EXERCISE-I

Arithmetic progression

1. If $2x, x+8, 3x+1$ are in A.P., then the value of x will be
(A) 3 (B) 7
(C) 5 (D) -2

2. 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) $2A$ (D) $2B$

3. If the 9^{th} term of an A.P. is 35 and 19^{th} is 75, then its 20^{th} terms will be
(A) 78 (B) 79
(C) 80 (D) 81

4. The 9^{th} term of the series $27+9+5\frac{2}{5}+3\frac{6}{7}+........$ will be
(A) $1\frac{10}{17}$ (B) $\frac{10}{17}$
(C) $\frac{16}{27}$ (D) $\frac{17}{27}$

5. If a, b, c are in A.P., then $\frac{(a-c)^2}{(b^2-ac)}=$
(A) 1 (B) 2
(C) 3 (D) 4

6. If $\log_3 2, \log_3(2^x-5)$ and $\log_3\left(2^x-\frac{7}{2}\right)$ are in A.P., then x is equal to
(A) $1, \frac{1}{2}$ (B) $1, \frac{1}{3}$
(C) $1, \frac{3}{2}$ (D) None of these

7. 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) 1/2

8. If n^{th} terms of two A.P.'s are $3n+8$ and $7n+15$, then the ratio of their 12^{th} terms will be
(A) 4/9 (B) 7/16
(C) 3/7 (D) 8/15

9. If $a_1=a_2=2, a_n=a_{n-1}-1\,(n>2)$, then a_5 is
(A) 1 (B) -1
(C) 0 (D) -2

10. If the numbers a, b, c, d, e form an A.P., then the value of $a-4b+6c-4d+e$ is
(A) 1 (B) 2
(C) 0 (D) None of these

11. The sixth 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) $x=\frac{8}{5}$ (B) $x=\frac{5}{4}$
(C) $x=2/3$ (D) None of these

12. 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

13. The sums of n terms of two arithmatic series are in the ratio $2n+3:6n+5$, then the ratio of their 13^{th} terms is
(A) 53 : 155 (B) 27 : 77
(C) 29 : 83 (D) 31 : 89

14. If a_m denotes the m^{th} term of an A.P. then $a_m =$

(A) $\frac{2}{a_{m+k}+a_{m-k}}$ (B) $\frac{a_{m+k}-a_{m-k}}{2}$

(C) $\frac{a_{m+k}+a_{m-k}}{2}$ (D) None of these

15. Let T_r be the r^{th} term of an A.P. for $r = 1, 2, 3, \ldots$. If for some positive integers m, n we have $T_m = \frac{1}{n}$ and $T_n = \frac{1}{m}$, then T_{mn} equals

(A) $\frac{1}{mn}$ (B) $\frac{1}{m}+\frac{1}{n}$

(C) 1 (D) 0

16. The maximum sum of the series $20+19\frac{1}{3}+18\frac{2}{3}+\ldots\ldots$ is

(A) 310 (B) 300

(C) 320 (D) None of these

17. The sum of the numbers between 100 and 1000 which is divisible by 9 will be

(A) 55350 (B) 57228

(C) 97015 (D) 62140

18. 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) $\frac{2n-1}{2m-1}$

19. The value of $\sum_{r=1}^{n} \log\left(\frac{a^r}{b^{r-1}}\right)$ is

(A) $\frac{n}{2}\log\left(\frac{a^n}{b^n}\right)$ (B) $\frac{n}{2}\log\left(\frac{a^{n+1}}{b^n}\right)$

(C) $\frac{n}{2}\log\left(\frac{a^{n+1}}{b^{n-1}}\right)$ (D) $\frac{n}{2}\log\left(\frac{a^{n+1}}{b^{n+1}}\right)$

20. The solution of the equation $(x+1)+(x+4)+(x+7)+\ldots\ldots+(x+28)=155$ is

(A) 1 (B) 2

(C) 3 (D) 4

21. The sum of all two digit numbers which, when divided by 4, yield unity as a remainder is

(A) 1190 (B) 1197

(C) 1210 (D) None of these

22. If S_n denotes the sum of n terms of an arithmetic progression, then the value of $(S_{2n} - S_n)$ is equal to

(A) $2S_n$ (B) S_{3n}

(C) $\frac{1}{3}S_{3n}$ (D) $\frac{1}{2}S_n$

23. The solution of $\log_{\sqrt{3}} x + \log_{\sqrt[4]{3}} x + \log_{\sqrt[6]{3}} x + \ldots\ldots + \log_{\sqrt[16]{3}} x = 36$ is

