

FIRST MID TERM TEST - 2024

Roll - 10826

Standard X

MATHEMATICS

Reg.No. 10826

Part - I

Marks : 50

Time : 1.30 hrs

I. Choose the correct answer:

1. $A = \{a, b, p\}$, $B = \{2, 3\}$, $C = \{p, q, r, s\}$, then $n[(A \cup C) \times B]$ is
 a) 8 b) 20 c) 12 d) 16
2. If $f: A \rightarrow B$ is a bijective function and if $n(B) = 7$, then $n(A)$ is equal to
 a) 7 b) 49 c) 1 d) 14
3. $f(x) = (x+1)^3 - (x-1)^3$ represents a function which is
 a) linear b) cubic c) reciprocal d) quadratic
4. The least number that is divisible by all the numbers from 1 to 10 (both inclusive) is
 a) 2025 b) 5220 c) 5025 d) 2520
5. Given $F_1 = 1$, $F_2 = 3$, $F_n = F_{n-1} + F_{n-2}$ then F_5 is
 a) 3 b) 5 c) 8 d) 11
6. The solution of the system $x + y - 3z = -6$, $-7y + 7z = 7$, $3z = 9$ is
 a) $x = 1, y = 2, z = 3$ b) $x = -1, y = 2, z = 3$
 c) $x = -1, y = -2, z = 3$ d) $x = -1, y = -2, z = -3$
7. In $\triangle LMN$, $\angle L = 60^\circ$, $\angle M = 50^\circ$, If $\triangle LMN \sim \triangle PQR$, then the value of $\angle R$ is
 a) 40° b) 70° c) 30° d) 110°

Part - II

II. Answer any 5 questions. (Q.No.14 is compulsory)

5 x 2 = 10

8. If $B \times A = \{(-2, 3), (-2, 4), (0, 3), (0, 4), (3, 3), (3, 4)\}$, find A and B.
9. A relation 'f' is defined by $f(x) = x^2 - 2$ where $x \in \{-2, -1, 0, 3\}$
 i) List the elements of f ii) Is f a function?
10. 'a' and 'b' are two positive integers such that $a^b \times b^a = 800$. Find 'a' and 'b'.
11. Find the sum to infinity of $9 + 3 + 1 + \dots$
12. Find a_6 and a_{13} of the sequence whose n^{th} term is given by $a_n = \frac{5n}{n+2}$
13. If $\triangle ABC \sim \triangle DEF$ such that $BC = 3$ cm, $EF = 4$ cm and area of $\triangle ABC = 54$ cm², Find the area of $\triangle DEF$.
14. Find the sum of $1 + 8 + 27 + \dots + 1000$

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Part - III

X Maths

5 x 5 = 25

III. Answer any 5 questions. (Q.No.21 is compulsory)

15. Given $A = \{1, 2, 3\}$, $B = \{2, 3, 5\}$, $C = \{3, 4\}$, $D = \{1, 3, 5\}$, check if

$(A \cap C) \times (B \cap D) = (A \times B) \cap (C \times D)$ is true.

16. $f(x) = 2x + 3$, $g(x) = 1 - 2x$ and $h(x) = 3x$, prove that $fo(goh) = (fog) oh$

17. Use Euclid's division algorithm to find the HCF of 84, 90 and 120

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

19. Solve the following system of linear equations in three variables :

$$3x - 2y + z = 2, \quad 2x + 3y - z = 5, \quad x + y + z = 6$$

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

21. A function $f : [-5, 9] \rightarrow \mathbb{R}$ is defined as follows :

$$f(x) = \begin{cases} 6x+1 & \text{if } -5 \leq x < 2 \\ 5x^2 - 1 & \text{if } 2 \leq x < 6 \\ 3x - 4 & \text{if } 6 \leq x \leq 9 \end{cases}$$

Find i) $f(7) - f(1)$

ii) $\frac{2f(-2) - f(6)}{f(4) + f(-2)}$

Part - IV

IV. Answer the following question.

1 x 8 = 8

22. a) Construct a triangle similar to a given triangle PQR with its sides equal to $\frac{3}{5}$ of the corresponding sides of the triangle PQR (Scale factor $\frac{3}{5} < 1$).

(OR)

b) 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 $\frac{7}{3}$).
