SRI VINAYAGA TUITION CENTRE

ANAIMALAI-642104

FIRST-MID TERM TEST 2024

MATHEMATICS

Total Marks: 50 Marks   Class: 10

Duration: 1 Hrs 30 Min

PART A

CHOOSE THE BEST ANSWERS   10 X 1 = 10

1. A = {a,b,p}, B = {2,3}, C = {p,q,r,s} then n[(A ∪ B) × B] is
   a) 8   b) 20   c) 12   d) 16

2. If there are 1024 relations from a set A = {1, 2, 3, 4, 5} to a set B, then the number of elements in B is
   a) 3   b) 2   c) 4   d) 8

3. Let n(A) = m and n(B) = n then the total number of non-empty relations that can be defined from A to B is
   a) m^n b) n^m
   c) $2^{mn} - 1$ d) 2^{mn}

4. 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) $0 \leq r < b$ d) $0 < r \leq b$

5. 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

6. If the HCF of 65 and 117 is expressible in the form of 65m - 117, then the value of m is
   a) 4   b) 2   c) 1   d) 3

7. Given $F_1 = 1$, $F_2 = 3$ and $F_n = F_{n-1} + F_{n-2}$ then F_5 is
   a) 3   b) 5   c) 8   d) 11

8. 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

9. If (x - 6) is the HCF of $x^2 - 2x - 24$ and $x^2 - kx - 6$ then the value of k is
   a) 3   b) 5   c) 6   d) 8

10. If n (AxB) = 24, and A= {1, 3, 5, 7} then n (B) is _____.
    a) 8   b) 4   c) 5   d) 6

PART B

Answer any 5 questions (Q.NO 17 COMPULSORY)   5 X 2 = 10

11. If A × B = {(3,2), (3,4), (5,2), (5,4)} then find A and B.

12. If f(x) = 3x - 2, g(x) = 2x + k and if f ∘ g = g ∘ f, then find the value of k.

13. A = {-2,-1,0,1,2} and f : A → B is an onto function defined by f(x) = $x^2 + x + 1$ then find B.

14. Find the number of terms in the A.P. 3, 6, 9, 12,…, 111.

15. Find the 8th term of the G.P. 9, 3, 1,....

16. Find the sum of 1 + 3 + 5 + ...+ 55

17. Find the LCM of $x^3 - 27$, $(x - 3)^2$, $x^2 - 9$

PART C

Answer any 5 questions (Q.NO 24 COMPULSORY)   5 X 5 = 25

18. Let $A = \{x \in \mathbb{W} | x < 2\}$, $B = \{x \in \mathbb{N} | 1 \leq x < 4\}$ and $C = \{3, 5\}$. Then verify that
    A × (B ∩ C) = (A × B) ∩ (A × C)

19. Let A = {1,2,3,4} and B = {2,5,8,11,14} be two sets. Let f : A → B be a function given by f(x) = 3x - 1 . Represent this function
    (i) by arrow diagram (ii) in a table form
    (iii) as a set of ordered pairs (iv) in a graphical form

20. Consider the functions f(x), g(x), h(x) as given below. Show that (f ∘ g) ∘ h = f ∘ (g ∘ h) in each case.
    f(x) = x - 1, g(x) = 3x + 1 and h(x) = x^2

21. Find the sum to n terms of the series 5 + 55 + 555 + ...

22. 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?

23. $\frac{1}{x^4} - \frac{6}{x^3} + \frac{13}{x^2} + \frac{m}{x} + n$ is a perfect sqaure. Find the values of m and n.

24. Solve the following system of linear equations in three variables
   x + y + z = 5; 2x - y + z = 9; x - 2y + 3z = 16

PART D

Answer any 1 questions in brief   1 X 8 = 8

25. Construct a triangle similar to a given triangle PQR with its sides equal to $\frac{7}{4}$ of the corresponding sides of the triangle PQR (scale factor $\frac{7}{4} > 1$).

26. Construct a triangle similar to a given triangle PQR with its sides equal to $\frac{2}{3}$ of the corresponding sides of the triangle PQR (scale factor $\frac{2}{3} < 1$).