PROGRESSIONS ASSIGNMENT

1. If tan $n\theta = \tan m\theta$, then the different values of θ will be in

(a) A.P. (b) G.P. (c) H.P. (d) None of these

2. If the p^{th}, q^{th} and r^{th} term of an arithmetic sequence are *a*, *b* and *c* respectively, then the value of [a (*q* – *r*)+*b*(*r* – *p*)+ *c* (*p* – *q*)]=

(a) 1 (b) – 1 (c) 0 (d) $\frac{1}{2}$

3. If n^{th} terms of two A.P.'s are 3*n* + 8 and 7*n* +15, then the ratio of their 12th terms will be

(a) $\frac{4}{9}$ (b) $\frac{7}{16}$ (c) $\frac{3}{7}$ (d) $\frac{8}{15}$

4. The 6th term of an A.P. is equal to 2, the value of the common difference of the A.P. which makes the product $a_1a_4a_5$ least is given by

(a) $\frac{8}{5}$ (b) $\frac{5}{4}$ (c) $\frac{2}{3}$ (d) None of these

5. If p times the p^{th} term of an A.P. is equal to *q* times the q^{th} term of an A.P., then $(p+q)^{th}$ term is

(a) 0 (b) 1 (c) 2 (d) 3

6. The numbers $t(t^2+1)$, $-\frac{1}{2}t^2$ and 6 are three consecutive terms of an A.P. If t be real, then the next two terms of A.P. are

(a) –2, –10 (b) 14, 6 (c) 14, 22 (d) None of these

7. If the p^{th} term of the series 25, $22\frac{3}{5}$, $20\frac{1}{2}$, $18\frac{1}{4}$,...... is numerically the smallest, then *p*=

(a) 11 (b) 12 (c) 13 (d) 14

8. The second term of an A.P. is (*x* – *y*) and the 5th term is (*x* + *y*), then its first term is

(a) $x-\frac{1}{3}y$ (b) $x-\frac{2}{3}y$ (c) $x-\frac{4}{3}y$ (d) $x-\frac{5}{3}y$

9. The number of common terms to the two sequences 17, 21, 25, ...417 and 16, 21, 26, ... 466 is

(a) 21 (b) 19 (c) 20 (d) 91

10. In an A.P. first term is 1. If $T_1\,T_3 + T_2T_3$ is minimum, then common difference is

(a) –5/4 (b) –4/5 (c) 5/4 (d) 4/5

11. Let the sets *A*={2, 4, 6, 8,......} and *B*= {3, 6, 9, 12, ...}, and *n*(*A*) = 200, *n*(*B*) = 250. Then

(a) $n(A \cap B) = 67$ (b) $n(A \cup B) = 450$ (c) $n(A \cap B) = 66$ (d) $n(A \cup B) = 384$

12. If the ratio of the sum of n terms of two A.P.'s be (7*n*+1) : (4*n*+27), then the ratio of their 11th terms will be

(a) 2 : 3 (b) 3 : 4 (c) 4 : 3 (d) 5 : 6

13. The interior angles of a polygon are in A.P. If the smallest angle be 120° and the common difference be 5, then the number of sides is

(a) 8 (b) 10 (c) 9 (d) 6

14. The sum of integers from 1 to 100 that are divisible by 2 or 5 is

(a) 3000 (b) 3050 (c) 4050 (d) None of these

15. If the sum of first *n* terms of an A.P. be equal to the sum of its first *m* terms, ($m \neq n$), then the sum of its first (*m* + *n*) terms will be

(a) 0 (b) *n* (c) *m* (d) *m* + *n*

16. If a_1, a_2 ,......., a_n are in A.P. with common difference *d*, then the sum of the following series is

$\sin d(\text{cosec } a_1 . \text{cosec } a_2 + \text{cosec } a_2 . \text{cosec } a_3 + ... + \text{cosec } a_{n-1} \text{ cosec } a_n)$

(a) $\sec a_1 - \sec a_n$ (b) $\cot a_1 - \cot a_n$ (c) $\tan a_1 - \tan a_n$ (d) $\text{cosec } a_1 - \text{cosec } a_n$

17. The odd numbers are divided as follows

1 3
5 7 9 11
13 15 17 19 21 23
. . . . . .
. . . . . .
. . . . . .

