GOVERNMENT OF KARNATAKA
DEPARTMENT OF SCHOOL EDUCATION (PRE-UNIVERSITY)
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CHAPTERWISE MULTIPLE CHOICE QUESTIONS FOR COMPETATIVE EXAM

SUBJECT: MATHEMATICS – I PUC

NAME OF THE CHAPTER: SEQUENCE AND SERIES

RECAP

SYNOPSIS

- Sequence: Arrangement of numbers or terms using some rule is called sequence.
- Finite/ Infinite Sequence: If the number of terms in the sequence is finite then it is called finite sequence. Otherwise sequence is infinite
- ***Series:*** If $a_1, a_2, a_3, \ldots \ldots .., a_n$ is any sequence then $a_1 + a_2 + a_3 + \cdots \ldots .. + a_n$ is called series and it is denoted by $\sum_{r=1}^{n} a_r = \sum a_r$
- ***Geometric Progression[G.P] :*** A sequence is said to be in G.P if ratio of any two consecutive terms are same. If $a_1, a_2, a_3, a_4, \ldots \ldots \ldots \ldots .. a_n$ is in G.P then $\frac{a_2}{a_1} = \frac{a_3}{a_2} = \cdots . = \frac{a_n}{a_{n-1}}$ is called common ratio and it is denoted by r
- The consecutive terms of a G.P is given by $a, ar, ar^2, \ldots \ldots \ldots ., ar^{n-1}$
- The n^{th} or last term of G.P is given by T_n or $\boldsymbol{l = ar^{n-1}}$
- Sum of n terms of G.P: If a is the first term and r is the common ratio then sum of n terms is given by $\boldsymbol{S_n} = \frac{a(r^n-1)}{r-1}$, where $r > 1$ and $\boldsymbol{S_n} = \frac{a(1-r^n)}{1-r}$, where $r < 1$
- If a is the first term and r is the common ratio then sum of ∞ terms is given by $\boldsymbol{S_\infty = \frac{a}{1-r}, |r| < 1}$
- ***Geometrical Mean (G. M.):*** G.M. of any n positive numbers $a_1, a_2, a_3, \ldots .. a_n$ is $(a_1 . a_2 . a_3 \ldots .. a_n)^{1/n}$.
- Product of n GM's inserted between 'a' and 'b' is equal to n th power of the single GM between 'a' and 'b' i.e. $\prod_{r=1}^{n} G_r = (G)^n$ where $G = \sqrt{ab}$
- In a G.P. every term (except first) is GM of its two terms which are at equidistant from it. i.e. $T_r = \sqrt{T_{r-k} T_{r+k}} k < r$
- In a finite G.P. , the number of terms be odd then its middle term is the G.M. of the first and last term.

- If $a_1, a_2, a_3 \dots . a_n$ is a G.P. of non zero, non negative terms, then $\log a_1, \log a_2, \dots \dots . \log a_n$ is an A.P. and vice-versa.
- If $a_1, a_2, a_3 \dots\dots$ and $b_1,\ b_2,\ b_3 \dots\dots$ are two G.P.'s then $a_1\ b_1, a_2\ b_2, a_3\ b_3 \dots.$ is also in G.P.
- Relation between A.M., & G.M.

  A, G are AM and GM respectively between two numbers 'a' and 'b' then

  $A = \frac{a+b}{2}$, $G = \sqrt{ab}$, $\Rightarrow A \geq G$
- Sum of first n natural numbers $\Rightarrow \sum_{r=1}^{n} r = \frac{n(n+1)}{2}$
- Sum of first n odd natural numbers $\Rightarrow \sum_{r=1}^{n}(2r-1) = n^2$
- Sum of first n even natural numbers $\Rightarrow \sum_{r=1}^{n} 2r = n(n+1)$
- Sum of squares of first n natural numbers $\Rightarrow \sum_{r=1}^{n} r^2 = \frac{n(n+1)(2n+1)}{6}$
- Sum of cubes of first n natural numbers $\Rightarrow \sum_{r=1}^{n} r^3 = \left[\frac{n(n+1)^2}{2}\right]$
- $1 + 3 + 7 + 13 + \cdots \dots . + n$ terms $= \frac{n(n^2+2)}{3}$
- $1 + 5 + 12 + 22 + 35 + \cdots \dots \dots +$ n terms $= \frac{n^2(n+1)}{2}$
- If r^{th} term of an A.P. $T_r = Ar^3 + Br^2 + Cr + D$, then sum of n term of AP is

