TIME : 1 HR. 30 min.   **M.M. : 45**

XI MATHS TEST ON SETS,RELATIONS AND FUNCTIONS , PMI AND LINEAR INQUALITIES

1. If A = {x : $x^2 - 5x + 7 = 0$, x ∈ R} and B = ϕ, is A = B?   **1**

2. Write the set by using property method {1, 4, 9, …, 100}   **1**

3. Let $f = \{(1, 1), (2, 3), (0, -1), (-1, -3)\}$ be a function on Z. If $f(x)$ be a linear function, then find the function $f(x)$.   **1**

4. If A = {−1, 3, 7}. Find P (A) and proper subsets of A.   **2**

5. If f is a function defined by $f(x) = \dfrac{x-1}{x+1}$, then prove that: $f(2x) = \dfrac{3f(x)+1}{f(x)+3}$ **2**

6. Let A and B be sets. If A ∩ X = B ∩ X = ϕ and A ∪ X = B ∪ X for some set X. Show that A = B.   **4**

7. From amongst the 3000 literate individuals of a city 55% read newspaper A, 60% news paper B and 25% neither A nor B. Find the symmetric difference in % of news paper A and news paper B.   **4**

8. Draw Venn diagrams for the following sets

    a. B − A   **b.** (A △ B)′   **c.** (A ∩ B ∩ C)′   **d.** A ∩ B′∩ C′   **4**

9. For any sets A and B, show that : P (A ∩ B) = P (A) ∩ P (B).   **4**

OR

    Write De – morgan's Law and hence prove them.

10. How many litres of water will have to be added to 1125 L of the 45% solution of acid so that the resulting mixture will contain more than 25% but less than 30% acid content?   **4**

11. Solve $|x+1|+|x| \geq 3$ **4**

12. Prove $2.7^n + 3.5^n - 5$ is divisible by 24 using principle of mathematical induction   **4**

13. Solve the following inequality graphically $6x + 5y \leq 150$; $x + 4y \leq 80$; $x \leq 15$; $x \geq 0$, $y \geq 0$ **4**

14. Find domain and range of the $f(x) = \sqrt{(x-1)(3-x)}$ **6**