TEST -1
CLASS 10+1
ARITHMETRIC PROGRESSION

1.If the pth term of an A.P. is q and the qth term is p, prove that its nth term is (p+q-n).

2.If 10 times the 10^{th} term of an A.P. is equal to 15 times the 15^{th} term , show that 25^{th} term of the A.P. is zero.

3.The 4^{th} term of an A.P. is three times the first and 7^{th} term exceeds twice the third term by 1. Find the first term and common difference.

4.The sum of the first four terms of an A.P. is 56. The sum of the last four terms is 112.If its first term is 11, then find the number of terms.

5.If the sum of first m terms of an A.P. is the same as the same as the sum of its n terms, show that the sum of its (m+n) terms is zero.

6.The sum of n terms of two A.P. are in the ratio (3n+8) : (7n+15).Find the ratio of their 12^{th} terms.

7.Find the sum of all integers between 84 and 719 ,which are divisible by 5.

8. Between 1 and 31 are inserted m A.M. so that the ratio of the 7^{th} and (m-1)th means is 5:9. Find the value of m.

9. Find the four numbers in A.P. whose sum is 50 and in which the greastest number is 4 times the least.

10. If $\frac{b+c-a}{a},\frac{c+a-b}{b},\frac{a+b-c}{c}$ are in A.P. prove that $\frac{1}{a},\frac{1}{b},\frac{1}{c}$ are also in A.P.

11. If a,b,c are in A.P. then prove that $a^3+4b^3+c^3=3b\left(a^2+c^2\right)$.

12.Divide 32 into four parts which are in A.P. such that the product of extremes is to the product of means is 7:15.

13. If the sum of n terms of an A.P. is $3n^2+5n$ and its mth term is 164, find the value of m.

14.Find the sum of first 20 terms of an A.P. in which 3^{rd} term is 7 and 7^{th} term is two more than thrice of its 3^{rd} term.

15.In an A.P. the first term is 2 and sum of the first five terms is one fourth of the next five terms. Show that 20th term is -112.

GEOMETRIC PROGRESSIONS

16.Which term of the G.P. $\sqrt{3},3,3\sqrt{3}.....$ is 729 ? .

17.In a G.P. the 3rd term is 24 and the 6th term is 192. Find the 10th term.

18.Find four numbers forming a G.P. in which the 3rd term is greater than the 1st term by 9, and 2nd term is greater than the 4th by 18.

19.If the pth , qth and rth terms of a G.P. are a,b and c resp. ,prove that $a^{q-r}.b^{r-p}.c^{p-q}=1$.

20.Find the sum of series 0.7 + 0.77 + 0.777 + ……..to n terms.

21.The sum of first three terms of a G.P. is 16 and the sum of the next three terms is 128. Find the sum of n terms of the G.P.

22. The sum of two positive numbers is 6 times their G.M. ,show that the numbers are in the ratio $\frac{3+2\sqrt{2}}{3-2\sqrt{2}}$.

23.Find two positive numbers whose difference is 12 and whose A.M. exceeds the G.M. by 2.

24.If a,b,c are in G.P. and the eqns $ax^2+2bx+c=0$ and $dx^2+2ex+f=0$ $dx^2+2ex+f=0$ have a common root, then show that $\frac{d}{a},\frac{e}{b},\frac{f}{c}$ are in A.P.

25.If pth, qth, rth , sth terms of A.P. are in G.P., then show that (p-q), (q-r) (r-s) are also in G.P.

26.If $\frac{a+bx}{a-bx}=\frac{b+cx}{b-cx}=\frac{c+dx}{c-dx}$ (x ≠ 0) ,then show that a,b,c and d are in G.P.

27.The sum of three numbers in G.P. is 14. If the first two terms are each increased by 1 and the third term decreased by 1, the resulting numbers are in A.P. Find the numbers.

28.In an increasing G.P. the sum of the first and the last term is 66, the product of the second and the last but one is 128 and the sum of the terms is 126.How many terms are there in the progression ?

29.If S be the sum , P the product and R the sum of the reciprocals of n terms of a G.P., prove that $\left(\frac{S}{R}\right)^n = P^2$.

30.Find the sum of 2n terms of the series whose every even term is 'a' times the term before it and every odd term is 'c' times the term before it , the first term being unity.

31.If a and b are the roots of $x^2 - 3x + p = 0$ and c,d are the roots $x^2 - 12x + q = 0$, where a,b,c,d form a G.P. Prove that $\frac{q+p}{q-p} = \frac{17}{15}$.

32.If a,b,c are in G.P. then prove that $\log a^n, \log b^n, lobc^n$ are in A.P.

33.If a,b,c are in G.P. and x,y are the A.M. of a,b and b,c resp. then prove that $\frac{a}{x} + \frac{c}{y} = 2, \frac{1}{x} + \frac{1}{y} = \frac{2}{b}$.

34.If a,b,c are in G.P. and $a^{\frac{1}{x}} = b^{\frac{1}{y}} = c^{\frac{1}{z}}$, prove that x,y,z are in A.P.

35.If a,b,c are in A.P. , b,c,d are in G.P. and $\frac{1}{c}, \frac{1}{d}, \frac{1}{e}$ are in A.P , prove that a,c,e are in G.P.

36. If a,b,c are three distinct real numers in G.P. and a+b+c=xb ,then prove that either x<-1 or x>3.