  $S_n = \sum_{r=1}^{n} T_r = A\sum_{r=1}^{n} r^3 + B\sum_{r=1}^{n} r^2 + C\sum_{r=1}^{n} r + D\sum_{r=1}^{n} 1$
- If number of terms in an A.P./G.P. is odd then its mid term is the A.M./G.M. between the first and last number.
- If the number of terms in an A.P./G.P. is even then A.M./G.M. of its two middle terms is equal to the A.M./G.M.between the first and last numbers.
- If a, b, c are in A.P. then $\frac{1}{bc}, \frac{1}{ac}, \frac{1}{ab}$ are in A.P.
- If a, b, c are in G.P. then $a^2,\ b^2, c^2$ are in G.P.
- If $a^2,\ b^2, c^2$ are in A.P. then $\frac{1}{b+c}, \frac{1}{c+a}, \frac{1}{a+b}$ are in A.P.

Multiple choice questions

1. **7^{th} term of the sequence $\sqrt{2}, \sqrt{10}, 5\sqrt{2}, \ldots \ldots$ is** *(Easy)*

   1) $125\sqrt{10}$ 2) $25\sqrt{2}$ 3) 125 4) $125\sqrt{2}$

2. **Which term of the G.P., 5, 10, 20, 40, ……. is 5120?** *(Easy)*

   1) 9^{th} 2) 10^{th} 3) 11^{th} 4) 12th

3. **If the first term of a G.P. be 5 and common ratio be -5, then which term is 3125** *(Easy)*

   1) 6^{th} 2) 5^{th} 3) 7^{th} 4) 8^{th}

4. **The m^{th} term of an A.P. is n and its n^{th} term is m. Its p^{th} term is** *(Average)*

   1) m – n + p 2) m + n – p 3) m + n + p 4) m – n - p

5. **If a, b, c are three consecutive terms of an A.P and x, y, z are three consecutive terms of a G.P., then the value of $x^{b-c}.y^{c-a}.z^{a-b}$ is :** *(KCET 2018) (Average)*

   1) 0 2) xyz 3) – 1 4) 1

6. **Consider an infinite geometric series with first term a and common ratio r. If the sum is 4 and the second term is $\frac{3}{4}$, then:** *(KCET 2014) (Difficult)*

   1) $a = \frac{4}{7}, r = \frac{3}{7}$ 2) $a = 3, r = \frac{1}{4}$ 3) $a = 2, r = \frac{3}{8}$ 4) $a = \frac{3}{2}, r = \frac{1}{2}$

7. **If the 2^{nd} and 5^{th} terms of G.P are 24 and 3 respectively, then the sum of 1^{st} six terms is:** *(KCET 2015) (Easy)*

   1) $\frac{189}{2}$ 2) $\frac{189}{5}$ 3) $\frac{179}{2}$ 4) $\frac{2}{189}$

8. **If the third term of a G.P. is 4 then the product of its first 5 terms is** *(Easy)*

   1) 4^3 2) 4^4 3) 4^5 4) None of these

9. **The 20^{th} term of the series $2 \times 4 + 4 \times 6 + 6 \times 8 +$ ___ will be** *(Easy)*

   1) 1600 2) 1680 3) 420 4) 840

10. **If the 10^{th} term of a geometric progression is 9 and 4^{th} term is 4, then its 7^{th} term is** *(Average)*

    1) 6 2) 36 3) $\frac{4}{9}$ 4) $\frac{9}{4}$

11. **If the n^{th} term of geometric progression $5, -\frac{5}{2}, \frac{5}{4}, -\frac{5}{8}, \ldots$ is $\frac{5}{1024}$, then the value of n is** *(Average)*

