

**10 - Std UNIT TEST - I - 2022**

Time : 1.30 Hrs

**MATHEMATICS**

Marks : 50

5x1=5

**I Choose the correct answer.**

- If there are 1024 relations from a set  $A = \{1, 2, 3, 4, 5\}$  to a set  $B$ , then the number of element in  $B$  is  
a) 3                      b) 2                      c) 4                      d) 8
- Let  $A = \{1, 2, 3, 4\}$  and  $B = \{4, 8, 9, 10\}$  A function  $f : A \rightarrow B$  given by  $f = \{(1, 4), (2, 8), (3, 9), (4, 10)\}$  is a  
a) Many - one function    b) identity function  
c) one - to - one function    d) Into function
- The sum of the exponents of the prime factors in the prime factorization of 1729 is    a) 1    b) 2    c) 3    d) 4
- The next term of the sequence  $3/16, 1/8, 1/12, 1/18, \dots$  is    a)  $1/24$     b)  $1/27$     c)  $2/3$     d)  $1/81$
- If  $f$  is an identity function, then the value of  $f(1) - 2f(2) + f(3)$  is    a) 1    b) 0    c) -1    d) -3

**II Answer any five of the following questions.****Question No. 13 is compulsory.**

5 x 2 = 10

- If  $B \times A = \{(-2, 3), (-2, 4), (0, 3), (0, 4), (3, 3), (3, 4)\}$  find  $A$  and  $B$ .
- A relation  $R$  is given by the set  $\{(x, y)/y = x + 3, x \in \{0, 1, 2, 3, 4, 5\}\}$ . Determine its domain and range.
- A relation  $f : x \rightarrow y$  defined by  $f(x) = x^2 - 2$  where  $x = \{-2, -1, 0, 3\}$  and  $y = R$ . List the element of  $f$ .
- Find  $k$  if  $f \circ f(k) = 5$  where  $f(k) = 2k - 1$ .
- Find the least positive value of  $x$  such that  $89 \equiv (x + 3) \pmod{4}$ .
- Find the indicated terms of sequences whose  $n^{\text{th}}$  term is given by  $a_n = 5^n / n + 2$ ;  $a_6$  and  $a_{13}$
- Find the sum of 102, 97, 92, ... up to 27 terms.
- i) Write an A.P. whose first term is 5 and common difference is 0. (ii) Write a G.P. whose first term is 5 and common ratio is 1.

III Answer any five of the following questions. Question No. 21 is compulsory. www.Padasalai.Net  
 $5 \times 5 = 25$

14. Let  $A = \{1, 2, 3, 4\}$  and  $B = \{2, 5, 8, 11, 14\}$  be two sets. Let  $f : A \rightarrow B$  be a function give by  $f(x) = 3x - 1$ . Represent this function.
15. A function  $f$  is defined by  $f(x) = 2x - 3$   
i)  $\frac{f(0) + f(1)}{2}$     ii) Find  $x$  such that  $f(x) = 0$   
iii) Find  $x$  such that  $f(x) = x$ .  
iv) Find  $x$  such that  $f(x) = f(1 - x)$ .
16.  $f(x) = x - 1$ ,  $g(x) = 3x + 1$  and  $h(x) = x^2$ . Show that  $(f \circ g) \circ h = f \circ (g \circ h)$ .
17. Find the HCF of 396, 504, 636.
18. 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  $x^{b-c} \times y^{c-a} \times z^{a-b} = 1$ .
19. Find the sum of the Geometric series  $3 + 6 + 12 + \dots + 1536$ .
20. Rekha has 15 square colour papers of sizes 10cm, 11cm, 12cm, ..... 24cm. How much area can be decorated with these colour papers.
21. If  $A = \{4, 5, 6, 7\}$ ,  $B = \{6, 7, 8, 9\}$ ,  $C = \{0, 1, 2, 3\}$  and  $D = \{1, 3, 5\}$  find (i)  $(A - B) \times (C - D)$  (ii)  $(A \cup B) \times (C \cap D)$ .

IV Answer the following.  $2 \times 5 = 10$

22. Construct a triangle similar to a given triangle LMN with its sides equal to  $\frac{4}{5}$  of the corresponding sides of the triangle LMN. (Scale factor  $\frac{4}{5} < 1$ ). (OR)  
Draw a triangle ABC of base BC 5.6cm  $\angle A = 40^\circ$  and the bisector of  $\angle A$  meets BC at D such that CD = 4cm.
23. Graph the following linear function  $y = \frac{1}{2}x$ . Identify the constant of variation and verify its with the graph. Also (i) find  $y$  when  $x = 9$ . (ii) find  $x$  when  $y = 7.5$ . (OR)  
Graph the quadratic equation of  $(2x - 3)(x + 2) = 0$  and state is nature of solution.