Chapter 02

# Sequence And Series

## TOPIC WISE QUESTIONS

### ARITHMETIC PROGRESSION (A.P.)

**Q.1** $10^{th}$ term of the progression $-4-1+2+5+\ldots$ is-
(1) – 23 (2) 23 (3) – 32 (4) 32

**Q.2** If $4^{th}$ term of an AP is 64 and its $54^{th}$ term is – 61, then its common difference is –
(1) 5/2 (2) – 5/2 (3) 3/50 (4) – 3/50

**Q.3** Which term of the series 3 + 8 + 13 + 18 + ... is 498-
(1) $95^{th}$ (2) $100^{th}$ (3) $102^{th}$ (4) $101^{th}$

**Q.4** The number of terms in the series 101 + 99 + 97 + .....+ 47 is-
(1) 25 (2) 28 (3) 30 (4) 20

**Q.5** If $(m + 2)^{th}$ term of an A.P. is $(m + 2)^2 - m^2$, then its common difference is-
(1) 4 (2) – 4 (3) 2 (4) – 2

**Q.6** If $m^{th}$ terms of the series 63 + 65 + 67 + 69 + .... and 3 + 10 + 17 + 24 + ... be equal, then m =
(1) 11 (2) 12 (3) 13 (4) 15

**Q.7** If the $9^{th}$ term of an A.P. be zero, then the ratio of its $29^{th}$ and $19^{th}$ term is-
(1) 1 : 2 (2) 2 : 1 (3) 1 : 3 (4) 3 : 1

**Q.8** If fourth term of an A.P. is thrice of its first term and third term = 7, then its common difference is-
(1) 1 (2) 2 (3) – 2 (4) 3

**Q.9** The $19^{th}$ term from the end of the series 2 + 6 + 10 + .... + 86 is –
(1) 6 (2) 18 (3) 14 (4) 10

**Q.10** In the following two A.P.'s how many terms are identical?
2, 5, 8, 11.... to 60 terms, 3, 5, 7, ..... 50 terms
(1) 15 (2) 16 (3) 17 (4) 18

**Q.11** The first term of an A.P. is 2 and common difference is 4. The sum of its 40 terms will be –
(1) 3200 (2) 1600
(3) 200 (4) 2800

**Q.12** If $n^{th}$ term of an AP is (1/3) (2n + 1), then the sum of its 19 terms is-
(1) 131 (2) 132 (3) 133 (4) 134

**Q.13** The sum of numbers lying between 10 and 200 which are divisible by 7 will be-
(1) 2800 (2) 2835
(3) 2870 (4) 2849

**Q.14** If the sum of n terms of an AP is $2n^2 + 5n$, then its nth term is-
(1) 4n-3 (2) 4n + 3
(3) 3n + 4 (4) 3n – 4

**Q.15** The sum of three consecutive terms of an increasing A.P. is 51. If the product of the first and third of these terms be 273, then third term is-
(1) 13 (2) 17 (3) 21 (4) 9

**Q.16** If we divide 20 into four parts which are in A.P. such that ratio of product of the first and the fourth with the product of the second and third is equal to 2 : 3, then the smallest part is-
(1) 1 (2) 2 (3) 3 (4) 4

**Q.17** Three numbers are in A.P. The product of the extremes is 5 times the mean, also the sum of the two largest is 8 times the least, the numbers are-
(1) 3, 9, 15 (2) 6, 18, 30
(3) 3, 8, 13 (4) 6, 16, 26

**Q.18** If the angles of a quadrilateral are in A.P. whose common difference is 10°, then the angles of the quadrilateral are-
(1) 65°, 85°, 95°, 105°
(2) 75°, 85°, 95°, 105°
(3) 65°, 75°, 85°, 95°
(4) 65°, 95°, 105°, 115°

**Q.19** Three numbers are in A.P., If their sum is 33 and their product is 792, then the smallest of these numbers is –
(1) 14 (2) 11 (3) 8 (4) 4

**Q.20** The sum of first four terms of an A.P. is 56 and the sum of its last four terms is 112. If its first term is 11, then number of terms is-
(1) 10 (2) 11
(3) 12 (4) None of these

**Q.21** If the numbers a, b, c, d, e form an A.P., then the value of a – 4b + 6c – 4d + e is-
(1) 1 (2) 2
(3) 0 (4) None of these