    1) 11 2) 10 3) 9 4) 4

12. If $a_1, a_2, a_3, \dots \dots a_{10}$ is a geometric progression and $\frac{a_3}{a_1} = 25$, then $\frac{a_9}{a_5}$ equals

(KCET 2022) (Easy)

1) $3(5^2)$ 2) 5^4 3) 5^3 4) $2(5^2)$

13. The sum of the first five terms of the series $3 + 4\frac{1}{2} + 6\frac{3}{4} + \cdots \dots$ will be ***(Average)***

1) $39\frac{9}{16}$ 2) $18\frac{3}{16}$ 3) $39\frac{7}{16}$ 4) $13\frac{9}{16}$

14. The angles of a triangle are in A. P and the greatest angle is double the least angle, then sine of the third angle is ***(KCET 2026) (Average)***

1) $\frac{\sqrt{3}}{2}$ 2) $\frac{1}{\sqrt{2}}$ 3) $\frac{1}{2}$ 4) 0

15. The sum of the series $3 + 33 + 333 + \cdots + n$ terms is ***(Average)***

1) $\frac{1}{27}(10^{n+1} + 9n - 28)$ 2) $\frac{1}{27}(10^{n+1} - 9n - 10)$

3) $\frac{1}{27}(10^{n+1} + 10n - 9)$ 4) None of these

16. If in a geometric progression $\{a_n\}, a_1 = 3, a_n = 96$ and $S_n = 189$ then the value of n is

(Average)

1) 5 2) 8 3) 7 4) 6

17. Three numbers are in G.P. such that their sum is 38 and their product is 1728. The greatest number among them is ***(Difficult)***

1) 18 2) 16 3) 14 4) None of these

18. If we insert two numbers between $\sqrt{2}$ and 4 so that the resulting sequence is in G.P, then the inserted numbers in the order are ***(KCET 2026) (Easy)***

1) $8, \sqrt{2}$ 2) $\sqrt{2}, 8$ 3) $\sqrt{8}, 2$ 4) $2, \sqrt{8}$

19. If three geometric means be inserted between 2 and 32, then the third geometric mean will be ***(Easy)***

1) 8 2) 4 3) 16 4) 12

20. The two geometric means between the number 1 and 64 are ***(Easy)***

1) 1 and 64 2) 8 and 16 3) 2 and 16 4) 4 and 16

21. If a, b, c are in G.P., then ***(Easy)***

1) a^2, b^2, c^2 are in G.P. 2) $a^2(b+c), c^2(a+b), b^2(a+c)$ are in G.P.

3) $\frac{a}{b+c}, \frac{b}{c+a}, \frac{c}{a+b}$ are in G.P. 4) None of the above

22. If 4^{th}, 10^{th} and 16^{th} terms of a G.P. are x, y and z respectively, then

(KCET 2025) (Average)

1) $y = \sqrt{xz}$ 2) $x = \sqrt{yz}$ 3) $y = \frac{x+z}{2}$ 4) $z = \sqrt{xy}$

23. If S_n stands for sum to n-terms of a G.P. with ' a' as the first term and ' r ' as the common ratio then $S_n : S_{2n}$ is *(KCET 2024) (Easy)*

1) $r^n + 1$ 2) $\frac{1}{r^n - 1}$ 3) $\mathbf{r^n - 1}$ 4) $\frac{1}{r^n + 1}$

24. The sum can be found of a infinite G.P. whose common ratio is r *(Average)*

1) For all values of r
2) For only positive value of r
3) Only for $0 < r < 1$
4) Only for $-1 < r < 1 (r \neq 0)$

25. The sum of infinite terms of a G.P. is x and on squaring the each term of it, the sum will be y, then the common ratio of this series is *(Difficult)*

1) $\frac{x^2 - y^2}{x^2 + y^2}$ 2) $\frac{x^2 + y^2}{x^2 - y^2}$ 3) $\frac{x^2 - y}{x^2 + y}$ 4) $\frac{x^2 + y}{x^2 - y}$