(A) $x = 3$ (B) $x = 4\sqrt{3}$

(C) $x = 9$ (D) $x = \sqrt{3}$

24. If S_k denotes the sum of first k terms of an arithmetic progression whose first term and common difference are a and d respectively, then S_{kn}/S_n be independent of n if

(A) $2a-d=0$ (B) $a-d=0$

(C) $a-2d=0$ (D) None of these

25. A series whose n^{th} term is $\left(\frac{n}{x}\right)+y$, the sum of r terms will be

(A) $\left\{\frac{r(r+1)}{2x}\right\}+ry$ (B) $\left\{\frac{r(r-1)}{2x}\right\}$

(C) $\left\{\frac{r(r-1)}{2x}\right\}-ry$ (D) $\left\{\frac{r(r+1)}{2y}\right\}-rx$

26. If the sum of the 10 terms of an A.P. is 4 times to the sum of its 5 terms, then the ratio of first term and common difference is

(A) $1:2$ (B) $2:1$

(C) $2:3$ (D) $3:2$

27. Three number are in A.P. such that their sum is 18 and sum of their squares is 158. The greatest number among them is

(A) 10 (B) 11

(C) 12 (D) None of these

28. If $\dfrac{3+5+7+\text{..........to n terms}}{5+8+11+\text{.........to 10 terms}}=7$, then the value of n is

(A) 35 (B) 36

(C) 37 (D) 40

29. If A_1, A_2 be two arithmetic means between $\dfrac{1}{3}$ and $\dfrac{1}{24}$, then their values are

(A) $\dfrac{7}{72},\dfrac{5}{36}$ (B) $\dfrac{17}{72},\dfrac{5}{36}$

(C) $\dfrac{7}{36},\dfrac{5}{72}$ (D) $\dfrac{5}{72},\dfrac{17}{72}$

30. If $\dfrac{a^{n+1}+b^{n+1}}{a^n+b^n}$ be the A.M. of a and b, then $n=$

(A) 1 (B) -1

(C) 0 (D) None of these

31. A number is the reciprocal of the other. If the arithmetic mean of the two numbers be $\dfrac{13}{12}$, then the numbers are

(A) $\dfrac{1}{4},\dfrac{4}{1}$ (B) $\dfrac{3}{4},\dfrac{4}{3}$

(C) $\dfrac{2}{5},\dfrac{5}{2}$ (D) $\dfrac{3}{2},\dfrac{2}{3}$

32. If A be an arithmetic mean between two numbers and S be the sum of n arithmetic means between the same numbers, then

(A) $S=nA$ (B) $A=nS$

(C) $A=S$ (D) None of these

33. The arithmetic mean of first n natural number

(A) $\dfrac{n-1}{2}$ (B) $\dfrac{n+1}{2}$

(C) $\dfrac{n}{2}$ (D) n

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

(A) $\dfrac{n(a+b)}{2}$ (B) $n(a+b)$

(C) $\dfrac{(n+1)(a+b)}{2}$ (D) $(n+1)(a+b)$

35. After inserting n A.M.'s between 2 and 38, the sum of the resulting progression is 200. The value of n is

(A) 10 (B) 8

(C) 9 (D) None of these

Geometric progression

36. The first and last terms of a G.P. are a and l respectively; r being its common ratio; then the number of terms in this G.P. is

