Code No: D-2371/N/BL/AICTE

FACULTY OF ENGINEERING

B.E. (CSE) III - Semester (AICTE) (New) (Backlog) Examination,
September / October 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) Define an Algorithm and briefly explain Time and Space complexity of an Algorithm.
   b) List out the basic operations that can be performed on a stack and explain briefly
   c) What is the postfix form of the infix Expression (A+B)/B+(C+D)*E-F
   d) Explain collision in hash table.
   e) Define minimum cost spanning tree and give an example.
   f) State the difference between breadth first search and depth first search
   g) When do you say that undirected graph in connected?

2. a) Define Asymptotic notations. Elaborate the role of them in choosing the right algorithm and performance measurement.
   b) Write an algorithm to add two polynomials when the polynomials are represented using singly linked list.

3. a) Write an algorithm to evaluate postfix expression with one example.
   b) Write a recursive function to reverse elements of queue using operators of queue.

4. a) Consider the Hash function H(i) = (2i + 5) % 11 Insert the keys 3, 8, 102, 23, 4, 10, 9, 12, 44, 23 and construct the 11 item hash table by using Dynamic hashing.
   b) Write logic to use minimum iterations for inserting a new node at the end of a Circular linked list. Note: Linked List has only one pointer pointing to the head.

5. a) What is a Binary Search Tree (BST)? Make a BST for the following sequence of numbers. 55, 36, 70, 23, 89, 100, 58, 39, 41, 60, 65, 25 Write preorder, inorder and postorder traversals of this tree.
   b) Construct AVL tree with the following example. 21 26 30 9 4 14 28 18 15 10

6. a) Explain the working of Quick Sort. Sort the following sequence of keys using Quick sort. 66, 77, 11, 88, 99, 22, 33, 44, 55. Specify its time complexity.
   b) What is BFS and DFS? Explain with an example.

7. Write short notes on
   a) Sparse matrices
   b) Pattern matching

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