26. If S is the sum to infinity of a G.P., whose first term is a, then the sum of the first n terms is *(Average)*

1) $S\left(1 - \frac{a}{S}\right)^n$ 2) $S\left[1 - \left(1 - \frac{a}{S}\right)^n\right]$ 3) $a\left[1 - \left(1 - \frac{a}{S}\right)^n\right]$ 4) None of these

27. If three numbers be in G.P., then their logarithms will be in *(Easy)*

1) A.P. 2) G.P. 3) H.P. 4) None of these

28. If A_1, A_2 are the two A.M.'s between two numbers a and b and G_1, G_2 be two G.M.'s between same two numbers, then $\frac{A_1 + A_2}{G_1 \cdot G_2} =$ *(Average)*

1) $\frac{a+b}{ab}$ 2) $\frac{a+b}{2ab}$ 3) $\frac{2ab}{a+b}$ 4) $\frac{ab}{a+b}$

29. If the A.M. is twice the G.M. of the numbers a and b, then $a : b$ will be *(Average)*

1) $\frac{2-\sqrt{3}}{2+\sqrt{3}}$ 2) $\frac{\sqrt{3}+2}{\sqrt{3}-2}$ 3) $\frac{\sqrt{3}-2}{\sqrt{3}+2}$ 4) $\frac{2+\sqrt{3}}{2-\sqrt{3}}$

30. The sum to n terms of the series $2^2 + 4^2 + 6^2 + \_\_\_$ is *(Average)*

1) $\frac{n(n+1)(2n+1)}{3}$ 2) $\frac{n(n+1)(2n+1)}{9}$ 3) $\frac{n(n+1)(2n+1)}{6}$ 4) $\frac{2n(n+1)(2n+1)}{3}$

31. $\frac{1}{1.2} + \frac{1}{2.3} + \frac{1}{3.4} + \cdots \ldots\ldots + \cdots \ldots . \frac{1}{n.(n+1)}$ equals *(Average)*

1) $\frac{1}{n(n+1)}$ 2) $\frac{2n}{n+1}$ 3) $\frac{n}{n+1}$ 4) $\frac{2}{n(n+1)}$

32. The sum of the series $1^2.2 + 2^2.3 + 3^2.4 + \_\_\_$ to n terms is *(Average)*

1) $\frac{n^3(n+1)^3(2n+1)}{24}$
2) $\frac{n(n+1)(3n^2+7n+2)}{12}$
3) $\frac{n(n+1)}{6}[n(n+1) + (2n+1)]$
4) $\frac{n(n+1)}{12}[6n(n+1) + 2(2n+1)]$

33. If the 4^{th}, 7^{th} and 10^{th} terms of a G.P. be a, b, c respectively, then the relation between a, b, c is *(Average)*

1) $b = \frac{a+c}{2}$ 2) $a^2 = bc$ 3) $b^2 = ac$ 4) $c^2 = ab$

34. The number which should be added to the numbers 2, 14, 62 so that the resulting numbers may be in G.P., is ***(Easy)***

1) 1 2) 2 3) 3 4) 4

35. The terms of a G.P. are positive. If each term is equal to the sum of two terms that follow it, then the common ratio is ***(Average)***

1) $\frac{\sqrt{5}-1}{2}$ 2) $\frac{1-\sqrt{5}}{2}$ 3) 1 4) $2\sqrt{5}$

36. If the ratio of the sum of first three terms and the sum of first six terms of a G.P. be $125:152$, then the common ratio r is ***(Average)***

1) $\frac{3}{5}$ 2) $\frac{5}{3}$ 3) $\frac{2}{3}$ 4) $\frac{3}{2}$

37. If n geometric means between a and b be $G_1, G_2, \ldots\ldots G_n$ and a geometric mean be G, then the true relation is ***(Average)***

1) $G_1 \cdot G_2 \ldots\ldots\ldots G_n = G$ 2) $G_1 \cdot G_2 \ldots\ldots\ldots G_n = G^{1/n}$

3) $G_1 \cdot G_2 \ldots\ldots\ldots G_n = G^n$ 4) $G_1 \cdot G_2 \ldots\ldots\ldots G_n = G^{2/n}$