**Q.22** If $a^2(b + c)$, $b^2(c + a)$, $c^2(a + b)$ are in A.P., then a, b, c, are in-
(1) A.P. (2) G.P.
(3) H.P. (4) None of these

**Q.23** If a, b, c are in A.P., then $\frac{1}{\sqrt{b}+\sqrt{c}}, \frac{1}{\sqrt{c}+\sqrt{a}}, \frac{1}{\sqrt{a}+\sqrt{b}}$ are in-
(1) A.P. (2) G.P.
(3) H.P. (4) None of these

**Q.24** If $a\left(\frac{1}{b}+\frac{1}{c}\right), b\left(\frac{1}{c}+\frac{1}{a}\right), c\left(\frac{1}{a}+\frac{1}{b}\right)$ are in A.P. then a, b, c are is-
(1) A.P. (2) G.P.
(3) H.P. (4) None of these

**Q.25** If the roots of the equation $(b – c)x^2 + (c – a)x + (a – b) = 0$ are equal , then a, b, c will be in-
(1) A.P. (2) G.P.
(3) H.P. (4) None of these

**Q.26** If $\frac{1}{p+q}, \frac{1}{r+p}, \frac{1}{q+r}$ are in A.P. then-
(1) $p^2, q^2, r^2$ are in A.P.
(2) $q^2, p^2, r^2$ are in A.P.
(3) $q^2, r^2, p^2$ are in A.P.
(4) p, q, r are in A.P.

**Q.27** The middle term of the progression 4, 9, 14,....104 is-
(1) 44 (2) 49 (3) 59 (4) 54

## ARITHMETIC MEAN (A.M.)

**Q.28** If x, y, z are in A.P. and A.M. of x and y is a and that to y and z is b, then A.M. of a and b is -
(1) x (2) y
(3) z (4) 1/2(x + y)

**Q.29** If $A_1$, $A_2$ be two arithmetic means between 1/3 and 1/24, then their values are-
(1) 7/72, 5/36 (2) 17/72, 5/36
(3) 7/36, 5/72 (4) 5/72, 17/72

**Q.30** The AM of 1, 3, 5, ...., (2n – 1) is –
(1) n + 1 (2) n + 2 (3) $n^2$ (4) n

**Q.31** Given two numbers a and b, let A denotes the single A.M. and S denote the sum of n A.M.'s between a and b, then S/A depends on-
(1) n, a, b (2) n, b (3) n, a (4) n

## GEOMETRICAL PROGRESSION (G.P.)

**Q.32** If the first term of a G.P. be 5 and common ratio be – 5, then which term is 3125 –
(1) $6^{th}$ (2) $5^{th}$ (3) $7^{th}$ (4) $8^{th}$

**Q.33** The fifth term of a GP is 81 and its 8th term is 2187, then its third term is-
(1) 3 (2) 9
(3) 27 (4) None of these

**Q.34** In any G.P. the first term is 2 and last term is 512 and common ratio is 2, then $5^{th}$ term from end is-
(1) 16 (2) 32
(3) 64 (4) None of these

**Q.35** Which term of the progression

18, –12, 8, .... is $\frac{512}{729}$ ?

(1) $9^{th}$ (2) $10^{th}$
(3) $8^{th}$ (4) None of these

**Q.36** If third term of a G.P is 4, then product of first 5 term is-
(1) $4^3$ (2) $4^4$
(3) $4^5$ (4) None of these

**Q.37** If third and seventh terms of a GP are 15 and 135 respectively, then its fifth term will be-
(1) 5 (2) 9 (3) 45 (4) 90

**Q.38** For which values of x, the numbers 1, $x^2$, $6 - x^2$ taken in that order form a geometric progression-
(1) $x = \pm 2$ (2) $x = \pm\sqrt{2}$
(3) $x = \pm 3$ (4) $x = \pm\sqrt{3}$

**Q.39** Three numbers a, b, 12 are in G.P. and a, b, 9 are in A.P., then a and b are –
(1) 3, 6 (2) – 3, 6
(3) 3, – 6 (4) – 3, – 6

**Q.40** The second; third and sixth terms of an A.P. are consecutive terms of a G.P. The common ratio of the G.P. is-
(1) 1 (2) 3 (3) – 1 (4) – 3

