FIRST MID TERM EXAMINATION - 2022

10 - STD MATHS Time : 1.30 Hrs

Marks : 50

PART - A

I Choose the correct answers. 7 X 1 = 7

1. 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}

2. If n (A X B) = 12 and (A) = {1, 2, 3} then n(B) =

   a) 3 b) 4 c) 6 d) 2

3. If {(a, 8), (6,b)} represents an identify function, then the value of a and b are represents

   a) (8, 6) b) (8, 8) c) (6, 8) d) {6,6}

4. 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

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

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

6. An AP consists of 31 terms. If its 16th term is m then the sum of all the terms of this AP is

   a) 16m b) 62m c) 31m d) $31/2$ m

7. A system three linear equations in three variables is inconsistent if their planes

   a) intersect only at a point b) intersect in a line

   c) coincides with each other d) do not intersect

PART - B

II i) Answer any five questions.

ii) Question number 14 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. Show that function f : N → N defined by f(x) = 2x - 1 is one-one but not onto.

10. Represent the function $f(x) = \sqrt{2x^2-5x+3}$ as a composition of two functions.

11. A man has 532 flower pots. He wants to arrange them, in rows such that each row contains 21 flower pots. Find the number of completed rows and how many flower pots are left over.

12. Find the sum a $3+1+\frac{1}{3}+\ldots\ldots\infty$.

13. Simplify : $\frac{9x^2+81x}{x^3+8x^2-9x}$.

14. a) If A = {2, -2, 3} and B = {1, -4} then find A X B and B X A. **(OR)**
b) Find the first four terms of the sequences whose n^{th} terms is $a_n = n^2-2$.

PART - C

III i) Answer any five questions. 5 X 5 = 25
ii) Question number 21 compulsory.

15. Let A = {x ∈ N / 1 < x < 4}, B={x ∈ W / 0 ≤ x < 2} and C = {x ∈ N / x < 3} then verify A X (B ∪ C) = (A X B) ∪ (A X C).

16. Let A = {1, 2, 3, 4} and B = {2, 5, 8, 11, 14} be two sets let f : A→B be a functions given by f(x) = 3x - 1 represent the function.
i) by arrow diagram ii) In a table form iii) as set of ordered pair
iv) In a graphical form.

17. If f(x) = x -1, g(x) = 3x + 1 and h(x) = x^2 then verify (fog) oh = fo(goh).

18. If nine times ninth term is equal to the fifteen times fifteenth term, show that six times twenty fourth term is zero.

19. Find the sum of the series $6^2 + 7^2 + 8^2 + \ldots\ldots\ldots + 21^2$.

20. Find the GCD of the followings $x^3 + x^2 - x + 2$ and $2x^3 - 5x^2 + 5x - 3$.

21. a) If the function f : R→R is defined by $f(x) = \begin{cases} 2x+7, & x<-2 \\ x^2-2, & -2\le x<3 \\ 3x-2, & x\ge 3 \end{cases}$

i) f(4) ii) f(-2) iii) f(4) + 2f(1) iv) $\frac{f(1)-3f(4)}{f(-3)}$

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

PART - D

IV Answer any one of the following. 1 X 8 = 8

22. a) Draw the graph of xy = 24, x,y > 0 using the graph find
i) y when x = 3 and ii) x when y = 6 **(OR)**
b) Construct a triangle similar to a given triangle PQR with its sides equal to 7/4 of the corresponding sides of the triangle PQR (scale factor 7/4 > 1)