SEQUENCE AND SERIES

1. If the *p*th term of an A.P. is *q* and the *qth* term is *p*, then its *(p+q)*th term is

   (a) 0 (b) *p-q*

   (c) *p+q* *(d)* *none*

2. The number of numbers lying between 100 and 500 that are divisible by 7 but not by 21 is

   (a) 57 (b) 19

   (c) 36 (d) none

3. The middle term in the following arithmetic progression 20, 16, 12,…, -176 is

   (a) -46 (b) -76

   (c) -80 (d) none

4. In the following two A.P.s 2,5,8,11,.. to 60 terms and 3,5,7,9,.. to 50 terms, the number of terms that are identical is

   (a) 17 (b) 15

   (c) 19 (d) none

5. If *a, b, c* be the *pth*, *qth* and *r*th terms respectively of an A.P., then a*(q-r)*+ *b(r-p)+c(p-q)=*

   (a) *a* *(b)* *0*

   (c) *b* (d) *c*

6. If the *n*th term of a series is $\frac{3+n}{4}$, then the sum of 105 terms is

   (a) 1470 (b) 1360

   (c) 1530 (d) none

7. The sum of all natural numbers less than 200, that are divisible neither by 3 nor by 5, is

   (a) 10730 (b) 10732

   (c) 15375 (d) none

8. The sum to *n* terms of the sequence $\log a, \log ar, \log ar^2, \ldots$ is

   (a) $\frac{n}{2}\log a^2 r^{n-1}$ (b) $n\log a^2 r^{n-1}$

   (c) $\frac{3n}{2}\log a^2 r^{n-1}$ (d) *none*

9. The sum of 11 terms of an A.P. whose middle term is 30, is

   (a) 320 (b) 330

   (c) 340 (d) 350

10. The sum of numbers of three digits which are divisible by 7, is

    (a) 70336 (b) 70331

    (c) 70330 (d) none

11. If $5^{1+x}+5^{1-x}, \frac{a}{2}$ and 25^x+25^{-x} are three consecutive terms of an A.P., then the values of *a* are given by

    (a) $a \geq 12$ (b) $a > 12$

    (c) $a < 12$ (d) $a \leq 12$

12. If $\log_{10} 2, \log_{10}\left(2^x-1\right)$ and $\log_{10}\left(2^x+3\right)$ be three consecutive terms of an A.P., then

    (a) *x=0* *(b)* *x=1*

    (c) $x=\log_2 5$ (d) $x=\log_{10} 2$

13. In an A.P. of even number of terms, the sum of the odd terms is 24 while that of even terms is 30. If the last term exceeds the first by 10.5, then the number of terms is

    (a) 8 (b) 6

    (c) 10 (d) none

14. If the ratio of the sum of *n* terms of two A.P.s is (3n-13) : (5n+21), then the ratio of 24th terms of the two progressions is

    (a) 2:3 (b) 2:1

    (c) 1:2 (d) none

15. The sum of each of two sets of three terms in A.P. is 15. The common difference of the first set is greater than that of the second by 1 and the ratio of the products of the terms in the first set and that of the second set is 7:8. The two sets of numbers are

    (a) 3,5,7 and 4,5,6 (b) 3,5,7 and 7,8,9

    (c) 2,4,6 and 4,5,6 (d) 21,5,-11& 22,5,-12

16. A polygon has 25 sides, the lengths of which starting from the smallest side are in AP. If the perimeter of the polygon is 2100 cm and the length of the largest side 20 times that of the smallest, then the length of the smallest side and the common difference of the AP is

(a) $8cm, 6\frac{1}{3}cm$ (b) $6cm, 6\frac{1}{3}cm$

(c) $8cm, 5\frac{1}{3}cm$ (d) *none*

17. If four numbers in AP are such that their sum is 20 and sum of their squares is 120, then the numbers are

(a) 1,4,7,10 (b) 3,5,7,9

(c) 2,4,6,8 (d) none

18. If 5th and 8th terms of a G.P. are 32 and 256 respectively, then the 4th term of the G.P. is

(a) 8 (b) 12

(c) 16 (d) 20

19. If 5th, 8th and 11th terms of a G.P. are *p, q* and *s* respectively, then

(a) $p^2 = qs$ (b) $q^2 = ps$

(c) $s^2 = pq$ (d) *none*

20. The 3rd term of a G.P. is the square of the first term. If the second term is 8, then the 6th term is

(a) 128 (b) 64

(c) 32 (d) none

21. If the four numbers forming a G.P. are such that the third term is grater than the first by 9 and the second term is greater than the fourth by 18, then the numbers are

