Roll No. **Total No. of Pages : 02**

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.

(a) Define Intersection of two sets. Give an example.

(b) Define Disjunction. Give an example.

(c) Show that $(p \to q) \Leftrightarrow (\sim p \vee q)$ is tautology.

(d) Find the cardinal number of set

$$A = \{x : x^2 = 25,\ 3x = 6\}$$

(e) Evaluate C(19, 17) + C(19, 18).

(f) Define Reflexive and Symmetric relations.

(g) Let S = $\{(a, b) : a - b \text{ is even}\}$ is relation on A = {1, 2, 3, 4}. Find matrix of S.

(h) Define function.

(i) Define generating function.

(j) Prove by using Boolean Algebra that :

$$A + \bar{A} \cdot C = A + C.$$

SECTION-B

2. (a) Prove that :

$$A \cap (B \backslash C) = (A \cap B) \backslash (A \cap C) \quad (5)$$

(b) Among 50 students in a class, 26 got an A in the first examination and 21 got an A in the second examination. If 17 students did not get an A in either examination, how many students got A in both the examinations? (5)

3. Show by mathematical induction :

$$1^3 + 2^3 + 3^3 + \ldots + n^3 = \left[\frac{n(n+1)}{2}\right]^2. \quad (10)$$

4. Write down the truth table of the following statement :

$$[p \to (q \vee r)] \wedge (p \leftrightarrow \sim r) \quad (10)$$

5. Solve :

$$S(K) - 7S(K-1) + 10S(K-2) = 0,$$

$$S(0) = 4, \; S(1) = 17. \quad (10)$$

6. A function $f : X \to Y$ will be invertible if f is one to one and onto. (10)

7. (a) Determine n if :

$$C(2n, 3) : C(n, 3) = 11 : 1. \quad (5)$$

(b) If $F = \bar{x}y + \bar{y}z + z\bar{x}$. Find $\bar{F}$ and check that $F\bar{F} = 0$ and $F + \bar{F} = 1$. (5)