**Q.41** Total number of terms in the progression 96 + 48 + 24 + 12 + .....+ 3/16 is-
(1) 9 (2) 10 (3) 15 (4) 20

**Q.42** The sum of the first 10 terms of a certain G.P. is equal to 244 times the sum of the first 5 terms. Then the common ratio is-
(1) 3 (2) 4 (3) 5 (4) None

**Q.43** The sum of the infinite terms of $1 - 1/3 + 1/3^2 - 1/3^3 + ...$ is-
(1) 3/4 (2) 4/3 (3) – 3/4 (4) – 4/3

**Q.44** The sum $1 + \frac{2}{x} + \frac{4}{x^2} + \frac{8}{x^3} + ....$ (upto $\infty$) is finite if –
(1) $x < 2$ (2) $x > 2$ (3) $x < 1$ (4) $x < 1/2$

**Q.45** If the sum to n terms of a series be $3(2^n - 1)$, then it is-
(1) A.P. (2) G.P.
(3) H.P. (4) None of these

**Q.46** The value of $9^{1/3}.\ 9^{1/9}.\ 9^{1/27}...$ upto $\infty$, is-
(1) 1 (2) 3
(3) 9 (4) None of these

**Q.47** If $3 + 3\alpha + 3\alpha^2 + ... \infty = \frac{45}{8}$ $(\alpha > 0)$; then $\alpha$ equals-
(1) $\frac{15}{23}$ (2) $\frac{15}{7}$ (3) $\frac{7}{15}$ (4) $\frac{23}{15}$

**Q.48** If the sum of an infinite GP be 3 and the sum of the squares of its term is also 3, then its first term and common ratio are –
(1) 3/2, 1/2 (2) 1/2, 3/2
(3) 1, 1/2 (4) None of these

**Q.49** Every term of an infinite GP is thrice the sum of all the successive terms. If the sum of first two terms is 15, then the sum of the GP is-
(1) 20 (2) 16 (3) 28 (4) 30

**Q.50** A geometric progression consists of an even number of terms. The sum of all the terms is three times that of the odd terms, the common ratio of the progression will be-
(1) 1/2 (2) 2
(3) 3 (4) 1/3

**Q.51** If first term of a decreasing infinite G.P. is 1 and sum is S, then sum of squares of its terms is-
(1) $S^2$ (2) $1/S^2$
(3) $\frac{S^2}{(2S-1)}$ (4) $\frac{S^2}{(2S+1)}$

**Q.52** If sum of three numbers of a G.P. is 19 and their product is 216, then its common ratio is-
(1) 1/2 (2) 1/3
(3) 3/2 (4) 3/4

**Q.53** If the product of three numbers in GP is 3375 and their sum is 65, then the smallest of these numbers is -
(1) 3 (2) 5 (3) 4 (4) 6

**Q.54** 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-
(1) 2, 4, 8 (2) 4, 8, 16
(3) 3, 6, 12 (4) None of these

**Q.55** In the four numbers first three are in G.P. and last three are in A.P. whose common difference is 6. If the first and last numbers are same, then first will be-
(1) 2 (2) 4 (3) 6 (4) 8

**Q.56** Break the number 155 into three parts so that the obtained numbers form a G.P., the first term being less than the third one by 120-
(1) 5, 65, 125 (2) 10, 65, 120
(3) 5, 25, 125 (4) None of these

**Q.57** Find three numbers in G.P. such that their sum is 14 and the sum of their squares is 84 -
(1) 3, 6, 12 (2) 2, 6, 18
(3) 1, 3, 9 (4) 2, 4, 8

**Q.58** Determine the first term and the common ratio of the geometric progression, the sum of whose first and third terms is 40 and the second and fourth term is 80 -
(1) 8, 3 (2) 8, 2
(3) 7, 3 (4) 7, 2

**Q.59** The sum of three positive numbers constituting an arithmetic progression is 15. If we add 1,4,19 to those numbers respectively. We get a geometric progression, then the numbers are-
(1) 2, 5, 8 (2) 8, 5, 2
(3) 5, 8, 2 (4) All of these

**Q.60** If a, b, c, d are in G.P. then a + b, b + c, c + d are in-
(1) A.P. (2) G.P.
(3) H.P. (4) None of these

**Q.61** If a, b, c are in G.P. then $\frac{1}{a}, \frac{1}{b}, \frac{1}{c}$ are in -
(1) A.P. (2) G.P.
(3) H.P. (4) None of these

