

Register Number :

010301

## FIRST MID TERM EXAMINATION - 2024

Std: 10

MATHEMATICS

Marks : 50

Time : 1.30 hr

## PART - I

## A. Choose the correct answer

7x1=7

1. If  $\{(a, 8), (6, b)\}$  represents an identity function, then the value of  $a$  and  $b$  are respectively

- a) (8, 6)                      b) (8, 8)                      c) (6, 8)                      d) (6, 6)

2. If  $g = \{(1, 1), (2, 3), (3, 5), (4, 7)\}$  is a function given by  $g(x) = \alpha x + \beta$  then the values of  $\alpha$  and  $\beta$  are

- a) (-1, 2)                      b) (2, -1)                      c) (-1, -2)                      d) (1, 2)

3. The next term of the sequences ..... is  $\frac{3}{16}, \frac{1}{18}, \frac{1}{12}, \frac{1}{18}$

- a)  $\frac{1}{24}$                       b)  $\frac{1}{27}$                       c)  $\frac{2}{3}$                       d)  $\frac{1}{18}$

4.  $7^{4k} = \underline{\hspace{2cm}}$  (MOD 100)

- a) 1                      b) 2                      c) 8                      d) 4

5. The least number that is divisible by all the numbers from, to 10 (Both Inclusive)

- a) 2025                      b) 5220                      c) 5025                      d) 2520

6. Eculcid's division lemma states that for positive integers  $a$  and  $b$ , there exist unique integers  $q$  and  $r$  such that  $a = bq + r$  where  $r$  raurt identify.

- a)  $1 < r < b$                       b)  $0 < r < b$                       c)  $0 \leq r < b$

7. Sum to infinite number of terms of a G.P. is

- a)  $\frac{a(r^n - 1)}{r - 1}$                       b)  $\frac{a}{1 - r}$                       c)  $\frac{a(1 - r^n)}{1 - r}$                       d)  $\frac{n}{2}(a + l)$

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**PART - B (5x2=10)**

**B. Answer any five of the following question no 14 is compulsory**

8. Let  $A = \{1, 2, 3\}$  and  $B = \{x/x \text{ is a prime number less than } 10\}$ .

Find  $A \times B$  and  $B \times A$

9. Find  $f \circ g$  and  $g \circ f$  when  $f(x) = 2x + 1$  and  $g(x) = x^2 - 2$

10. What is the time after 100 hours at 7 am

11. 'a' and 'b' are two positive integers such that  $a^b \times b^a = 800$ . Find 'a' and 'b'

12. Find the 9<sup>th</sup> term of an A.P, -11, -15, -19, .....

13. Find the number of terms in the following G.P.

i) 4, 8, 16, ....., 8192?

14. Find the sum of infinity of  $9 + 3 + 1 + \dots$

**PART - C (5x5=25)**

**C. Answer any five of the following question no 21 is compulsory**

15. Let  $A = \{x \in \mathbb{N} / 1 < x < 4\}$ ,  $B = \{x \in \mathbb{W} / 0 < x < 2\}$  and  $C = \{x \in \mathbb{N} / x < 3\}$  then verify that  $A \times (B \cup C) = (A \times B) \cup (A \times C)$

16. The sum of three consecutive terms that are in A.P. is 27 and their product is 288. Find the three terms.

17. Find the first five terms of the following sequence.

$$a_1 = 1, a_2 = 1, a_n = \frac{a_{n-1}}{a_{n-2} + 3}; n \geq 3, n \in \mathbb{N}$$

18. Find the sum to n terms of the series  $5 + 55 + 555 + \dots$

19. Represent each of the following given relations by (a) an arrow diagram, (b) a graph and (c) a set in roster form, whenever possible.

$$\{(x, y) / x = 2y, x \in \{2, 3, 4, 5\}, y \in \{1, 2, 3, 4\}\}$$

**PART - D (1x8=8)**

20. Find the sum of all natural numbers between 300 and 600 which are divisible by 7.

21. Rekha has 15 square colour papers of sides 10cm, 11cm, 12cm, ....., 24cm. How much area can be decorated with these colour papers?

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PART - D

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22 (a)  $PQR \Rightarrow \frac{2}{5} < 1$  (100)

(b)  $PQR \Rightarrow \frac{7}{4} > 1$