Std. : IX **SEQUENCE AND SERIES** **Time: 1.30 Hrs.**

Subject: MATHEMATICS **Marks: 50 Marks**

I. Choose the best answer: **[6 x 1 = 6]**

1. Two A.Ps have same common difference. If the difference between their 100^{th} terms is 111222333 then the difference between their millionth terms is a)123 b) 112233 c) 111222333 d)112333
2. The three non-zero numbers a, b, c are in A.P. if and only if ___ a) 2b= a + c b) 2b= a - c c) a = b + c d) c = b - a
3. When each term of a sequence G.P. is added or subtracted by a constant, then the resulting sequence is also ___ a) an A.P. b) Neither A.P nor G.P c) a G.P d) none
4. In the sequence whose $t_n = \frac{3n-2}{4}$; $n \in N$ the first term of the sequence is___

a) $\frac{1}{4}$ b) $\frac{3}{4}$ c) $\frac{1}{2}$ d) 1

5. $1^3 + 2^3 + 3^3 + \cdots + 10^3$ is ___ a) 44^2 b) 33^2 c) 55^2 d) 66^2
6. The sequence -3,-3,-3,... is ___ a) an A.P.only b) Neither A.P nor G.P c) a G.P. only d) either A.P or G.P

II. Answer **ANY 7** questions. Question No. **15** is **Compulsory** : **[7 x 2 = 14]**

7. Check whether the sequence $5\sqrt{2}, 4\sqrt{2}, 3\sqrt{2}, 2\sqrt{2}, \ldots$ in A.P or not?
8. Find the sum of first 15 terms of the sequence $8, 7\frac{1}{4}, 6\frac{1}{2}, 5\frac{3}{4}, \ldots$
9. Which term of an A.P. 16,11,6,1, ... is -54?
10. Find a_8 and a_{15} whose n^{th} term is $a_n = \begin{cases} \frac{n^2-1}{n+3} ; n \text{ is even}, & n \in N \\ \frac{n^2}{2n+1} ; n \text{ is odd}, & n \in N \end{cases}$
11. If $3 + k, 18 - k, 5k + 1$ are in A.P. then find k.
12. Find the number of terms in the G.P. $\frac{1}{3}, \frac{1}{9}, \frac{1}{27}, \ldots, \frac{1}{2187}$
13. How many terms of the series 1+5+9+... must be taken so that their sum is 190?
14. Find the sum of $15^2 + 16^2 + 17^2 + \cdots + 28^2$
15. If a, b, c are three consecutive terms of an A.P. and x, y, z are three consecutive terms of a G.P. then prove that $x^{b-c} \times y^{c-a} \times z^{a-b} = 1$.

III. Answer **ANY 6** questions. Question No. **20** is **Compulsory** : **[6 x 5 = 30]**

16. Find the sum of $0.40 + 0.43 + 0.46 + \cdots + 1$.
17. The sum of four consecutive terms that are in A.P. is 28 and their sum of their squares is 276. Find the four terms.
18. In a G.P. the 9^{th} term is 32805 and 6^{th} term is 1215. Find the 12^{th} term.
19. The sum of first $n, 2n$ and $3n$ terms of an A.P. are S_1, S_2 and S_3 respectively. Prove that $S_3 = 3(S_2 - S_1)$.
20. The present value of a machine is Rs. 40,000 and its value depreciates each year by 10%. Find the estimated value of the machine in the 6^{th} year.
21. The product of three consecutive terms of a G.P. is 27 and the sum of the product of two terms taken at a time is $\frac{57}{2}$. Find the three terms.
22. Find the sum to n terms of the series $5 + 55 + 555 + \cdots$
23. a) Find the rational form of the number $0.\overline{6}$
    b) Rekha has 15 square colour papers of sizes 10 cm, 11 cm, 12 cm, ... , 24 cm. How much area can be decorated with these colour papers?

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