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Total No. of Pages : 02

Total No. of Questions : 07

**B.Sc.(IT) (2015 Batch) / BCA (2011 & Onward) (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 a Triangular Matrix.
- (b) Define Recurrence Relations.
- (c) What do you mean by 'Union of two Sets'?
- (d) Name the different types of relations.
- (e) Define the term 'Equivalent Statements'.
- (f) What is the principle of Mathematical Induction?
- (g) Differentiate between Directed and Undirected Graphs.
- (h) What do you mean by a 'Hamilton Graph'?
- (i) Define the term 'Spanning Trees',
- (j) What do you mean by an Argument?

## SECTION-B

2. Write a note on the various types of graphs.

3. Prove De Morgan's Law for B

(a)  $(x + y)' = x' \cdot y'$

(b)  $(x \cdot y)' = x' + y'$

4. (a) Are the following statements equivalent?

(i) *"It is true that he will get a job, if and only if he secures first division"*

(ii) *"He will not get a job, if and only if he secures first division"*

(b) For any sets A and B, show that  $(A - B) \cup (B - A) = (A \cup B) - (A \cap B)$

5. (a) In a certain government office, there are 400 employees; there are 150 men, 276 university graduates, 212 married people, 94 male university graduates, 151 married university graduates, 119 married men, 72 married male university graduates. Find the number of single women who are not university graduates.

(b) Prove that :  $\frac{1}{3 \cdot 5} + \frac{1}{5 \cdot 7} + \dots + \frac{1}{(2n+1)(2n+3)} = \frac{n}{3(2n+3)}$

6. Find the inverse of the matrix  $\begin{bmatrix} 1 & 2 & -1 \\ -4 & -7 & 4 \\ -4 & -9 & 5 \end{bmatrix}$

7. If  $A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix}$ ,  $B = \begin{bmatrix} 0 & 1 & 2 \\ 3 & 4 & 5 \end{bmatrix}$ ,  $C = \begin{bmatrix} -1 & 0 & 1 \\ 1 & 2 & 3 \end{bmatrix}$

Verify,  $(A + B) + C = A + (B + C)$