(A) $\dfrac{\log l-\log a}{\log r}$ (B) $1-\dfrac{\log l-\log a}{\log r}$

(C) $\dfrac{\log a-\log l}{\log r}$ (D) $1+\dfrac{\log l-\log a}{\log r}$

37. If $\log_x a, a^{x/2}$ and $\log_b x$ are in G.P., then $x=$

(A) $-\log(\log_b a)$

(B) $-\log_a(\log_a b)$

(C) $\log_a(\log_e a)-\log_a(\log_e b)$

(D) $\log_a(\log_e b)-\log_a(\log_e a)$

38. If the roots of the cubic equation $ax^3+bx^2+cx+d=0$ are in G.P., then

(A) $c^3a=b^3d$ (B) $ca^3=bd^3$

(C) $a^3b=c^3d$ (D) $ab^3=cd^3$

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

(A) 6 (B) 36

(C) $\frac{4}{9}$ (D) $\frac{9}{4}$

40. 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

(A) – 1 (B) 2

(C) 4 (D) – 4

41. For a sequence $< a_n >, a_1 = 2$ and $\frac{a_{n+1}}{a_n} = \frac{1}{3}$.

Then $\sum_{r=1}^{20} a_r$ is

(A) $\frac{20}{2}[4 + 19 \times 3]$ (B) $3\left(1 - \frac{1}{3^{20}}\right)$

(C) $2(1 - 3^{20})$ (D) None of these

42. The solution of the equation $1 + a + a^2 + a^3 + ... + a^x = (1 + a)(1 + a^2)(1 + a^4)$ is given by x is equal to

(A) 3 (B) 5

(C) 7 (D) None of these

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

(A) 5 (B) 6

(C) 7 (D) 8

44. The sum of few terms of any ratio series is 728, if common ratio is 3 and last term is 486, then first term of series will be

(A) 2 (B) 1

(C) 3 (D) 4

45. The product of n positive numbers is unity. Their sum is

(A) A positive integer

(B) Equal to $n + \frac{1}{n}$

(C) Divisible by n

(D) Never less than

46. Three numbers are in G.P. such that their sum is 38 and their product is 1728. The greatest number among them is

(A) 18 (B) 16

(C) 14 (D) None of these

47. The sum of the series $3 + 33 + 333 + ... + n$ terms is

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

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

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

(D) None of these

48. The first term of a G.P. is 7, the last term is 448 and sum of all terms is 889, then the common ratio is

(A) 5 (B) 4

(C) 3 (D) 2

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

(A) 6 (B) 5

(C) 4 (D) 10

50. If n geometric means be inserted between a and b then the n^{th} geometric mean will be

(A) $a\left(\frac{b}{a}\right)^{\frac{n}{n-1}}$ (B) $a\left(\frac{b}{a}\right)^{\frac{n-1}{n}}$

(C) $a\left(\frac{b}{a}\right)^{\frac{n}{n+1}}$ (D) $a\left(\frac{b}{a}\right)^{\frac{1}{n}}$

51. If $A = 1 + r^z + r^{2z} + r^{3z} + ...\infty$, then the value of *r* will be

(A) $A(1 - A)^z$ (B) $\left(\frac{A-1}{A}\right)^{1/z}$

(C) $\left(\frac{1}{A} - 1\right)^{1/z}$ (D) $A(1 - A)^{1/z}$

52. $x = 1 + a + a^2 + ...\infty (a < 1)$

$y = 1 + b + b^2 ....\infty (b < 1)$

Then the value of $1 + ab + a^2b^2 + ...\infty$ is

(A) $\frac{xy}{x+y-1}$ (B) $\frac{xy}{x+y+1}$

(C) $\frac{xy}{x-y-1}$ (D) $\frac{xy}{x-y+1}$

53. The first term of a G.P. whose second term is 2 and sum to infinity is 8, will be

(A) 6 (B) 3

(C) 4 (D) 1

54. $0.4\dot{2}\dot{3} =$

(A) $\frac{419}{990}$ (B) $\frac{419}{999}$

(C) $\frac{417}{990}$ (D) $\frac{417}{999}$

55. If $y = x - x^2 + x^3 - x^4 + ...\infty$, then value of x will be

(A) $y + \frac{1}{y}$ (B) $\frac{y}{1+y}$

(C) $y - \frac{1}{y}$ (D) $\frac{y}{1-y}$

56. 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) $xy + yz = xz + y$ (D) $xy + xz = yz + x$

57. 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

(A) $\frac{x^2 - y^2}{x^2 + y^2}$ (B) $\frac{x^2 + y^2}{x^2 - y^2}$

(C) $\frac{x^2 - y}{x^2 + y}$ (D) $\frac{x^2 + y}{x^2 - y}$

58. If the sum of an infinite G.P. and the sum of square of its terms is 3, then the common ratio of the first series is

(A) 1 (B) $\frac{1}{2}$

(C) $\frac{2}{3}$ (D) $\frac{3}{2}$

59. 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

(A) $S\left(1 - \frac{a}{S}\right)^n$ (B) $S\left[1 - \left(1 - \frac{a}{S}\right)^n\right]$