Then the sum of n^{th} row is

(a) $2^{n-2}[2^n+2^{n-1}-1]$ (b) $\frac{1}{2}(2n+1)$ (c) $2n$ (d) $4n^3$

18. If the sum of *n* terms of an A.P. is $2n^2+5n,$ then the n^{th} term will be

(a) $4n+3$ (b) $4n+5$ (c) $4n+6$ (d) $4n+7$

19. The *n*th term of an A.P. is $3n-1$. Choose from the following the sum of its first five terms

(a) 14 (b) 35 (c) 80 (d) 40

20. If the sum of two extreme numbers of an A.P. with four terms is 8 and product of remaining two middle term is 15, then greatest number of the series will be

(a) 5 (b) 7 (c) 9 (d) 11

21. The ratio of sum of *m* and *n* terms of an A.P. is $m^2:n^2$, then the ratio of m^{th} and n^{th} term will be

(a) $\frac{m-1}{n-1}$ (b) $\frac{n-1}{m-1}$ (c) $\frac{2m-1}{2n-1}$ (d) $\frac{2n-1}{2m-1}$

22. The value of *x* satisfying $\log_a x+\log_{\sqrt{a}} x+\log_{\sqrt[3]{a}} x+.....+\log_{\sqrt[n]{a}} x=\frac{a+1}{2}$ will be

(a) $x=a$ (b) $x=a^a$ (c) $x=a^{-1/a}$ (d) $x=a^{1/a}$

23. Sum of first *n* terms in the following series $\cot^{-1}3+\cot^{-1}7+\cot^{-1}13+\cot^{-1}21+.....$ is given by

(a) $\tan^{-1}\left(\frac{n}{n+2}\right)$ (b) $\cot^{-1}\left(\frac{n+2}{n}\right)$ (c) $\tan^{-1}(n+1)-\tan^{-1}1$ (d) All of these

24. Let S_n denotes the sum of *n* terms of an A.P. If $S_{2n}=3S_n,$ then ratio $\frac{S_{3n}}{S_n}=$

(a) 4 (b) 6 (c) 8 (d) 10

25. If the sum of the first *n* terms of a series be $5n^2+2n,$ then its second term is

(a) 7 (b) 17 (c) 24 (d) 42

26. All the terms of an A.P. are natural numbers. The sum of its first nine terms lies between 200 and 220. If the second term is 12, then the common difference is

(a) 2 (b) 3 (c) 4 (d) None of these

27. If $S_1=a_2+a_4+a_6+.....$up to 100 terms and $S_2=a_1+a_3+a_5+......$ up to 100 terms of a certain A.P. then its common difference *d* is

(a) S_1-S_2 (b) S_2-S_1 (c) $\frac{S_1-S_2}{2}$ (d) None of these

28. In the arithmetic progression whose common difference is non-zero, the sum of first 3*n* terms is equal to the sum of the next *n* terms. Then the ratio of the sum of the first 2*n* terms to the next 2*n* terms is

(a) $\frac{1}{5}$ (b) $\frac{2}{3}$ (c) $\frac{3}{4}$ (d) None of these

29. If the sum of *n* terms of an A.P. is $nA+n^2B,$ where *A*, *B* are constants, then its common difference will be

(a) *A* – *B* (b) *A* + *B* (c) 2*A* (d) 2*B*

30. The sum of *n* arithmetic means between *a* and *b*, is

(a) $\frac{n(a+b)}{2}$ (b) $n(a+b)$ (c) $\frac{(n+1)(a+b)}{2}$ (d) $(n+1)(a+b)$

31. Given that *n* A.M.'s are inserted between two sets of numbers *a*, 2*b* and 2*a*, *b*, where *a*, *b* ∈ *R*. Suppose further that m^{th} mean between these sets of numbers is same, then the ratio *a* : *b* equals

(a) *n* – *m* + 1 : *m* (b) *n* – *m* + 1 : *n* (c) *n* : *n* – *m* + 1 (d) *m* : *n* – *m* + 1

32. Given two number *a* and *b*. Let A denote the single A.M. and *S* denote the sum of *n* A.M.'s between *a* and *b*, then *S*/*A* depends on

(a) *n*, *a*, *b* (b) *n*, *b* (c) *n*, *a* (d) *n*

33. The A.M. of series $a+(a+d)+(a+2d)+.....+(a+2nd)$ is

(a) $a+(n-1)d$ (b) $a+nd$ (c) $a+(n-1)d$ (d) None of these

34. If 11 AM's are inserted between 28 and 10, then three mid terms of the series are

(a) $\frac{41}{2},19,\frac{35}{2}$ (b) $20,\frac{41}{2},\frac{43}{2}$ (c) $20,\frac{61}{2},\frac{62}{3}$ (d) $20,\ 22,24$

35. If $f(x+y,x-y)=xy$, then the arithmetic mean of $f(x,y)$ and $f(y,x)$ is

(a) x (b) y (c) 0 (d) 1

36. If A.M. of the roots of a quadratic equation is $\frac{8}{5}$ and the A.M. of their reciprocals is $\frac{8}{7}$, then the quadratic equation is

