

Sequence and Series - Class XI

Past Year JEE Questions

Questions

Question: 01

Let a_1, a_2, \dots, a_{10} be an AP with common difference -3 and b_1, b_2, \dots, b_{10} be a GP with common ratio 2 . Let $c_k = a_k, k = 1, 2, \dots, 10$. If $c_2 = 12$ and $c_3 = 13$, then $\sum_{k=1}^{10} c_k$ is equal to

Solutions

Solution: 01

Answer

Correct Answer is **2021**

Explanation

$$c_2 = a_2 + b_2 = a_1 - 3 + 2b_1 = 12$$

$$a_1 + 2b_1 = 15 \dots\dots(1)$$

$$c_3 = a_3 + b_3 = a_1 - 6 + 4b_1 = 13$$

$$a_1 + 4b_1 = 19 \dots\dots (2)$$

From (1) & (2), $b_1 = 2, a_1 = 11$

$$\sum_{k=1}^{10} c_k = \sum_{k=1}^{10} (a_k + b_k) = \sum_{k=1}^{10} a_k + \sum_{k=1}^{10} b_k$$

$$= \frac{10}{2}(2 \times 11 + 9 \times (-3)) + \frac{2(2^{10}-1)}{2-1}$$

$$= 5(22 - 27) + 2(1023)$$

$$= 2046 - 25 = 2021$$