(a) 3,-6,12,-24 (b) 2,-8,32,-128

(c) 1,-3,9,-27 (d) none

22. If *a, b, c,* are in G.P., then $a^2b^2c^2\left(\frac{1}{a^3}+\frac{1}{b^3}+\frac{1}{c^3}\right)=$

(a) a+b+c (b) ab+ac+bc

(c) $a^3+b^3+c^3$ (d) none

23. If *pth* and *qth* terms of a GP are *q* and *p* respectively then *(p+q)th* term is

(a) $\left(\frac{p^p}{q^q}\right)^{\frac{1}{p-q}}$ (b) $\left(\frac{q^q}{p^p}\right)^{\frac{1}{q-p}}$

(c) $\left(\frac{p^p}{q^q}\right)^{\frac{1}{p+q}}$ (d) *none*

24. The sum of three numbers which are consecutive terms of an A.P. is 21. If the second number is reduced by 1 while the third is increased by 1, three consecutive terms of a G.P. result. The three numbers are

(a) 3,7,11 (b) 12,7,2

(c) 1,7,11 (d) none

25. The sum of an infinite GP whose first term is 28 and fourth term is $\frac{4}{49}$, is

(a) $\frac{98}{3}$ (b) $\frac{49}{3}$

(c) $\frac{78}{3}$ (d) *none*

26. If the sum of three numbers in GP is 63 and the product of the first and the second term is $\frac{3}{4}$ of the third term, then the numbers are

(a) 3,12,48 (b) 4,12,36

(c) 2,10,50 (d) none

27. If the continued product of three numbers in GP is 216 and the sum of their products in pairs is also 216, then the numbers are

(a) $\frac{12}{5\pm\sqrt{21}}, 6, 3\left(5\pm\sqrt{21}\right)$

(b) $\frac{12}{4\pm\sqrt{17}}, 6, 3, \left(4\pm\sqrt{17}\right)$

(c) $\frac{12}{7\pm\sqrt{19}}, 6, 3, \left(7\pm\sqrt{19}\right)$

(d) *none*

28. In a set of four numbers the first three are in GP and the last three are in AP with a common difference 6. If the first number is same as the fourth, the four numbers are

(a) 3,9,15,21

(b) 1,7,13,19

(c) 8,-4,2,8

(d) none

29. A number consists of three digits in GP. If the sum of the right hand and left hand digits exceeds twice the middle digit by 1 and the sum of the left hand and middle digits is two third of the sum of the middle and right hand digits, then the number is

(a) 469 (b) 376

(c) 468 (d) none

30. If $S_1, S_2, S_3, ...S_p$ are the sum of the infinite geometric series whose first terms are 1,2,3,…,*p* and whose common ratios are $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, ..., \frac{1}{p+1}$ respectively, then $S_1 + S_2 + S_3 + ... + S_p =$

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

(c) $\frac{p(p+3)}{2}$ (d) *none*

31. If the first term of a GP exceeds the second term by 2 and the sum to infinity is 50, then the common ratio is

(a) $3/5$ (b) $2/5$

(c) $1/5$ (d) $4/5$

32. Sum to infinity of the series $\frac{3}{4} - \frac{5}{4^2} + \frac{3}{4^3} - \frac{5}{4^4} + \frac{3}{4^5} - \frac{5}{4^6} + ...$ is

(a) $7/15$ (b) $2/5$

(c) $1/3$ (d) *none*

33. If one geometric mean G and two arithmetic means p and q be inserted between two numbers, then G^2 is equal to

(a) *(3p-q) (3q-p)* *(b)* *(2p-q) (2q-p)*

(c) *(4p-q) (4q-p)* *(d)* *none*

34. The sum to *n* terms of the series $\frac{1}{2} + \frac{3}{4} + \frac{7}{8} + \frac{15}{16} + ...$ is given by

(a) $2^n - 1$ (b) $2^n - n - 1$

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

35. If the AM between two numbers is 34 and their GM is 16, then the two numbers are

(a) 64 and 8 (b) 64 and 4

(c) 8 and 4 (d) none

36. The AM between two numbers *b* and *c* is *a* and the two GMs between them are g_1 and g_2. If $g_1^3 + g_2^3 = kabc$, then *k* is equal to

