CLASS XI – MATHEMATICS (041)
CHAPTER 8 : SEQUENCES AND SERIES
PRACTICE PAPER (SESSION 2026–27)

Maximum Marks: 40 **Time Allowed: 1½ Hours**

General Instructions:

Read the following instructions very carefully and strictly follow them:

1. This question paper contains 23 questions. All questions are compulsory.
2. This question paper is divided into five Sections – A, B, C, D and E.
3. In Section A, Questions 1 to 12 are Multiple Choice Questions (MCQs) and Questions 13 and 14 are Assertion–Reason based questions of 1 mark each.
4. In Section B, Questions 15 to 18 are Very Short Answer (VSA) type questions, carrying 2 marks each.
5. In Section C, Questions 19 to 21 are Short Answer (SA) type questions, carrying 3 marks each.
6. In Section D, Question 22 is a Long Answer (LA) type question, carrying 5 marks.
7. In Section E, Question 23 is a case study based question, carrying 4 marks.
8. There is no overall choice. However, an internal choice has been provided in 2 questions of Section B (Q17, Q18), 2 questions of Section C (Q20, Q21), in Q22 of Section D and in one sub-part of Q23 of Section E.
9. Draw neat and clean figures wherever required. Use of calculators is not allowed. G.P. stands for geometric progression, A.M. for arithmetic mean and G.M. for geometric mean.

SECTION – A **(14 × 1 = 14)**

This section comprises of 12 multiple choice questions (Q1–Q12) and 2 assertion–reason based questions (Q13–Q14) of 1 mark each.

No.	Questions	Marks
Q1.	Fig. 1 shows matchstick squares placed side by side in a row. The number of matchsticks needed to make 10 such squares in a row is	**1**



Fig. 1

(A) 30 (B) 31

(C) 33 (D) 40

Q2. Fig. 2 shows the ancestors of a person: 2 parents, 4 grandparents, 8 great-grandparents, and so on, the number doubling in every generation. The total number of ancestors in the six generations preceding the person is **1**

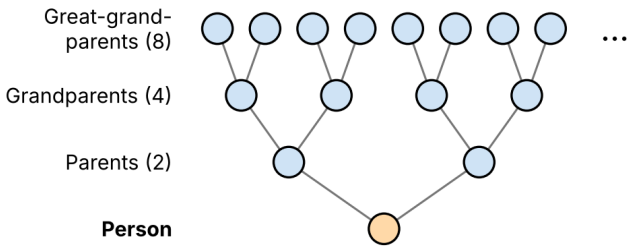


Fig. 2

(A) 64 (B) 62

(C) 128 (D) 126

Q3. The 6th term of the sequence whose nth term is $a_n = (n + 1)(n – 2)(n + 3)$ is **1**

(A) 252 (B) 224

(C) 288 (D) 216

Q4. A sequence is defined by $a_1 = 2$ and $a_n = 3a_{n–1} – 1$ for $n \geq 2$. Then a_4 is equal to **1**

(A) 38 (B) 40

(C) 41 (D) 44

Q5. The 8th term of the G.P. 3, 6, 12, 24, . . . is **1**

(A) 192 (B) 384

(C) 768 (D) 256

Q6. In a G.P., the 2nd term is 6 and the 5th term is 162. The common ratio is **1**

(A) 3 (B) 9

(C) 2 (D) 27

Q7. The sum of the first 6 terms of the G.P. 2, 6, 18, . . . is **1**

(A) 364 (B) 1458

(C) 726 (D) 728

Q8. A ball is dropped from a height of 81 cm. Every time it hits the floor it rebounds to 2/3 of the height from which it fell. Fig. 3 shows the first two rebounds. The height of the 4th rebound is **1**