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

60. 0.14189189189…. can be expressed as a rational number

(A) $\frac{7}{3700}$ (B) $\frac{7}{50}$

(C) $\frac{525}{111}$ (D) $\frac{21}{148}$

Harmonic progression

61. If 5^{th} term of a H.P. is $\frac{1}{45}$ and 11^{th} term is $\frac{1}{69}$, then its 16^{th} term will be

(A) 1/89 (B) 1/85

(C) 1/80 (D) 1/79

62. The first term of a harmonic progression is 1/7 and the second term is 1/9. The 12^{th} term is

(A) 1/19 (B) 1/29

(C) 1/17 (D) 1/27

63. If a, b, c are three distinct positive real numbers which are in H.P., then $\frac{3a+2b}{2a-b}+\frac{3c+2b}{2c-b}$ is
(A) Greater than or equal to 10
(B) Less than or equal to 10
(C) Only equal to 10
(D) None of these

64. If a, b, c, d are in H.P., then $ab+bc+cd$ is equal to
(A) $3ad$ (B) $(a+b)(c+d)$
(C) $3ac$ (D) None of these

65. If the 7^{th} term of a harmonic progression is 8 and the 8^{th} term is 7, then its 15^{th} term is
(A) 16 (B) 14
(C) $\frac{27}{14}$ (D) $\frac{56}{15}$

66. If the 7^{th} term of a H.P. is $\frac{1}{10}$ and the 12^{th} term is $\frac{1}{25}$, then the 20^{th} term is
(A) $\frac{1}{37}$ (B) $\frac{1}{41}$
(C) $\frac{1}{45}$ (D) $\frac{1}{49}$

67. If sixth term of a H.P. is $\frac{1}{61}$ and its tenth term is $\frac{1}{105}$, then first term of that H.P. is
(A) $\frac{1}{28}$ (B) $\frac{1}{39}$
(C) $\frac{1}{6}$ (D) $\frac{1}{17}$

68. In a H.P., p^{th} term is q and the q^{th} term is p. Then pq^{th} term is
(A) 0 (B) 1
(C) pq (D) $pq(p+q)$

69. The 4^{th} term of a H.P. is $\frac{3}{5}$ and 8^{th} term is $\frac{1}{3}$, then its 6^{th} term is
(A) $\frac{1}{6}$ (B) $\frac{3}{7}$
(C) $\frac{1}{7}$ (D) $\frac{3}{5}$

70. If H is the harmonic mean between p and q, then the value of $\frac{H}{p}+\frac{H}{q}$ is
(A) 2 (B) $\frac{pq}{p+q}$
(C) $\frac{p+q}{pq}$ (D) None of these

Relation between A.P., G.P. and H.P.

71. If a, b, c are in A.P. as well as in G.P., then
(A) $a=b\neq c$ (B) $a\neq b=c$
(C) $a\neq b\neq c$ (D) $a=b=c$

72. If a, b, c are in G.P. and x, y are the arithmetic means between a, b and b, c respectively, then $\frac{a}{x}+\frac{c}{y}$ is equal to
(A) 0 (B) 1
(C) 2 (D) $\frac{1}{2}$

73. If a, b, c are in A.P. and a, b, d in G.P., then $a, a-b, d-c$ will be in
(A) A.P. (B) G.P.
(C) H.P. (D) None of these

74. 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

75. If a, b, c are in A.P., then $\frac{1}{bc}, \frac{1}{ca}, \frac{1}{ab}$ will be in

(A) A.P. (B) G.P.
(C) H.P. (D) None of these

76. If $x, 1, z$ are in A.P. and $x, 2, z$ are in G.P., then $x, 4, z$ will be in

(A) A.P. (B) G.P.
(C) H.P. (D) None of these

77. If a, b, c are in A.P. and $|a|, |b|, |c| < 1$ and

$x = 1 + a + a^2 + ...\infty$

$y = 1 + b + b^2 + ...\infty$

$z = 1 + c + c^2 ....\infty$

Then x, y, z shall be in

(A) A.P. (B) G.P.
(C) H.P. (D) None of these

78. If three unequal non-zero real numbers a, b, c are in G.P. and $b - c, c - a, a - b$ are in H.P., then the value of $a + b + c$ is independent of

(A) a (B) b
(C) c (D) None of these

79. If a, b, c are in A.P., b, c, d are in G.P. and c, d, e are in H.P., then a, c, e are in

(A) No particular order
(B) A.P.
(C) G.P.
(D) H.P.