(a) 1 (b) 2

(c) 3 (d) 4

37. If two geometric means g_1 *and* g_2 and one arithmetic mean A be inserted between two numbers, then $\frac{g_1^2}{g_2} + \frac{g_2^2}{g_1} =$

(a) 4A (b) 3A

(c) 2A (d) A

38. If *a, b, c* are in AP, *x* is the GM between *a* and *b, y* is the GM between *b* and *c* then b^2 is

(a) AM between x^2 *and* y^2

(b) GM between x^2 *and* y^2

(c) HM between x^2 *and* y^2

(d) none

39. The sum of three numbers in AP is 15. If 1, 4, 19 are added to them respectively, the resulting series is in GP then the numbers are

(a) 2, 5, 8 (b) 26, 5, 4

(c) 3, 5, 7 (d) none

40. $\sim[p \vee((\sim q)]$ is equal to

(a) $\sim p \vee q$ (b) $(\sim p) \wedge q$

(c) $\sim p \vee \sim p$ (d) $\sim p \wedge \sim q$

41. The negation of the compound proposition $p \vee (\sim p \vee q)$ is

(a) $(p \wedge \sim q) \wedge \sim p$ (b) $(p \wedge \sim q) \vee \sim p$

(c) $(p \wedge \sim q) \wedge \sim p$ (d) none of these

42. $\sim (p \Rightarrow q) \Leftrightarrow \sim p \vee \sim q$ is

(a) a tautology

(b) a contradication

(c) neither a tautology not a contradication

(d) cannot come to any conclusion

43. Which of the following is true?

(a) $p \Rightarrow q \equiv \sim p \Rightarrow \sim q$

(b) $\sim (p \Rightarrow \sim q) \equiv \sim p \wedge q$

(c) $\sim (\sim p \sim q) \equiv \sim p \wedge q$

(d) $\sim (p \Leftrightarrow q) \equiv [\sim (p \Rightarrow q) \wedge \sim (q \Rightarrow p)]$

44. $\sim (p \vee q) \vee (\sim p \wedge q)$ is logically equivalent to

(a) $\sim p$ (b) p

(c) q (d) $\sim q$

45. $(p \wedge \sim q) \wedge (\sim p \vee q)$ is

(a) a contradication

(b) a tautology

(c) either (a) or (b)

(d) Neither (a) nor (b) .

46. pth term of an H.P. is qr and qth term is pr then the rth term of the H.P. is

(a) pqr (b) 1

(c) pq (d) pqr^2.

47. The sum of the series $\frac{1}{3\times 7}+\frac{1}{7\times 11}+\frac{1}{11\times 15}+.....\text{to}\ \infty$ is

(a) 1/3 (b) 1/6

(c) 1/9 (d) 1/12

48. If a, b, c, d are in H.P., then $ab+bc+cd$ is

(a) $3ad$ (b) $(a+b)(c+d)$

(c) $3\ ac$ (d) $3\ bd$.

49. If $x=\sum_{n=0}^{\infty} a^n, y=\sum_{n=0}^{\infty} b^n, z=\sum_{n=0}^{\infty}(ab)^n$, where $a, b < 1$, then

(a) $xyz = x+y+z$

(b) $xz+yz = xy+z$

(c) $xy+yx = xz+y$

(d) $xy+xz = yz+x$

50. Let $S_n = \frac{1}{1^3}+\frac{1+2}{1^3+2^3}+.....$

$+\frac{1+2+.....+n}{1^3+2^3+....+n^3}$, n = 1, 2, 3. then S_n is not greater than or equal to

(a) $\frac{1}{2}$ (b) 1

(c) 2 (d) 4

ANSWERS

1. (a)	2. (c)	3. (b)	4. (a)	5. (b)	6. (a)	7. (b)	8. (a)	9. (b)	10. (a)
11. (a)	12. (c)	13. (a)	14. (c)	15. a, d	16. (a)	17. (c)	18. (c)	19. (b)	20. (a)
21. (a)	22. (c)	23. (a)	24. a, b	25. (a)	26. (a)	27. (a)	28. (c)	29. (a)	30. (c)
31. (d)	32. (a)	33. (b)	34. (c)	35. (b)	36. (b)	37. (c)	38. (a)	39. (a)	40. (b)
41. (a)	42. (c)	43. (c)	44. (a)	45. (a)	46. (c)	47. (d)	48. (a)	49. (b)	50. (c)