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I Semester B.C.A. Degree Examination, January/February - 2025

COMPUTER SCIENCE

Discrete Structures

(SEP Scheme)

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates:

Answer All the Sections.

SECTION - A

I. Answer any Ten questions. Each question carries 2 mark.

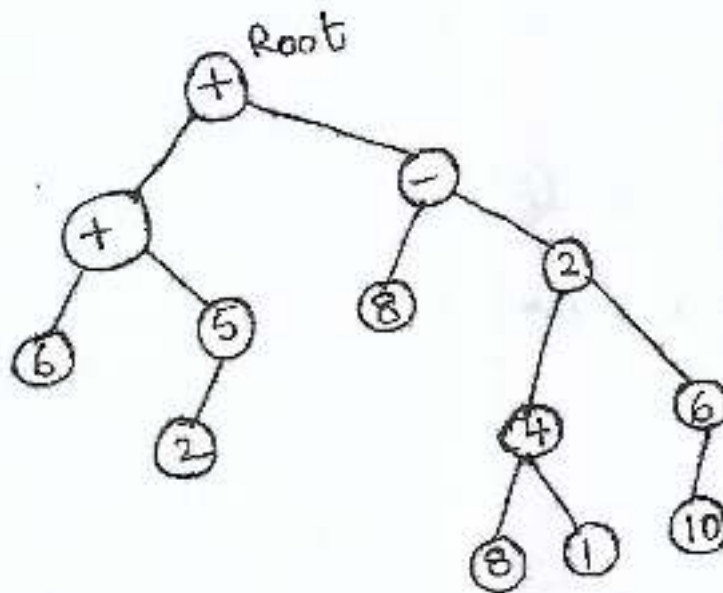
(10×2=20)

1. Find the intersection $A \cap B$ and set difference $A - B$ if $A = \{1, 3, 5, 7, 9\}$ and $B = \{2, 3, 4, 5, 6, 8\}$.
2. Construct a truth table for $\sim(p \vee q)$.
3. Find A^{-1} if $A = \begin{bmatrix} 6 & 3 \\ 2 & 4 \end{bmatrix}$.
4. Find the value of
 - a) $4P_3$
 - b) $6C_2$
5. Define Equivalence Relation.
6. Define Unit Matrix with example.
7. If $A = \begin{bmatrix} 2 & -1 \\ 4 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 5 & 2 \\ -3 & 2 \end{bmatrix}$ find $3A - 2B$.
8. What is a minimum cost spanning tree?
9. Define the terms
 - a) Graph
 - b) Loop

[P.T.O.]



20. Traverse the following tree in Preorder, Postorder and Inorder.



SECTION - C

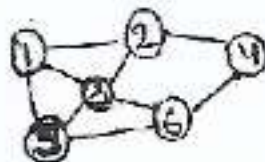
- III. Answer any Three questions. Each question carries Ten marks. (3×10=30)

21. Consider the function f & $g : R \rightarrow R$ defined by $f(x) = x^2 + 5$ and $g(x) = 5x - 2$. Find the composite function

a) $f \circ g$

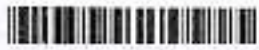
b) $g \circ f$

22. Define Permutation. How many 4 digits numbers can be formed with the digits 0, 1, 2, 3, 5? (Repetition not being allowed). How many of these are greater than 2000?
23. What is a Hamilton Circuit? Check whether the following graph contains Hamiltonian Circuit. Justify your answer.



24. Define Binary Search Tree. Construct binary search tree.

56, 38, 10, 65, 72, 44, 50



25. Find the minimum weight spanning tree by PRIM's algorithm.

