

(2)

⑧ Imp Model:- Progression (A.P.) - Based on theory concepts 13/4/25 &
14/4/25

8) Three terms in A.P. have sum 24, The middle term is 8
 $(\because a + a + d + a + 2d = 24 \Rightarrow 3a + 3d = 24 \Rightarrow a + d = 8)$

9) If n^{th} term $= 2n + 7$, 7^{th} term of the A.P. is 21
 $(\because a_1 = t_1 = 2(1) + 7 = 2 + 7 = 9 \quad a = 9, d = 2 \quad (\because 11 - 9 = 2)$
 $a_2 = t_2 = 2(2) + 7 = 4 + 7 = 11 \quad a_7 = a + 6d = 9 + 6(2) = 9 + 12 = 21)$

10) If a, b, c are in A.P. then $b = \frac{a+c}{2}$ Eg:- $2k-3 = \frac{14}{2} = 7$
 $2k = 10, k = 5$

11) n^{th} term of the A.P. $-5, -2, 1, \dots$ is $3n - 8$
 $(\because a_n = a + (n-1)d \Rightarrow a_n = -5 + (n-1)(3) = -5 + 3n - 3 = 3n - 8)$

12) 9^{th} term from the end of the A.P. $7, 11, 15, \dots, 147$ is 125
 $(\because 147 = 7 + (n-1)(4) = 7 + 4n - 4 = 4n + 3 \Rightarrow 4n = 147 - 3 = 144$
 $\therefore n = \frac{144}{4} = 38; \quad a_{30} = a + 29d = 7 + 29(4) = 7 + 116 = 123)$

13) The sum of 3 terms in A.P. is 30. If the greatest no. is 13, then $d =$ -3
 $(\because a + a + d + a + 2d = 30 \Rightarrow 3a + 3d = 30 \Rightarrow a + d = 10$
 $a + 2d = 13 \quad -d = -3 \Rightarrow d = 3$

14) The sum of 6th & 7th terms of an A.P. is 39, $d = 3$, $a =$ 2
 $(\because a + 5d + a + 6d = 39 \Rightarrow 2a + 11d = 39 \Rightarrow 2a = 39 - 11(3) = 39 - 33 = 6 \Rightarrow a = 3)$

15) Find the sum of A.P. $2, 7, 12, \dots$ to 10 terms 245
 $\because S_{10} = \frac{10}{2} [2 \times 2 + (10-1)(5)] = 5(4 + 45) = 5 \times 49 = 245$

16) In A.P. $a = -1, d = -3$ then $a_{12} =$ -34
 $\because a_{12} = -1 + 11(-3) = -1 - 33 = -34$

17) Which term of the A.P. $100, 90, 80, \dots$ is zero? 11
 $(\because a_n = 100 + (n-1)(-10) = 0 \Rightarrow 100 - 10n + 10 = 0 \Rightarrow 10n = 110, n = \frac{110}{10} = 11)$

18) If 7 times to the 7th term of A.P. is equal to 11 times to the 11th term, then 18th term of it is 0
 $(\because 7(a + 6d) = 11(a + 10d) \Rightarrow 7a + 42d = 11a + 110d \Rightarrow 4a = -68d \Rightarrow a = -17d$
 $7a + 42d = 11a + 110d \Rightarrow 4a = -68d \Rightarrow a = -17d$

19) How many two digit numbers are divisible by 3? 30
 $(\because 10, 11, 12, \dots, 99) \quad 100 - 9 = 91; \quad 3, 6, 9, \dots, 99;$

20) Which term of A.P. $5, 2, -1, \dots$ is -22
 $(\because a = 5, d = 2 - 5 = -3; \quad a_n = 5 + (n-1)(-3) = -5 - 3n + 3 = -3n - 2 = -22$
 $-3n = -22 + 2 = -20 \Rightarrow n = \frac{-20}{-3} = \frac{20}{3} = 6\frac{2}{3}$