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Total No. of Questions : 07

B.Sc.(IT) (Sem.–2nd)

# MATHEMATICS-II (DISCRETE)
## Subject Code : BS-104
## Paper ID : [B0406]

Time : 3 Hrs.　　　　　　　　　　　　　　Max. Marks : 60

**INSTRUCTION TO CANDIDATES :**
1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SIX questions carrying TEN marks each and students has to attempt any FOUR questions.

## SECTION-A

1. Write briefly :

(a) Draw Venn-Diagram for $A \Delta B$ where $\Delta$ denote symmetric difference of sets.

(b) Define function.

(c) If R is a relation defined on set $E = \{a, b, c, d\}$ as

$R = \{(a, b) (a, c) (a, d), (b, c) (b, d) (c, d)\}$. Write its $R^{-1}$.

(d) Prove in Boolean Algebra that $a + a \cdot b = a$.

(e) If $^nP_4 = 12 \cdot {}^nP_2$ Find $n$.

(f) Prove by means of truth table that

$\sim (p \to q) = p \wedge \sim q$

(g) Write converse, Inverse of following :

"If John is a model, he goes to Gym."

(h) Write the Fibonnaci sequence in recurrence relation.

(i) Define Partition of set with example.

(j) What are contigent statements?

## SECTION-B

2. An inquiry into 1000 candidates who failed in B.Sc. revealed the following data.

658 failed in aggregate, 372 in group I.

166 failed in aggregate and in group I.

590 in group II.

434 failed in aggregate and in group II.

126 failed in both groups.

You have to find the following, how many failed in

(i) all the three

(ii) in aggregate, but not in group II

(iii) group I but not in aggregate

(iv) group II, but not in group I

(v) aggregate or group II but not in group I

(vi) aggregate, but not in group I and II.

3. A cricket team of 11 players is to be formed out of 16 players including 4 bowlers and 2 wicket keepers. In how many different ways can a team be formed so that it contains (a) exactly 3 bowlers and 1 wicket keeper. (b) at least 3 bowlers and at least one wicket keeper.

4. Prove in Boolean Algebra that

$(a \cdot b)' = a' + b'$

5. Test the validity of the arguement

"*If my brother stands first in the class, I will give him a watch. Either he stood first or I was out of station. I did not give him a watch. Therefore I was out of station*".

6. Prove that $A \times (B \cup C) = (A \times B) \cup (A \times C)$

where A, B, C are non empty sets and X denote Cartesian product of sets.

7. Prove by PMI that :

$$1 \cdot 3 + 2 \cdot 3^2 + 3 \cdot 3^3 + \ldots\ldots + n \cdot 3^n = \frac{(2n-1)\,3^{n+1} + 3}{4}$$