(a) $7x^2+16x+5=0$ (b) $7x^2-16x+5=0$ (c) $5x^2-16x+7=0$ (d) $5x^2-8x+7=0$

37. If $a_1=0$ and $a_1, a_2, a_3, \ldots a_n$ are real numbers such that $|a_i|=|a_{i-1}+1|$ for all i, then A.M. of the numbers $a_1, a_2, \ldots a_n$ has the value x where

(a) $x<1$ (b) $x<-\frac{1}{2}$ (c) $x\geq-\frac{1}{2}$ (d) $x=\frac{1}{2}$

38. If A.M. of the numbers 5^{1+x} and 5^{1-x} is 13 then the set of possible real values of x is

(a) $\{5, \frac{1}{5}\}$ (b) $\{1,-1\}$ (c) $\{x \mid x^2-1 \mid =0, x\in R\}$ (d) None of these

39. If the sum of the roots of the equation $ax^2+bx+c=0$ be equal to the sum of the reciprocals of their squares, then bc^2, ca^2, ab^2 will be in

(a) A.P. (b) G.P. (c) H.P. (d) None of these

40. If $\frac{1}{b-c}, \frac{1}{c-a}, \frac{1}{a-b}$ be consecutive terms of an A.P., then $(b-c)^2, (c-a)^2, (a-b)^2$ will be in

(a) G.P. (b) A.P. (c) H.P. (d) None of these

41. If a^2, b^2, c^2 are in A.P., then $(b+c)^{-1}$, $(c+a)^{-1}$ and $(a+b)^{-1}$ will be in

(a) H.P. (b) G.P. (c) A.P. (d) None of these

42. If the sides of a right angled triangle are in A.P., then the sides are proportional to

(a) 1, 2, 3 (b) 2, 3, 4 (c) 3, 4, 5 (d) 4, 5, 6

43. If *a, b, c* are in A.P., then the straight line $ax+by+c=0$ will always pass through the point

(a) $(-1,-2)$ (b) $(1,-2)$ (c) $(-1,2)$ (d) $(1,2)$

44. If *a, b, c* are in A.P. then $\frac{(a-c)^2}{(b^2-ac)}=$

(a) 1 (b) 2 (c) 3 (d) 4

45. If *a, b, c, d, e, f* are in A.P., then the value of $e-c$ will be

(a) $2(c-a)$ (b) $2(f-d)$ (c) $2(d-c)$ (d) $d-c$

46. If *p, q, r* are in A.P. and are positive, the roots of the quadratic equation $px^2+qx+r=0$ are all real for

(a) $\left|\frac{r}{p}-7\right|\geq 4\sqrt{3}$ (b) $\left|\frac{p}{r}-7\right|<4\sqrt{3}$ (c) All *p* and *r* (d) No *p* and *r*

47. If $a_1, a_2, a_3, \ldots\ldots a_n$ are in A.P., where $a_i>0$ for all i, then the value of $\frac{1}{\sqrt{a_1}+\sqrt{a_2}}+\frac{1}{\sqrt{a_2}+\sqrt{a_3}}+\ldots\ldots+\frac{1}{\sqrt{a_{n-1}}+\sqrt{a_n}}=$

(a) $\frac{n-1}{\sqrt{a_1}+\sqrt{a_n}}$ (b) $\frac{n+1}{\sqrt{a_1}+\sqrt{a_n}}$ (c) $\frac{n-1}{\sqrt{a_1}-\sqrt{a_n}}$ (d) $\frac{n+1}{\sqrt{a_1}-\sqrt{a_n}}$

48. Given $a+d>b+c$ where *a, b, c, d* are real numbers, then

(a) *a, b, c, d* are in A.P. (b) $\frac{1}{a}, \frac{1}{b}, \frac{1}{c}, \frac{1}{d}$ are in A.P.

(c) $(a+b), (b+c), (c+d), (a+d)$ are in A.P. (d) $\frac{1}{a+b}, \frac{1}{b+c}, \frac{1}{c+d}, \frac{1}{a+d}$ are in A.P.

49. If *a, b, c* are in A.P., then $(a+2b-c)(2b+c-a)(c+a-b)$ equals

(a) $\frac{1}{2}abc$ (b) *abc* (c) 2 *abc* (d) 4 *abc*

50. If the roots of the equation $x^3-12x^2+39x-28=0$ are in A.P., then their common difference will be

(a) ± 1 (b) ± 2 (c) ± 3 (d) ± 4