80. If a, b, c are in G.P., $a - b, c - a, b - c$ are in H.P., then $a + 4b + c$ is equal to

(A) 0 (B) 1
(C) -1 (D) None of these

81. If the ratio of two numbers be $9:1$, then the ratio of geometric and harmonic means between them will be

(A) $1:9$ (B) $5:3$
(C) $3:5$ (D) $2:5$

82. If a, b, c are in H.P.,

then $\frac{a}{b+c}, \frac{b}{c+a}, \frac{c}{a+b}$ are in

(A) A.P. (B) G.P.
(C) H.P. (D) None of these

83. If $\frac{x+y}{2}, y, \frac{y+z}{2}$ are in H.P.,

then x, y, z are in

(A) A.P. (B) G.P.
(C) H.P. (D) None of these

84. If the first and $(2n-1)^{th}$ terms of an A.P., G.P. and H.P. are equal and their n^{th} terms are respectively a, b and c, then

(A) $a \geq b \geq c$ (B) $a + c = b$
(C) $ac - b^2 = 0$ (D) (A) and (C) both

85. An A.P., a G.P. and a H.P. have the same first and last terms and the same odd number of terms. The middle terms of the three series are in

(A) A.P. (B) G.P.
(C) H.P. (D) None of these

86. If $,a, b, c$ be in G.P. and $a + x, b + x, c + x$ in H.P., then the value of x is (a, b, c are distinct numbers)

(A) c (B) b
(C) a (D) None of these

87. If $\frac{a+b}{1-ab}, b, \frac{b+c}{1-bc}$ are in A.P.,

then $a, \frac{1}{b}, c$ are in

(A) A.P. (B) G.P.
(C) H.P. (D) None of these

88. If all the terms of an A.P. are squared, then new series will be in

(A) A.P. (B) G.P.
(C) H.P. (D) None of these

89. If $2(y-a)$ is the H.M. between $y-x$ and $y-z$, then $x-a, y-a, z-a$ are in

(A) A.P. (B) G.P.
(C) H.P. (D) None of these

90. If the ratio of A.M. between two positive real numbers a and b to their H.M. is $m:n$, then $a:b$ is

(A) $\frac{\sqrt{m-n}+\sqrt{n}}{\sqrt{m-n}-\sqrt{n}}$ (B) $\frac{\sqrt{n}+\sqrt{m-n}}{\sqrt{n}-\sqrt{m-n}}$
(C) $\frac{\sqrt{m}+\sqrt{m-n}}{\sqrt{m}-\sqrt{m-n}}$ (D) None of these

91. If $a^x = b^y = c^z$ and a, b, c are in G.P. then x, y, z are in

(A) A. P. (B) G. P.
(C) H. P. (D) None of these

92. If G_1 and G_2 are two geometric means and *A* the arithmetic mean inserted between two numbers, then the value of $\frac{G_1^2}{G_2}+\frac{G_2^2}{G_1}$ is

(A) $\frac{A}{2}$ (B) *A*
(C) 2 *A* (D) None of these

93. If $\log(x+z)+\log(x+z-2y)=2\log(x-z)$, then x, y, z are in

(A) H.P. (B) G.P.
(C) A.P. (D) None of these

94. If $\frac{a}{b+c}, \frac{b}{c+a}, \frac{c}{a+b}$ are in H.P., then a, b, c are in

(A) A.P. (B) G.P.
(C) H.P. (D) None of these

95. If *a,b,c* are in A.P., then $\frac{1}{\sqrt{a}+\sqrt{b}}, \frac{1}{\sqrt{a}+\sqrt{c}}, \frac{1}{\sqrt{b}+\sqrt{c}}$ are in

(A) A.P. (B) G.P.
(C) H.P. (D) None of these

96. If $\frac{a}{b}, \frac{b}{c}, \frac{c}{a}$ are in H.P., then

(A) a^2b, c^2a, b^2c are in A.P.
(B) a^2b, b^2c, c^2a are in H.P.
(C) a^2b, b^2c, c^2a are in G.P.
(D) None of these

97. If *A* is the A.M. of the roots of the equation $x^2-2ax+b=0$ and G is the G.M. of the roots of the equation $x^2-2bx+a^2=0$, then