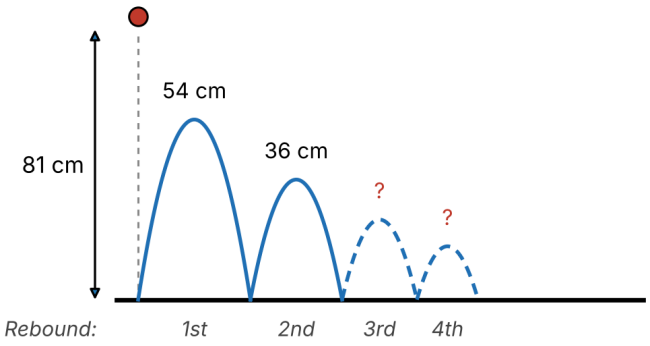


Fig. 3

(A) 24 cm (B) 18 cm

(C) 16 cm (D) 36 cm

Q9. If 5, G, 20 are in G.P. and G is a positive number, then G is equal to **1**

(A) 12.5 (B) 10

(C) 15 (D) 100

Q10. The value of the series $\sum 2^k$, where k takes the values 1 to 4, is **1**

(A) 15 (B) 31

(C) 20 (D) 30

Q11. The A.M. and G.M. of two positive numbers are 13 and 12 respectively. The numbers are **1**

(A) 8 and 18 (B) 9 and 16

(C) 6 and 24 (D) 4 and 36

Q12. The number of terms of the G.P. 1, 2, 4, 8, . . . that are needed to give the sum 255 is **1**

(A) 7 (B) 9

(C) 8 (D) 10

Assertion–Reason Based Questions

Directions: Question numbers 13 and 14 are Assertion and Reason based questions carrying 1 mark each. Two statements are given, one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer from the options (A), (B), (C) and (D) as given below:
(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(B) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

Q13. **Assertion (A):** The 7th term of the sequence 1, 1, 2, 3, 5, 8, . . . is 13. **1**
Reason (R): In this (Fibonacci) sequence, $a_1 = a_2 = 1$ and $a_n = a_{n-2} + a_{n-1}$ for $n > 2$.

Q14. **Assertion (A):** For two positive numbers, the A.M. is always less than the G.M. **1**
Reason (R): A.M. – G.M. $= (\sqrt{a} - \sqrt{b})^2 / 2 \geq 0$ for any two positive numbers a and b.

SECTION – B (4 × 2 = 8)

This section comprises of 4 very short answer (VSA) type questions of 2 marks each.

Q15. Fig. 4 shows a square of area 1 square unit. It is cut into a part of area 1/2, a part of area 1/4 and a part of area 1/8, and the remaining piece is halved again and again in the same way. **2**

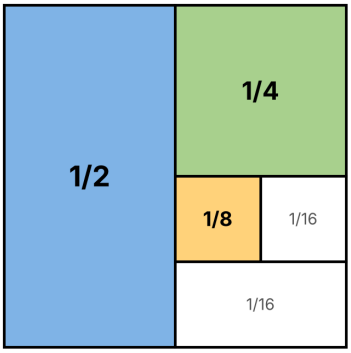


Fig. 4

(i) Write the next two terms of the sequence 1/2, 1/4, 1/8, . . . and state its common ratio. **[1]**

(ii) Find the total area of the first four cut-off parts. **[1]**

Q16. A sequence is defined by $a_1 = 2$ and $a_n = 2a_{n-1} - 1$ for $n \geq 2$. Write the first five terms of the sequence and the corresponding series. **2**

Q17. **(A)** Find the 10th term and the nth term of the G.P. 3, 6, 12, 24, . . . **2**

OR

(B) Which term of the G.P. 5, 10, 20, 40, . . . is 640?

Q18. **(A)** Find the sum of the first 5 terms of the G.P. 2, 6, 18, . . . **2**

OR

(B) Find the sum of n terms of the sequence 3, 33, 333, 3333, . . .

SECTION – C (3 × 3 = 9)

This section comprises of 3 short answer (SA) type questions of 3 marks each.

