FIRST MID TERM TEST - 2024

Standard X

Reg.No. | | | | | | |

MATHEMATICS

Time : 1.30 hrs *Marks : 50*

Part - I

I. Choose the correct answer: **7 x 1 = 7**

1. A = {a,b,p}, B = {2,3}, C = {p,q,r,s}, then n[(A∪C) x B] is
   a) 8 b) 20 c) 12 d) 16
2. If f : A→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 – 3x = –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 ΔLMN, ∠L = 60°, ∠M = 50°, If ΔLMN ~ ΔPQR, then the value of ∠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 x 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 + ...
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 ΔABC ~ ΔDEF such that BC = 3 cm, EF = 4 cm and area of ΔABC = 54cm², Find the area of ΔDEF.
14. Find the sum of 1 + 8 + 27 + ... + 1000

Part - III

III. Answer any 5 questions. (Q.No.21 is compulsory) **5 x 5 = 25**

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 + ...
19. Solve the following system of linear equations in three variables :
    3x – 2y + z = 2, 2x + 3y – z = 5, 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] → R is defined as follows : $f(x)=\begin{cases}6x+1 & \text{if } -5 \le x < 2\\ 5x^2-1 & \text{if } 2 \le x < 6\\ 3x-4 & \text{if } 6 \le x \le 9\end{cases}$

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

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