(A) $A > G$ (B) $A \neq G$
(C) $A = G$ (D) None of these

98. If *A* and *G* are arithmetic and geometric means and $x^2-2Ax+G^2=0$, then

(A) $A = G$ (B) $A > G$
(C) $A < G$ (D) $A = -G$

99. If ln $(a+c)$, In $(c-a)$, In $(a-2b+c)$ are in A.P., then

(A) a, b, c are in A.P.
(B) a^2, b^2, c^2 are in A.P.
(C) a, b, c are in G.P.
(D) a, b, c are in H.P

100. If the altitudes of a triangle are in A.P., then the sides of the triangle are in

(A) A.P.
(B) H.P.
(C) G.P.
(D) Arithmetico-geometric progression

101. If a, b, c are in G.P. then $\log_a x, \log_b x, \log_c x$ are in

(A) A.P. (B) G.P.
(C) H.P. (D) None of these

102. If a, b, c are three unequal numbers such that a, b, c are in A.P. and *b − a, c − b, a* are in G.P., then *a* : *b* : *c* is

(A) 1 : 2 : 3 (B) 2: 3 : 1
(C) 1 : 3 : 2 (D) 3 : 2 : 1

103. If $(y-x)$, $2(y-a)$ and $(y-z)$ are in H.P., then $x-a$, $y-a$, $z-a$ are in

(A) A.P. (B) G.P.
(C) H.P. (D) None of these

104. If a, b, c are in A.P. and a^2, b^2, c^2 are in H.P., then

(A) $a \neq b \neq c$
(B) $a^2 = b^2 = \frac{c^2}{2}$
(C) a, b, c are in G.P.
(D) $\frac{-a}{2}, b, c$ are in G.P

105. If $a_1, a_2, ...a_n$ are positive real numbers whose product is a fixed number *c*, then the minimum value of $a_1 + a_2 + ... + a_{n-1} + 2a_n$ is

(A) $n(2c)^{1/n}$ (B) $(n+1)c^{1/n}$
(C) $2nc^{1/n}$ (D) $(n+1)(2c)^{1/n}$

Arithmetic geometric progression, Method of difference

106. $2+4+7+11+16+......$ to n terms =

(A) $\frac{1}{6}(n^2+3n+8)$ (B) $\frac{n}{6}(n^2+3n+8)$
(C) $\frac{1}{6}(n^2-3n+8)$ (D) $\frac{n}{6}(n^2-3n+8)$

107. Sum of *n* terms of series $12+16+24+40+.....$ will be

(A) $2(2^n-1)+8n$ (B) $2(2^n-1)+6n$
(C) $3(2^n-1)+8n$ (D) $4(2^n-1)+8n$

108. If a, b, c are in H.P., then which one of the following is true

(A) $\frac{1}{b-a}+\frac{1}{b-c}=\frac{1}{b}$ (B) $\frac{ac}{a+c}=b$
(C) $\frac{b+a}{b-a}+\frac{b+c}{b-c}=1$ (D) None of these

109. The sum of the series $1+\frac{1.3}{6}+\frac{1.3.5}{6.8}+....\infty$ is

(A) 1 (B) 0
(C) ∞ (D) 4

110. n^{th} term of the series $2+4+7+11+.......$ will be

(A) $\frac{n^2+n+1}{2}$ (B) n^2+n+2
(C) $\frac{n^2+n+2}{2}$ (D) $\frac{n^2+2n+2}{2}$

111. The sum of the series $1+2x+3x^2+4x^3+.........$ upto n terms is

(A) $\frac{1-(n+1)x^n+nx^{n+1}}{(1-x)^2}$ (B) $\frac{1-x^n}{1-x}$
(C) x^{n+1} (D) None of these

112. The sum of the first n terms of the series $\frac{1}{2}+\frac{3}{4}+\frac{7}{8}+\frac{15}{16}+.........$ is

(A) 2^n-n-1 (B) $1-2^{-n}$
(C) $n+2^{-n}-1$ (D) 2^n-1

113. The sum of $1+\frac{2}{5}+\frac{3}{5^2}+\frac{4}{5^3}+..........$ upto n terms is

(A) $\frac{25}{16}-\frac{4n+5}{16\times 5^{n-1}}$ (B) $\frac{3}{4}-\frac{2n+5}{16\times 5^{n+1}}$
(C) $\frac{3}{7}-\frac{3n+5}{16\times 5^{n-1}}$ (D) $\frac{1}{2}-\frac{5n+1}{3\times 5^{n+2}}$

