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Total No. of Questions: 07

Total No. of Pages: 02

B. Sc. (IT/BCA) (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.
 - (a) Define Recursion.
 - (b) Define a Square Matrix.
 - (c) Explain the term 'Difference of two Sets'.
 - (d) Define a Truth Table.
 - (e) What is a Venn Diagram?
 - (f) What do you mean by 'Relation'?
 - (g) Differentiate between Simple and Multi graphs.
 - (h) What do you mean by Eulerian graphs?
 - (i) What is meant by 'Graph Colouring'?
 - (j) Explain 'Partitioning of a Set'.

SECTION B

2. **Write short notes on**
 - a) Graph Optimization
 - b) Spanning Trees
3. Prove the associative laws for B
 - a) $x + (y+z) = (x+y) + z$
 - b) $x \cdot (y \cdot z) = (x \cdot y) \cdot z$
for all x, y, z in B
4. Prove that the following statements are equivalent
 - a. $P \wedge Q$ and $(P \downarrow Q) \downarrow (Q \downarrow P)$
 - b. $Q \vee P$ and $(P \downarrow Q) \downarrow (Q \downarrow P)$

5. a) Out of 1000 students who appeared for C.A. Intermediate Examination, 750 failed in Maths, 600 failed in Accounts and 600 failed in Costing; 450 failed in both Maths and Accounts; 400 failed in both Maths and Costing; 150 failed in both Accounts and Costing. The students who failed in all three subjects were 75. Prove that the above data is not correct.

- b) By the method of induction, show that:

$$10^n + 3 \cdot 4^{n+2} + 5 \text{ is divisible by 9}$$

6. Find the Inverse of the matrix: $\begin{bmatrix} 1 & 3 & -2 \\ -3 & 0 & -5 \\ 2 & 5 & 0 \end{bmatrix}$

7. If $A = \begin{bmatrix} 0 & 1 & 2 \\ 2 & 3 & 4 \\ 4 & 5 & 6 \end{bmatrix}$ and $k_1 = i$, $k_2 = 2$

Verify, $(k_1 + k_2) A = k_1 A + k_2 A$