$, $T_{17} = a + 16d$, $T_{13} = a + 12d$
Now, $T_{10} = 52 \Rightarrow a + 9d = 52$ - - - (1)
and $T_{17} = T_{13} + 20 \Rightarrow a + 16d = a + 12d + 20$
$\Rightarrow 4d = 20 \Rightarrow d = 5$
Putting d = 5 in (1), we get
$a + 9 \times 5 = 52 \Rightarrow a = 52-45 \Rightarrow a = 7$
Thus, a = 7 and d = 5
So the required AP is 7, 12, 17, 22....

Question 18:
Let the first term of given AP = a and common difference = d
Then, $T_n = a + (n-1)\,d$
$\Rightarrow T_4 = a + (4 - 1)d$, $T_{25} = a + (25 - 1)d$, $T_{11} = a + (11 - 1)d$
$\Rightarrow T_4 = a + 3d$, $T_{25} = a + 24d$, $T_{11} = a + 10d$
Now, $T_4 = 0 \Rightarrow a + 3d = 0 \Rightarrow a = -3d$
$\therefore T_{25} = a + 24d = (-3d + 24d) \Rightarrow 21d$
and $T_{11} = a + 10d = (-3d + 10d) \Rightarrow 7d$
$\therefore T_{25} = 21d = 3 \times 7d = 3 \times T_{11}$
Hence 25^{th} term is triple its 11^{th} term.

Question 19:
The given AP is 3, 8, 13, 18.....
First term a = 3, common difference a = 8 - 3 = 5
$\therefore T_n = a + (n-1)\,d = 3 + (n - 1) \times 5 = 5n - 2$
$T_{20} = 3 + (20-1)\,5 = 3 + 19 \times 5 = 98$
Let n^{th} term is 55 more than the 20^{th} term
$\therefore (5n - 2) - 98 = 55$
Or 5n = 100 + 55 = 155
n = 155/5 = 31
$\therefore 31^{st}$ term is 55 more than the 20^{th} term of given AP.

Question 20:
The given AP is 5, 15, 25....
a = 5, d = 15 - 5 = 10
We have, $T_n = 130+T_{31}$
$\Rightarrow a + (n-1) d = 130 + 5 + (31 - 1) \times 10$
$\Rightarrow 5 + (n-1) 10 = 130 + 5 + (31 - 1) \times 10$
$\Rightarrow 5 + 10n - 10 = 135 + 300$
$\Rightarrow 10n - 5 = 435$ or $10n = 453 + 5$
$\therefore n = 440/10 = 44$
Thus, the required term is 44^{th}.

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