114. $2^{1/4}.4^{1/8}.8^{1/16}.16^{1/32}..........$ is equal to

(A) 1 (B) 2
(C) $\frac{3}{2}$ (D) $\frac{5}{2}$

115. The sum of $i-2-3i+4+.........$ upto 100 terms, where $i=\sqrt{-1}$ is

(A) $50(1-i)$ (B) $25i$
(C) $25(1+i)$ (D) $100(1-i)$

n^{th} term of special series, Sum to n terms and Infinite number of terms

116. The sum of the series $1^2.2+2^2.3+3^2.4+........$ to n terms is

(A) $\frac{n^3(n+1)^3(2n+1)}{24}$

(B) $\frac{n(n+1)(3n^2+7n+2)}{12}$

(C) $\frac{n(n+1)}{6}[n(n+1)+(2n+1)]$

(D) $\frac{n(n+1)}{12}[6n(n+1)+2(2n+1)]$

117. The sum of the series $1.2.3+2.3.4+3.4.5+.......$ to n terms is

(A) $n(n+1)(n+2)$

(B) $(n+1)(n+2)(n+3)$

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

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

118. The sum of $1^3+2^3+3^3+4^3+.....+15^3$,is

(A) 22000 (B) 10,000

(C) 14,400 (D) 15,000

119. Sum of the squares of first n natural numbers exceeds their sum by 330, then $n=$

(A) 8 (B) 10

(C) 15 (D) 20

120. 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

121. Sum of the n terms of the series $\frac{3}{1^2}+\frac{5}{1^2+2^2}+\frac{7}{1^2+2^2+3^2}+...$ is

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

(C) $\frac{6n}{n+1}$ (D) $\frac{9n}{n+1}$

122. The sum of the series $1.3.5+.2.5.8+3.7.11+.........$ upto 'n' terms is

(A) $\frac{n(n+1)(9n^2+23n+13)}{6}$

(B) $\frac{n(n-1)(9n^2+23n+12)}{6}$

(C) $\frac{(n+1)(9n^2+23n+13)}{6}$

(D) $\frac{n(9n^2+23n+13)}{6}$

123. Sum of the series $\frac{2}{3}+\frac{8}{9}+\frac{26}{27}+\frac{80}{81}+.....$ to n terms is

(A) $n-\frac{1}{2}(3^n-1)$ (B) $n+\frac{1}{2}(3^n-1)$

(C) $n+\frac{1}{2}(1-3^{-n})$ (D) $n+\frac{1}{2}(3^{-n}-1)$

124. $\sum_{m=1}^{n}m^2$ is equal to

(A) $\frac{m(m+1)}{2}$

(B) $\frac{m(m+1)(2m+1)}{6}$

(C) $\frac{n(n+1)(2n+1)}{6}$

(D) $\frac{n(n+1)}{2}$

125. The sum of n terms of the following series $1.2+2.3+3.4+4.5+.........$ shall be

(A) n^3

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

(C) $\frac{1}{6}n(n+1)(n+2)$

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

126. $11^3+12^3+....+20^3$

(A) Is divisible by 5

(B) Is an odd integer divisible by 5

(C) Is an even integer which is not divisible by 5

(D) Is an odd integer which is not divisible by 5

127. The sum to n terms of the infinite series $1.3^2+2.5^2+3.7^2+.........\infty$ is

(A) $\frac{n}{6}(n+1)(6n^2+14n+7)$

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

(C) $4n^3+4n^2+n$

(D) None of these

128. If the n^{th} term of a series be $3+n(n-1)$, then the sum of n terms of the series is

(A) $\frac{n^2+n}{3}$ (B) $\frac{n^3+8n}{3}$

(C) $\frac{n^2+8n}{5}$ (D) $\frac{n^2-8n}{3}$

129. The sum to n terms of $(2n-1)+2(2n-3)+3(2n-5)+.....$ is

(A) $(n+1)(n+2)(n+3)/6$

(B) $n(n+1)(n+2)/6$

(C) $n(n+1)(2n+3)$

(D) $n(n+1)(2n+1)/6$

130. First term of the 11^{th} group in the following groups (1), (2, 3, 4), (5, 6, 7, 8, 9),……….is

(A) 89 (B) 97

(C) 101 (D) 123