

1. A staircase pattern has blocks arranged as: 4, 7, 10, 13, ... Which recursive rule correctly represents the pattern? **1**

- a) $t_n = t_{n-1} + 2$ b) $t_n = t_{n-1} + 3$ c) $t_n = t_{n-1} \times 3$ d) $t_n = t_{n-1} - 3$

2. What is the sum of the first 20 natural numbers? **1**

- a) 190 b) 200 c) 210 d) 220

3. Which of the following is NOT a geometric progression? **1**

- a) $\frac{1}{3}, 1, 3, 9$ b) $\frac{1}{5}, \frac{1}{5}, \frac{1}{5}, \frac{1}{5}$ c) -2, 4, -8, 16 d) 2, 0, 4, 0, 8, 0

4. **Assertion (A):** If in a GP, $a_3 + a_5 = 90$ and if $r = 2$, then the first term of the GP is $\frac{9}{2}$.

Reason (R): The n^{th} term of a GP is $ar^{(n-1)}$. **1**

- (a) A (✓) & R (✓) | $R \rightarrow A$ (b) A (✓) & R (✓) | $R \rightarrow \neg A$ (c) A (✓) & R (X) (d) A (X) & R (✓)

5. **Assertion (A):** The 11^{th} term of the AP: $-5, -\frac{5}{2}, 0, \frac{5}{2}, \dots$ is 20.

Reason (R): If the common difference for an AP is 5, then $a_{18} - a_{13} = 25$. **1**

- (a) A (✓) & R (✓) | $R \rightarrow A$ (b) A (✓) & R (✓) | $R \rightarrow \neg A$ (c) A (✓) & R (X) (d) A (X) & R (✓)

6. The first three terms of a GP are $(m - 2), (m + 1)$ and $(m + 7)$. Find the value of m . **2**

7. The sequence 2, 9, 16, ... is given.

(a) Identify if the given sequence is an AP or a GP. Give reasons to support your answer.

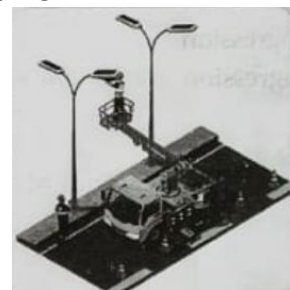
(b) Find the 20th term of the sequence.

(c) Does the term 102 belong to this sequence? **3**

8. A newly developed township decided to install smart street lights along its main road to improve safety and reduce electricity wastage. During the planning stage, engineers noticed that the number of street lights installed followed a fixed pattern every week as construction progressed.

In the first week, 18 street lights were installed. To speed up development, the workers installed 5 more street lights each succeeding week than they had installed in the previous week. The project manager used this pattern to estimate future requirements such as poles, wiring, maintenance costs and electricity consumption.

After several weeks, the authorities wanted to predict the number of street lights that would be installed in future weeks without manually counting every week. The weekly record looked like this: 18, 23, 28, 33, ...



(i) Identify the type of sequence formed by 18, 23, 28, 33, ... **1**

(ii) Find the number of street lights installed in the 8^{th} week. **1**

(iii) Find which term of the sequence 18, 23, 28, 33, ... is equal to 103? **1**

(iv) The township authorities claim that 88 street lights were installed in a particular week. Using the n^{th} term formula, determine whether this claim is possible. If possible, find the week number. **2**