V10M

Virudhunagar District

First Mid Term Test - 2023

Standard 10

MATHEMATICS

Time: 1.30 Hours

Marks: 50

PART -I

Note: i) **Answer all the questions:** **7×1=7**

ii) **Choose the most appropriate answer from the given four alternatives and write the option code and the corresponding answer.**

1) If A={a, b, p}, B={2,3}, C={p,q,r,s}, then n [(A∪C)×B] is

a) 8 b) 20 c) 12 d) 16

2) If f: A → B is a objective function and if n(B) = 7, then n(A) is equal to

a) 49 b) 7 c) 1 d) 14

3) $f(x)=(x+1)^3-(x-1)^3$ represents a function which is

a) quadratic b) reciprocal c) cubic d) linear

4) If A and B are two finite sets such that n(A)= p and n(B) = q, then what is the total number of functions that exist from A to B?

a) p^q b) q^p c) 2^{pq} d) 2^{pq-1}

5) The sum of the exponents of the prime factors in the prime factorization of 1729 is

a) 2 b) 3 c) 1 d) 4

6) The next term of the sequence $\frac{3}{16}, \frac{1}{8}, \frac{1}{12}, \frac{1}{18}$ ..... is

a) $\frac{1}{24}$ b) $\frac{1}{27}$ c) $\frac{2}{3}$ d) $\frac{1}{81}$

7) Which among the following sequences is not an AP?

a) $\sqrt{3}, \sqrt{3}, \sqrt{3}$..... b) $5\sqrt{5}, 10\sqrt{5}, 15\sqrt{5}$.....

c) $\sqrt{2}, \sqrt{3}, \sqrt{4}$ d) −100, 0, 100

PART -II

Note: i) **Answer five questions only:** **5×2=10**

ii) **Question number 14 is compulsory.**

8) If B × A = {(1,a), (1, b), (1, c), (2, a), (2, b), (2, c), (3, a), (3, b), (3, c)}, then find A and B.

9) A relation R is given by the set {(x,y)/y = x + 3, x ∈ {0, 1, 2, 3, 4, 5}}. Determine its domain and range.

10) If f(x) = 2x−k and g(x) = 4x + 5 and if fog = gof then find the value of k.

11) A man starts his journey from chennai to Delhi by train. He starts at 22:30 hours on Wednesday. If it takes 32 hours of travelling time and assuming that the train is not late, when will he reach Delhi?

12) Find the 8^{th} term of the GP 9, 3, 1, ...

13) If $1 + 2 + 3 + \ldots + n = 666$, then find n

14) State the Fundamental Theorem of Arithmetic.

PART -III

5×5=25

Note: i) Answer five questions only:

ii) Question number 21 is compulsory.

15) Let A = The set of all natural numbers less than 8, B = The set of all prime numbers less than 8 and C = The set of all even prime numbers. Verify that $A \times (B - C) = (A \times B) - (A \times C)$.

16) Let A = {1, 2, 3, 4} and B = {2, 5, 8, 11, 14} be two sets. Let f: A → B be a function defined by f(x) = 3x – 1. Represent this function.

i) by an arrow diagram ii) in a table form

iii) as a set of ordered pairs iv) in a graphical form

17) Let f be a function f: ¥ → ¥ defined by f(x) = 3x + 2, x∈ ¥

i) Find the images of 1, 2, and 3 ii) Find the pre-images of 29 and 53

iii) Identify the type of function

18) In an AP, sum of four consecutive terms is 28 and the sum of their squares is 276. Find the four numbers.

19) Find the HCF of 396, 504 and 636 using Euclid's division algorithm.

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 $f(x) = x - 4$, $g(x) = x^2$ and $h(x) = 3x - 5$, then prove that $f \circ (g \circ h) = (f \circ g) \circ h$.

PART -IV

Note: i) Answer the following: **1×8=8**

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

(OR)

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 $\frac{4}{5} < 1$).

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