Code No: D-2371/N/AICTE

FACULTY OF ENGINEERING

BE (CSE) III – Semester (AICTE) (Main) Examination, March / April 2022

Subject: Data Structures and Algorithms

Time: 3 Hours | Max marks: 70

Note: (i) First question is compulsory and answer any four questions from the remaining six questions. Each Questions carries 14 Marks.
(ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.
(iii) Missing data, if any, may be suitably assumed.

1 (a) Explain Performance Analysis of an Algorithm.

(b) How can a polynomial such as $6x^6+3x^5+9x^4+2x^2+x-19$ be represented by a linked list?

(c) Give the conditions for identifying a circular queue to be full and empty, when implemented using an array.

(d) Write AVL tree rotations.

(e) Calculate the time complexity of Quick Sort Algorithm

(f) Justify the data structure used for computing the DFS graph.

(g) Convert the given infix expression into postfix notation: 9+1-3/(4-1)*5

2 (a) Explain String ADT and implement String ADT using C program.
(b) Write various representations of sparse matrix. Explain with an example.

3 Write a program to convert infix expression into postfix expression.

4 (a) Write a program for the following operations using linked list.
(i) Insert at last node (ii) Delete the first node (iii) Search for an element (iv) Display the elements
(b) Define collision? Summarize different collision resolution techniques with examples?

5 (a) Define Heap. Construct and explain a heap with suitable example.
(b) Construct a Binary Search Tree for the following data and perform in-order, Preorder and Post-order traversal of the tree. 50, 60, 25, 40, 30, 70, 35, 10, 55, 65, 5.

6 (a) Develop an algorithm for Breadth First Search Traversal of a graph and discuss with an example.
(b) Write a program for binary search of a element.

7 (a) Show how Quick sort algorithm works on the input: 5, 9, 1, 7, 3, 8, 6, 2, 4
(b) Explain prim's algorithm to find minimum spanning tree.

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