EDUCATION DEPARTMENT, VILLUPURAM DISTRICT.

Class : X | **UNIT TEST** | Marks: 50

Subject: **Mathematics** | **UNIT 2 - Numbers and Sequences** | Time: 1½ hrs.

I. Choose the correct answer. 7×1=7

1. Euclid's division lemma states that for positive integers a and b, there exist unique integers q and r such that a = bq +r, where r must satisfy.

a) $1 < r < b$ b) $0 > r > b$ c) $0 \le r < b$ d) $0 < r \le b$

2. Using Euclid's division lemma, if the cube of any positive integer is divided by 9 then the possible remainders are

a) 0, 1, 8 b) 1, 4, 8 c) 0, 1, 3 d) 1, 3, 5

3. The sum of the exponents of the prime factors in the prime factorization of 1729 is

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

4. The first term of an arithmetic progression is unity and the common difference is 4. Which of the following will be a term of this A.P.

a) 4551 b) 10091 c) 7881 d) 13531

5. If 6 times of 6th term of an A.P. is equal to 7 times the 7th term, then the 13th term of the A.P. is

a) 0 b) 6 c) 7 d) 13

6. The next term of the sequence 3

a) 124 b) 127 c) 23 d) 181

7. If the sequence $t_1, t_2, t_3, \ldots$ are in A.P. then the sequence $t_6, t_{12}, t_{18}, \ldots$ is

a) a Geometric Progression

b) an Arithmetic Progression

c) neither an Arithmetic Progression nor a Geometric Progression

d) a constant sequence

II. Answer the following questions. (any 5) 5×2=10

1. If the Highest Common Factor of 210 and 55 is expressible in the form $55x - 325$, find x.
2. 'a' and 'b' are two positive integers such that $a^b \times b^a = 800$. Find 'a' and 'b'.
3. Find the least positive value of x such that (i) $71 \equiv x \pmod 8$ (ii) $78 + x \equiv 3 \pmod 5$
4. Find a_8 and a_{15} whose nth term is

$$a_n = \begin{cases} \dfrac{n^2-1}{n+3} & ; n \text{ is even}, \quad n \in N \\ \dfrac{n^2}{2n+1} & ; n \text{ is odd}, \quad n \in N \end{cases}$$

5. If nine times ninth term is equal to the fifteen times fifteenth term, show that six times twenty fourth term is zero.

6. Find the sum to infinity of $9 + 3 + 1 + ...$

7. Find the sum of the following series: $1 + 4 + 9 + 16 + ... + 225$

III. Answer the following questions. (any 5) **5×5=25**

1. Find the HCF of 396, 504, 636.
2. In an A.P., sum of four consecutive terms is 28 and their sum of their squares is 276. Find the four numbers.
3. Determine the general term of an A.P. whose 7th term is −1 and 16th term is 17.
4. Find the sum of all natural numbers between 300 and 600 which are divisible by 7.
5. In a G.P. the product of three consecutive terms is 27 and the sum of the product of two terms taken at a time is $\frac{57}{2}$. Find the three terms.
6. Find the sum to n terms of the series $3 + 33 + 333 + ...$ to n terms.
7. 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?

IV. Answer the following question. **1×8=8**

1. a) Construct a triangle similar to a given triangle PQR with its sides equal to $\frac{7}{3}$ of the corresponding sides of the triangle PQR (scale factor $\frac{7}{3} > 1$).

(OR)

b) Construct a ΔPQR such that QR = 6.5 cm, ∠P = 60° and the altitude from P to QR is of length 4.5 cm.

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