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

Total No. of Questions : 07

BCA (2011 & Onward) / B.Sc.(IT) (2015 & Onwards)

(Sem.–1)

MATHEMATICS – I

Subject Code : BSIT/BSBC-103

Paper ID : [B1110]

Time : 3 Hrs. **Max. Marks : 60**

INSTRUCTIONS 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 have to attempt any FOUR questions.**

SECTION-A

1. Write briefly :

(a) Define : Finite set and countable set.

(b) Define union of two sets.

(c) Define the Hamiltonian graph.

(d) Define multigraph and give an example.

(e) Explain the concept of propositions over a universe.

(f) Find $\begin{bmatrix} 1 & 4 \\ 2 & 3 \end{bmatrix} - \begin{bmatrix} 1 & 7 \\ 2 & -3 \end{bmatrix}$.

(g) If $A = \begin{bmatrix} 1 & -3 \\ 2 & 3 \end{bmatrix}$, then find $5A$.

(h) Find X and Y if $X + Y = \begin{bmatrix} 7 & -2 \\ 2 & 6 \end{bmatrix}, X - Y = \begin{bmatrix} 3 & 0 \\ 2 & 3 \end{bmatrix}$.

(i) When a function is said to be one-one onto.

(j) Define partitioning of a set.

SECTION-B

2. Suppose 120 studies Hindi, English and Punjabi. It is given that 60 study Hindi, 45 studies English, 42 study Punjabi, 20 study Hindi and English, 25 study Hindi and Punjabi and 15 students study English and Punjabi. Find the number of students who study all the three languages.

3. State and Prove DeMorgan's laws and also shows that Associativity holds over three sets.

4. Prove that an undirected graph possesses a eulerian circuit iff it is connected and has its vertices of even degree.

5. Show that by method of induction that

$$1^2 + 2^2 + \ldots + n^2 = \frac{(n)(n+1)(2n+1)}{6}, n \geq 1$$

6. Prove that associativity holds over conjunction by using propositional calculus.

7. If $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$, find A^{-1}.