38. If the p^{th}, q^{th} and r^{th} term of a G.P. are a, b, c respectively, then $a^{q-r}.b^{r-p}.c^{p-q}$ is equal to ***(Average)***

1) 0 2) 1 3) abc 4) pqr

39. If the 5^{th} term of a G.P. is $\frac{1}{3}$ and 9^{th} term is $\frac{16}{243}$, then the 4^{th} term will be ***(Average)***

1) $\frac{3}{4}$ 2) $\frac{1}{2}$ 3) $\frac{1}{3}$ 4) $\frac{2}{5}$

40. If a, b, c are p^{th}, q^{th} and r^{th} terms of a G.P., then $\left(\frac{c}{b}\right)^p \left(\frac{b}{a}\right)^r \left(\frac{a}{c}\right)^q$ is equal to ***(Average)***

1) 1 2) $a^P b^q c^r$ 3) $a^q b^r c^p$ 4) $a^r b^p c^q$

41. If $\log_x a, a^{x/2}$ and $\log_b x$ are in G.P., then $x =$ ***(Average)***

1) $-\log(\log_b a)$ 2) $-\log_a(\log_a b)$

3) $\log_a(\log_e a) - \log_a(\log_e b)$ 4) $\log_a(\log_e b) - \log_a(\log_e a)$

42. The 6^{th} term of a G.P. is 32 and its 8^{th} term is 128, then the common ratio of the G.P. is ***(Easy)***

1) – 1 2) 2 3) 4 4) -4

43. The third term of a G. P. is 9. The product of its first five terms is :

(KCET 2019) (Easy)

1) 3^{10} 2) 3^5 3) 3^{12} 4) 3^9

44. If the sum of an infinite G.P. be 9 and the sum of first two terms be 5 , then the common ratio is ***(Average)***

1) 1/3 2) 3/2 3) 3/4 4) 2/3

45. If the sum of three terms of G.P. is 19 and product is 216, then the common ratio of the series is *(Average)*

1) $-\frac{3}{2}$ 2) 2 3) $\frac{3}{2}$ 4) 3

46. The sum of the series $6+66+666+\_\_\_$ upto n terms is *(Easy)*

1) $(10^{n-1}-9n+10)/81$ 2) $2(10^{n+1}-9n-10)/27$

3) $2(10^{n}-9n-10)/27$ 4) None of these

47. If the sum of n terms of a G.P. is 255 and n^{th} terms is 128 and common ratio is 2, then first term will be *(Average)*

1) 1 2) 3 3) 7 4) None of these

48. If $1+a+a^2+a^3+\cdots\ldots..+a^x=(1+a)(1+a^2)(1+a^4)$ then x is equal to *(Average)*

1) 3 2) 5 3) 7 4) None of these

49. The sum of a G.P. with common ratio 3 is 364, and last term is 243, then the number of terms is *(Average)*

1) 6 2) 5 3) 4 4) 10

50. If the geometric mean between a and b is $\frac{a^{n+1}+b^{n+1}}{a^n+b^n}$, then the value of n is *(Average)*

1) 1 2) $-1/2$ 3) $1/2$ 4) 2

51. The G.M. of the numbers $3, 3^2, 3^3, \ldots.., 3^n$ is *(Average)*

1) $3^{\frac{2}{n}}$ 2) $3^{\frac{n+1}{2}}$ 3) $3^{\frac{n}{2}}$ 4) $3^{\frac{n-1}{2}}$

52. The product of three geometric means between 4 and $\frac{1}{4}$ will be *(Easy)*

1) 4 2) 2 3) -1 4) 1

53. The sum of 3 numbers in geometric progression is 38 and their product is 1728. The middle number is *(Easy)*

1) 12 2) 8 3) 18 4) 6

54. If the product of three consecutive terms of G.P. is 216 and the sum of product of pairwise is 156, then the numbers will be *(Easy)*

