

ASSIGNMENT-1 (SEQUENCE AND SERIES)

SUBJECT: MATHEMATICS

MAX. MARKS : 40

CLASS : XI

DURATION : 1½ hrs

General Instructions:

- (i). All questions are compulsory.
 - (ii). This question paper contains 20 questions divided into five Sections A, B, C, D and E.
 - (iii). **Section A** comprises of 10 MCQs of 1 mark each. **Section B** comprises of 4 questions of 2 marks each. **Section C** comprises of 3 questions of 3 marks each. **Section D** comprises of 1 question of 5 marks each and **Section E** comprises of 2 Case Study Based Questions of 4 marks each.
 - (iv). There is no overall choice.
 - (v). Use of Calculators is not permitted
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SECTION – A

Questions 1 to 10 carry 1 mark each.

1. If the 4th and 9th terms of a GP are 54 and 13122 respectively then its 6th term is
(a) 243 (b) 1458 (c) 486 (d) 729
2. Which term of the GP 5, 10, 20, 40,...is 5120?
(a) 9th (b) 10th (c) 11th (d) 12th
3. The 8th term from the end of the GP 3, 6, 12, 24, ..., 12288 is
(a) 96 (b) 192 (c) 48 (d) 288
4. If the nth term of a GP is 2^n , the sum of its first 6 terms is
(a) 124 (b) 126 (c) 190 (d) 254
5. In a GP it is given that $a = 3$, $a_n = 96$ and $S_n = 189$. The value of n is
(a) 7 (b) 8 (c) 6 (d) 5
6. How many terms of the GP 2, 6, 18,...will make the sum 728?
(a) 6 (b) 9 (c) 8 (d) 7
7. The sum of an infinite series is 8 and its second term is 2. Its common ratio is
(a) $1/2$ (b) $1/4$ (c) $2/3$ (d) $3/4$
8. The sum of an infinite geometric series is 15 and the sum of the squares of these terms is 45. The first term of the series is
(a) 6 (b) 7 (c) 5 (d) 9

For Q9 and Q10, a statement of assertion (A) is followed by a statement of reason (R). Choose the correct answer out of the following choices.

- (a) Both A and R are true and R is the correct explanation of A.
 - (b) Both A and R are true but R is not the correct explanation of A.
 - (c) A is true but R is false.
 - (d) A is false but R is true.
9. **Assertion (A):** The sum of the series $\frac{3}{\sqrt{5}} + \frac{4}{\sqrt{5}} + \sqrt{5} + \dots$ 25 terms is $75\sqrt{5}$.
- Reason (R):** If 27, x, 3 are in GP, then $x = \pm 4$.

10. Assertion (A): The sum of first 6 terms of the GP 4, 16, 64, ... is equal to 5460.

Reason (R): Sum of first n terms of the G. P is given by $S_n = \frac{a(r^n - 1)}{r - 1}$, where a = first term, r = common ratio and $|r| > 1$.

Ans: (a) Both A and R are true and R is the correct explanation of A.
Assertion Given GP 4, 16, 64, ...

SECTION – B

Questions 11 to 14 carry 2 marks each.

11. Insert 4 Geometric means between 1 and 243,
12. Find the values of p , if sum to infinity for the G.P. $p, 1, \frac{1}{p}, \dots$ is $\frac{25}{4}$.
13. If a, b, c, d are in G.P. ; prove that, $a + b, b + c, c + d$ are also in G.P.
14. Prove that : $9^{1/3} \cdot 9^{1/9} \cdot 9^{1/27} \dots = 3$

SECTION – C

Questions 15 to 17 carry 3 marks each.

15. If a, b, c and d are in G.P. Prove that, $(a^n + b^n), (b^n + c^n), (c^n + d^n)$ are in G.P.
16. Find the sum of ' n ' terms of the series : $0.5 + 0.55 + 0.555 + \dots n$ terms.
17. If the p th, q th and r th term of a G.P. are a, b, c respectively, prove that : $a^{q-r} \cdot b^{r-p} \cdot c^{p-q} = 1$.

SECTION – D

Questions 18 carry 5 marks.

18. The sum of two numbers is '6' times their geometric mean, show that the numbers are in the ratio $(3 + 2\sqrt{2}) : (3 - 2\sqrt{2})$.

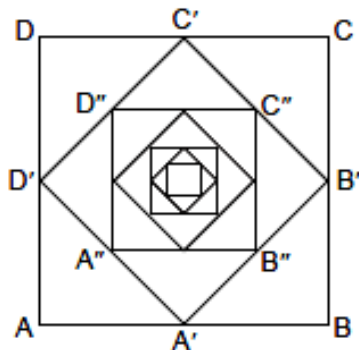
OR

If S_n denotes the sum of n terms of a G.P., prove that $(S_{10} - S_{20})^2 = S_{10} (S_{30} - S_{20})$.

SECTION – E (Case Study Based Questions)

Questions 19 to 20 carry 4 marks each.

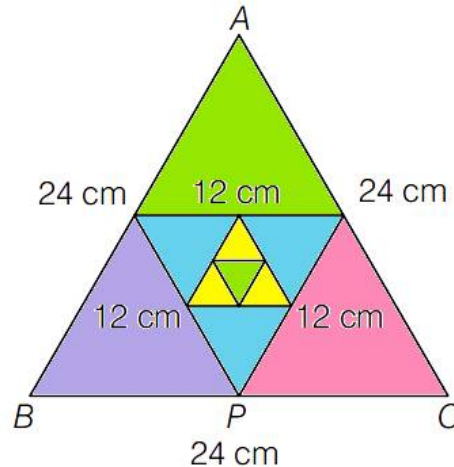
19. Geometrical mathematics has helped in art integration in the formation of designs of different patterns. Let us consider a square pattern. The mid points of whose sides are again joined to form another square, the mid points of whose sides are again joined to form another square and the process continues infinity. The pattern looks like.



If side of original square is 100 cm. Answer the following:

- (a) What is the side of square $A'B'C'D'$?
- (b) Find the area of square $A''B''C''D''$.
- (c) Find the Perimeter of square $A'B'C'D'$
- (d) Find the Sum of areas of squares if process continuous infinity.

20. In Rangoli competition in school, Preeti made Rangoli in the equilateral shape. Each side of an equilateral triangle is 24 cm. The mid-point of its sides are joined to form another triangle. This process is going continuously infinite.



Based on above information, answer the following questions.

- (a) Find the side of the 5th triangle is (in cm) (1)
- (b) Find the sum of perimeter of first 6 triangle is (in cm) (2)

OR

- (b) Find the area of all the triangle is (in sq cm). (2)
- (c) Find the sum of perimeter of all triangle is (in cm). (1)