## GEOMETRICAL MEAN (G.M.)

**Q.62** If three geometric means be inserted between 2 and 32, then the third geometric mean will be-
(1) 8 (2) 4 (3) 16 (4) 12

**Q.63** The product of three geometric means between 4 and 1/4 will be -
(1) 4 (2) 2 (3) – 1 (4) 1

**Q.64** The ratio between the GM's of the roots of the equations $ax^2 + bx + c = 0$ and $\ell x^2 + mx + n = 0$ is-
(1) $\sqrt{\frac{b\ell}{an}}$ (2) $\sqrt{\frac{c\ell}{an}}$
(3) $\sqrt{\frac{an}{c\ell}}$ (4) $\sqrt{\frac{cn}{a\ell}}$

**Q.65** If G be the geometric mean of x and y, then $\frac{1}{G^2 - x^2} + \frac{1}{G^2 - y^2} =$
(1) $G^2$ (2) $\frac{1}{G^2}$ (3) $\frac{2}{G^2}$ (4) $3G^2$

**Q.66** The A.M. of two numbers is 34 and GM is 16, the numbers are-
(1) 2 and 64 (2) 64 and 3
(3) 64 and 4 (4) None of these

**Q.67** Two numbers are in the ratio 4 : 1. If their AM exceeds their GM by 2, then the numbers are-
(1) 4, 1 (2) 16, 4
(3) 12, 3 (4) None of these

**Q.68** a, b, c are in A.P. If x is the GM between a and b and y is the GM between b and c, then the A.M. between $x^2$ and $y^2$ will be-
(1) $a^2$ (2) $b^2$
(3) $c^2$ (4) None of these

## HARMONIC PROGRESSION (H.P.)

**Q.69** If fourth term of an HP is 3/5 and its $8^{th}$ term is 1/3, then its first term is–
(1) 2/3 (2) 3/2
(3) 1/4 (4) None of these

**Q.70** The fifth term of the H.P. $2, 2\frac{1}{2}, 3\frac{1}{3}, \ldots$ will be-
(1) $5\frac{1}{5}$ (2) $3\frac{1}{5}$

(3) $\frac{1}{10}$ (4) 10

**Q.71** If first and second terms of a HP are a and b, then its $n^{th}$ term will be-

(1) $\frac{ab}{a+(n-1)ab}$ (2) $\frac{ab}{b+(n-1)(a+b)}$

(3) $\frac{ab}{b+(n-1)(a-b)}$ (4) None of these

**Q.72** If the $m^{th}$ term of a H.P. be n and $n^{th}$ term be m, then the $r^{th}$ term will be-

(1) $\frac{r}{mn}$ (2) $\frac{mn}{r+1}$

(3) $\frac{mn}{r}$ (4) $\frac{mn}{r-1}$

**Q.73** If b + c, c + a, a + b are in H.P., then $a^2$, $b^2$, $c^2$ will be in-

(1) A.P. (2) G.P.

(3) H.P. (4) None of these

**Q.74** If a, b, c be in H.P. then $a-\frac{b}{2}, \frac{b}{2}, c-\frac{b}{2}$ will be in -

(1) A.P. (2) G.P.

(3) H.P. (4) None of these

**Q.75** If a, b, c are in A.P., then $\frac{bc}{ca+ab}, \frac{ca}{bc+ab}, \frac{ab}{bc+ca}$ are in-

(1) A.P. (2) G.P.

