

D.O.E.-22/06/2026

MM-15

(1) Suppose $A_1, A_2, \dots, A_{30}$ are thirty sets each with 5 elements and $B_1, B_2, \dots, B_n$ are n sets each with 3

elements. Let $\bigcup_{i=1}^{30} A_i = \bigcup_{j=1}^n B_j = S$. Assume that each element of S belongs to exactly 10 of A_i 's and exactly

9 of B_j 's. Find the value of n .

(2) In a town of 10000 families it was found that 40% families buy newspaper A, 20% families buy newspaper B and 10% families buy newspaper C. 5% families buy newspaper A & B, 3% buy B & C and 4% buy A & C. If 2% families buy all the 3 newspapers, find the number of families which buy (i) A only (ii) B only (iii) none of A, B & C.

(3) Let U be the universal set containing 700 elements. If A, B are sub – sets of U such that $n(A) = 200$, $n(B) = 300$ and $n(A \cap B) = 100$. Then find the value of $n(A' \cap B')$.

(4)(i) Find the number of proper & improper subsets of a set containing 6 elements.

(ii) If $X = \{8^n - 7n - 1 : n \in \mathbb{N}\}$ and $Y = \{49(n - 1) : n \in \mathbb{N}\}$, then prove that $X \subseteq Y$.

(5) (i) Let A and B be two sets having 4 and 7 elements respectively. Then write the maximum number of elements that $A \cup B$ can have. Give reason of your answer.

(ii) Using Venn diagram represent $[(A \cup B) - (A \cap B \cap C)] - B$