11 - Std FIRST MID TERM TEST - 2023

Time : 1.30 Hrs **MATHEMATICS** Marks : 45

PART - A

I Choose the correct answer. 10 x 1 = 10

1. The range of the function $\frac{1}{1-2\sin x}$ is

   a) $(-\infty, -1) \cup \left(\frac{1}{3}, \infty\right)$ b) $\left(-1, \frac{1}{3}\right)$

   c) $\left[-1, \frac{1}{3}\right]$ d) $(-\infty, -1] \cup \left[\frac{1}{3}, \infty\right)$

2. If $n[(A \times B) \cap (A \times C)] = 8$ and $n(B \cap C) = 2$ then n (A) is

   a) 6 b) 4 c) 8 d) 16

3. Let A and B be subsets of the universal set N, then set of natural numbers. Then $A' \cup [(A \cap B) \cup B']$ is

   a) A b) A' c) B d) N

4. The function f : [0, 2π] -> [-1, 1] defined by f (x) = sinx is

   a) one - to - one b) onto c) bijection d) cannot be defined

5. Let f : R -> R be defined by f (x) = 1 – | x |. Then the range of f is

   a) R b) $(1, \infty)$ c) $(-1, \infty)$ d) $(-\infty, 1]$

6. The solution set of the following irequality | x – 1 | ≥ | x - 3 | is

   a) [0, 2] b) [2, ∞) c) (0, 2) d) (–∞, 2)

7. The value of $\log_3 \frac{1}{81}$ is

   a) –2 b) –8 c) –4 d) -9

8. The value of $\log_a b \log_b c \log_c a$ is

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

9. If |x + 2| ≤ 9 then x belongs to

   a) $(-\infty, -7)$ b) [–11, 7] c) $(-8, -7) \cup [11, \infty)$ d) (-11, 7)

10. The number of roots of $(x + 3)^4 + (x + 5)^4 = 16$ is

    a) 4 b) 2 c) 3 d) 0

PART - B

II Answer any 4 of the following questions. Q.No. 16 compulsory). 4x2=8

11. If A x A has 16 elements s = {(a, b) ∈ A x A ; a < b)} ; (–1, 2) and (0, 1) two elements of s then find the remaining elements of S.

12. Let f and g be the two functions from R to R - defined by f(x) - 3x = 4 and g (x) = x^2 + 3. Find get find gof and fog.

13. Construcut a quadratic equation with roots 7 and –3.

14. Solve : |5x – 12| < –2

15. $\log a + \log a^2 + \log a^3 + \ldots\ldots + \log a^n = \frac{n(n+1)}{2}$.

16. If n (A) = 10 and n (A $\cap$ B) = 3 , find $n\left((A \cap B)' \cap A\right)$.

PART - C

III Answer any four of the following questions. (Q.No.22 Compulsory). 4 x 3 = 12

17. If f : R –> R is defined as f (x) = $2x^2$ – 1, find the pre-images of 17, 4 and -2.

18. Find the domain $f(x) = \frac{1}{1-2\sin x}$.

19. Resolve into partial fractions $\frac{1}{x^2 - a^2}$.

20. To prove $\sqrt{2}$ is not a rational number.

21. Find $\log_9^{27} - \log_{27}^9$.

22. Find the range : $\frac{1}{2\cos x - 1}$.

PART - C

IV Answer all the questions. 5 x 3 = 15

23. In a survey of 5000 persons in a town, it was found that 45% of the persons know language A, 25% know language B, 10% know language C, 5% know language A and B, 4% know language B and C, and 4% known languages A and C. If 3% of the persons known all the three languages, find the number of persons who knows only one languages A. ***(OR)***

If f :R –> R defined by f (x) = 2x – 3 prove that f is a bijection and find its inverse.

24. Solve : $\frac{z+1}{x+3} < 3$. ***(OR)***

Resolve into partial fractions $\frac{x+12}{(x+1)^2(x-2)}$.

25. Prove that $\log 2 + 16\log\frac{16}{15} + 12\log\frac{25}{24} + 7\log\frac{81}{80} = 1$. **(OR)**

$\sqrt{6 - 4x - x^2} = x + 4$