(3) H.P. (4) None of these

## HARMONIC MEAN (H.M.)

**Q.76** The HM between $\frac{1}{21}$ and $\frac{-1}{5}$ is -

(1) $\frac{1}{8}$ (2) $-\frac{1}{8}$

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

**Q.77** If H is H.M. between two numbers a and b, then $\frac{1}{H-a}+\frac{1}{H-b}$ equals -

(1) a – b (2) a + b

(3) $\frac{1}{a}-\frac{1}{b}$ (4) $\frac{1}{a}+\frac{1}{b}$

**Q.78** The HM between $\frac{a}{b}$ and $\frac{b}{a}$ is-

(1) $\frac{2ab}{a+b}$ (2) $\frac{2a^2b^2}{a^2+b^2}$

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

**Q.79** If 4 HM's be inserted between 2/3 and 2/13, then the second HM is-

(1) 2/5 (2) 2/7

(3) 2/11 (4) 2/17

## RELATION BETWEEN A.M., G.M. & H.M.

**Q.80** If A,G & 4 are A.M, G.M & H.M of two numbers respectively and $2A + G^2 = 27$, then the numbers are-

(1) 8, 2 (2) 8, 6 (3) 6, 3 (4) 6, 4

**Q.81** If x, y, z are AM, GM and HM of two positive numbers respectively, then correct statement is-

(1) x < y < z (2) y < x < z

(3) z < y < x (4) z < x < y

**Q.82** If sum of A.M. and H.M. between two positive numbers is 25 and their GM is 12, then sum of numbers is-

(1) 9 (2) 18

(3) 32 (4) 18 or 32

**Q.83** The A.M. between two positive numbers exceeds the GM by 5, and the GM exceeds the H.M. by 4. Then the numbers are-

(1) 10, 40 (2) 10, 20

(3) 20, 40 (4) 10, 50

## SPECIAL SERIES

**Q.84** Sum of the series 1+ 3+ 7 + 15 + 31+ .... to n terms is-

(1) $2^n - 2 - n$ (2) $2^{n+1}+2 + n$

(3) $2^{n+1}-2-n$ (4) None of these

**Q.85** The number of terms in the sequence 1, 3, 6, 10, 15, 21, .... , 5050 is-

(1) 50 (2) 100

(3) 101 (4) 105

**Q.86** Sum of n terms of $1 + (1 + x) + (1 + x + x^2) + (1 + x + x^2 + x^3) + ....$ is-

(1) $\frac{1-x^n}{1-x}$ (2) $\frac{x(1-x^n)}{1-x}$

(3) $\frac{n(1-x)-x(1-x^n)}{(1-x)^2}$ (4) None of these

**Q.87** $\sum_{k=1}^{n} k^3$ is equal to-

(1) $2\sum_{k=1}^{n} k^2$ (2) $\left(\sum_{k=1}^{n} k\right)^2$

(3) $\left(\sum_{k=1}^{n} k\right)^3$ (4) $3\sum_{k=1}^{n} k^2$

## ARITHMETIC-GEOMETRICAL PROGRESSION (A.G.P.)

**Q.88** Sum to infinite of the series

$1 + \frac{2}{5} + \frac{3}{5^2} + \frac{4}{5^3} + \ldots.$ is-

(1) 5/4 (2) 6/5 (3) 25/16 (4) 16/9

**Q.89** The sum of infinite terms of the progression $1+ 3x + 5x^2 + 7x^3 + \ldots\ldots$ $|x| < 1$ is-

(1) $\frac{1+x}{1-x}$ (2) $\left(\frac{1+x}{1-x}\right)^2$

(3) $\frac{1+x}{(1-x)^2}$ (4) None of these

**Q.90** $1+2\left(1+\frac{1}{n}\right) + 3\left(1+\frac{1}{n}\right)^2 + \ldots \infty$ terms, equals-

(1) $n\left(1+\frac{1}{n}\right)$ (2) $n^2$

(3) $n\left(1+\frac{1}{n}\right)^2$ (4) None of these

# ANSWER KEY

## TOPIC WISE QUESTIONS

| Que. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ans. | 2 | 2 | 2 | 2 | 1 | 3 | 2 | 2 | 3 | 3 | 1 | 3 | 2 | 2 | 3 |
| Que. | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| Ans. | 2 | 1 | 2 | 4 | 2 | 3 | 1 | 1 | 1 | 1 | 1 | 4 | 2 | 2 | 4 |
| Que. | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 |
| Ans. | 4 | 2 | 2 | 2 | 1 | 3 | 3 | 2 | 1 | 2 | 2 | 1 | 1 | 2 | 2 |
| Que. | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
| Ans. | 2 | 3 | 1 | 2 | 2 | 3 | 3 | 2 | 2 | 4 | 3 | 4 | 2 | 1 | 2 |
| Que. | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 |
| Ans. | 2 | 3 | 4 | 2 | 2 | 3 | 2 | 2 | 2 | 4 | 3 | 3 | 1 | 2 | 3 |
| Que. | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 |
| Ans. | 1 | 4 | 3 | 2 | 3 | 3 | 4 | 1 | 3 | 2 | 3 | 2 | 3 | 3 | 2 |