FSS

FIRST MID TERM TEST - 2022

10 - STD **MATHEMATICS** Time : 1.30 Hrs

Marks : 50

I Choose the correct answer. $5 \times 1 = 5$

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 c) 16
2. If $n(A) = p$, $n(B) = q$ than the total number of functions that exist from A to B is
   a) 2^{pq} b) $2^{pq}-1$ c) p^q d) q^p
3. Give $F_1 = 1$, $F_2 = 3$ and $F_n = F_{n-1} + F_{n-2}$ then F_5 is
   a) 3 b) 5 c) 8 d) 11
4. 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
5. 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) $x = 1, y = -2, z = 3$

II Answer any 6 questions. Question No. 13 is compulsory. $6 \times 2 = 12$

6. Let $A = \{1, 2, 3\}$ and $B = \{x / x \text{ is a prime number} < 10\}$ Find $A \times B$ and $B \times A$.
7. Let $A = \{1,2,3, \ldots\ldots\ldots, 45\}$ and R be the relation defined as "is square of a number" an A. Write R as a subset of $A \times A$. Also, find the domain and range of R.
8. Let f be a function form R to R defined by $f(x) = 3x - 5$. Find the values of a and b given that $(a, 4)$ and $(1, b)$ belongs to f.
9. Find the greatest number that will divide 445 and 572 leaving remainders 4 and 5 respectively.
10. Solve : $5x \equiv 4$ (mode 6)
11. Find the sum : $3+1+\frac{1}{3}+\ldots\ldots\ldots \infty$.

12. Find the LCM : $P^2 - 3p + 2, P^2 - 4$.

13. Find Sn for $\left(1-\frac{1}{n}\right)+\left(1-\frac{2}{n}\right)+\left(1-\frac{3}{n}\right)+$ .... upto n terms.

III Answer any 5 questions. Question No. 20 is compulsory. $5 \times 5 = 25$

14. Let $A = \{x \in N / 1<x< 4\}$, $B = \{x \in W / 0 \leq x<2\}$ and $C = \{x \in N / x < 3\}$ then verify that $A \times (B \cup C) = (A \times B) \cup (A \times C)$.

15. If $f(x) = 2x-1$, $g(x)= \frac{x+1}{2}$, show that (fog) = gof = x.

16. i) Find the LCM and HCF of 408 and 170 by applying the fundamental theorem f of arithmetic.

ii) $a_n = \begin{cases} n(n+3)\ ; & n \in N \text{ is odd} \\ n^2+1\ ; & n \in N \text{ is even} \end{cases}$ Find a_{11}, a_{18}.

17. Find the sum of all natural numbers between 300 and 600 which are divisible by 7.

18. Find the sum of n terms of the series 0.4 + 0.44 + 0.444 + ... upto n terms.

19. Solve the following system of linear equations.
$x + y + z = 5; \quad 2x - y + z = 9; \quad x - 2y + 3z = 16$.

20. Let A = {9, 10, 11, 12, 13, 14, 15, 16, 17} and let $f : A \to N$ be defined by f(n) = n then highest prime factor of $(n \in A)$. Write f as a set of ordered pairs and find the range of f.

IV Answer the following question. $1 \times 8 = 8$

21. Construct a triangle similar to a given ΔPQR with the sides equal to $7/3$ of the corresponding sides of the ΔPQR. (Scale factor $7/3 > 1$) ***(OR)***

b) Two poles of height `a' metres and `b' metres are `p' metres apart. Prove that the height of the point of intersection of the lines joining the top of each pole to the foot of the opposite pole is $\frac{ab}{a+b}$ metes.