Q19. Fig. 5 shows squares drawn one by one so that the side of each new square equals the sum of the sides of the previous two squares. The sides of the squares drawn so far are 1, 1, 2, 3, 5, 8. **3**

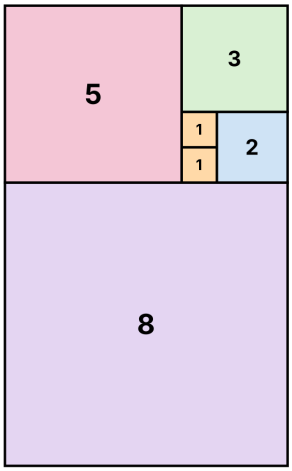


Fig. 5

(i) Write the sides of the next two squares. **[1]**

(ii) Write the recurrence relation satisfied by the sides a_1, a_2, a_3, . . . of the squares. **[1]**

(iii) Find the side of the 10th square and the ratio of the side of the 10th square to that of the 9th square. **[1]**

Q20. **(A)** In a G.P., the 4th term is 24 and the 7th term is 192. Find the 10th term. **3**

OR

(B) The sum of the first three terms of a G.P. is 14 and their product is 64. Find the common ratio and the terms.

Q21. **(A)** How many terms of the G.P. 2, 4, 8, . . . are needed to give the sum 510? **3**

OR

(B) Insert three numbers between 2 and 162 so that the resulting sequence is a G.P.

SECTION – D (1 × 5 = 5)

This section comprises of 1 long answer (LA) type question of 5 marks.

Q22. **(A)** (i) If A and G are the A.M. and G.M. of two positive numbers a and b, show that A ≥ G. **[2]** (ii) If the A.M. and G.M. of two positive numbers are 17 and 15 respectively, find the numbers. **[3]** **5**

OR

(B) A person writes a letter to 3 friends and asks each of them to copy it and mail it to 3 other persons, and so on. Assume that the chain is never broken. (i) How many letters are mailed in the nth set? Find the number in the 6th set. **[1]** (ii) Find the total number of letters mailed in the first 6 sets. **[2]** (iii) If mailing one letter costs ₹5, find the total postage spent up to the 6th set. **[1]** (iv) Find the least number of sets for which the total number of letters exceeds 5000. **[1]**

SECTION – E (1 × 4 = 4)

This section comprises of 1 case study based question of 4 marks with sub-parts (i), (ii), (iii) of marks 1, 1, 2 respectively.

Q23. **Case Study:** A microbiologist starts a culture with 40 bacteria. The number of bacteria doubles every hour. Fig. 6 shows the number of bacteria at the end of each of the first four hours; the number at the end of the 5th hour is not shown. **4**

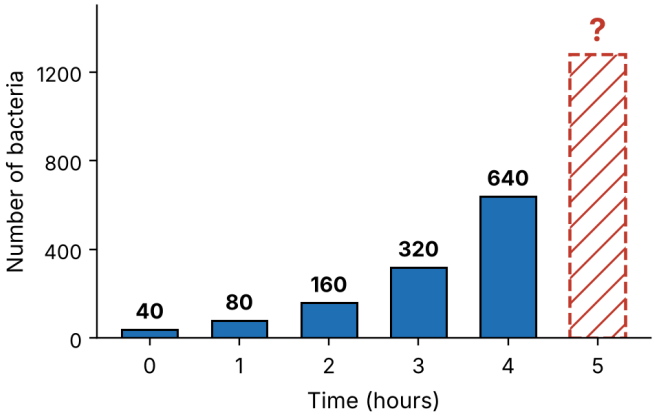


Fig. 6

Based on the given information, answer the following questions:

(i) Write the common ratio of the G.P. formed by the numbers in Fig. 6, and find the number of bacteria at the end of the 5th hour. **[1]**

(ii) Find the number of bacteria at the end of the 8th hour. **[1]**

(iii) **(a)** After how many hours does the number of bacteria first exceed 5000? **[2]**

OR

(b) Find the sum of the numbers of bacteria present at the end of the 1st, 2nd, 3rd, 4th, 5th and 6th hours. **[2]**

— End of Question Paper —