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Thapar Institute of Engineering & Technology, Patiala
Department of Computer Science and Engineering

B. E. (Second Year) Auxiliary Examination
Course code: UCS 301
Course Name: Data Structures
Time: 2 Hours, M. Marks: 50
Name Of Faculty: Sunita Garhwal
Dated: 24/8/2022

Note: Attempt all questions. Assume missing data, if any, suitably

Q1. Perform the following operations using stacks. Show contents of the stack at each intermediate step.

a) Convert the given infix expression into an equivalent postfix expression. [5+5]

P - Q - R * (S + T / U – V) - W

b) Compute the value of the postfix expression obtained in Q1(a) for

P = 45, Q = U = 2, R = 5, S = 8, T = 6, V = 4, and W = 3.

Q2. a) Create an AVL tree by considering sequences in the following given order are inserted into a tree. Show step after each rotation. [5+5]

64, 1, 14, 26, 13, 110, 98, 85

b) Define a graph. How a graph is stored in a computer's memory using Adjacency matrix and Adjacency list (linked list) representations?

Q3. a) Draw a Binary Search Tree by sequentially inserting the following elements in the given order: [5+5]

40, 60, 50, 22, 44, 10, 25, 52, 65, 51

b) Delete the following nodes in sequences 65, 52, and 60. Show the BST after each deletion.

Q4. a) What are the advantages of linked lists over arrays? [5+5]

b) Write a function/code which inserts a given item of information at the end of a list.

Q5. Write a complete algorithm/ pseudo-code to implement any one of the following: [10]

Insertion sort OR Selection sort