1) 1, 3, 9 2) 2, 6, 18 3) 3, 9, 27 4) 2, 4, 8

55. The first term of a G.P. whose second term is 2 and sum to infinity is 8, will be *(Easy)*

1) 6 2) 3 3) 4 4) 1

56. If $y=x-x^2+x^3-x^4+\_\_\_\infty$, then value of x will be *(Average)*

1) $y+\frac{1}{y}$ 2) $\frac{y}{1+y}$ 3) $y-\frac{1}{y}$ 4) $\frac{y}{1-y}$

57. Consider an infinite G.P. with first term a and common ratio r, its sum is 4 and the second term is 3/4, then *(Average)*

1) $a = \frac{7}{4}, r = \frac{3}{7}$ 2) $a = \frac{3}{2}, r = \frac{1}{2}$ 3) $a = 2, r = \frac{3}{8}$ 4) $a = 3, r = \frac{1}{4}$

58. If sum of infinite terms of a G.P. is 3 and sum of squares of its terms is 3 , then its first term and common ratio are *(Average)*

1) 3/2, ½ 2) 1, ½ 3) 3/2, 2 4) None of these

59. If the arithmetic and geometric means of a and b be A and G respectively, then the value of $A - G$ will be *(Average)*

1) $\frac{a-b}{a}$ 2) $\frac{a+b}{2}$ 3) $\left[\frac{\sqrt{a}-\sqrt{b}}{\sqrt{2}}\right]^2$ 4) $\frac{2ab}{a+b}$

60. If the arithmetic mean of two numbers be A and geometric mean be G, then the numbers will be *(Easy)*

1) $A \pm (A^2 - G^2)$ 2) $\sqrt{A} \pm \sqrt{A^2 - G^2}$

3) $A \pm \sqrt{(A+G)(A-G)}$ 4) $\frac{A \pm \sqrt{(A+G)(A-G)}}{2}$

61. The geometric mean of two numbers is 6 and their arithmetic mean is 6.5 . The numbers are *(Easy)*

1) (3,12) 2) (4,9) 3) (2,18) 4) (7,6)

62. If the product of three terms of G.P. is 512. If 8 added to first and 6 added to second term, so that number may be in A.P., then the numbers are *(Average)*

1) 2, 4, 8 2) 3, 6, 12 3) 4, 8, 16 4) None of these

63. If A.M. and G.M. of roots of a quadratic equation are 5 and 4 respectively, then the quadratic equation is *(KCET 2024) (Easy)*

1) $x^2 - 10x - 16 = 0$ 2) $x^2 + 10x + 16 = 0$

3) $x^2 + 10x - 16 = 0$ 4) $x^2 - 10x + 16 = 0$

64. The sum of $(n+1)$ terms of $\frac{1}{1} + \frac{1}{1+2} + \frac{1}{1+2+3} + \cdots \ldots$ is *(Average)*

1) $\frac{n}{n+1}$ 2) $\frac{2n}{n+1}$ 3) $\frac{2}{n(n+1)}$ 4) $\frac{2(n+1)}{n+2}$

65. n^{th} term of the series $1 + \frac{3}{7} + \frac{5}{7^2} + \frac{1}{7^2} + \cdots \ldots$ is *(KCET 2023) (Average)*

1) $\frac{2n-1}{7^n}$ 2) $\frac{2n+1}{7^{n+1}}$ 3) $\frac{2n-1}{7^{n-1}}$ 4) $\frac{2n+1}{7^n}$

SEQUENCE AND SERIES									
1	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***
4	3	2	2	4	2	4	3	2	1
11	***12***	***13***	***14***	***15***	***16***	***17***	***18***	***19***	***20***
1	2	1	1	2	4	1	4	3	2
21	***22***	***23***	***24***	***25***	***26***	***27***	***28***	***29***	***30***
1	1	4	4	3	2	1	1	4	4
31	***32***	***33***	***34***	***35***	***36***	***37***	***38***	***39***	***40***
3	2	3	2	1	1	3	1	2	1
41	***42***	***43***	***44***	***45***	***46***	***47***	***48***	***49***	***50***
1	2	1	2	3	2	1	3	1	2
51	***52***	***53***	***54***	***55***	***56***	***57***	***58***	***59***	***60***
2	4	1	2	3	4	4	1	3	3
61	***62***	***63***	***64***	***65***					
2	3	4	4	3					