Code No: F-13670/N/AICTE

FACULTY OF ENGINEERING

B.E. (IT) III – Semester (AICTE) (Main& Backlog) (New) Examinations, February/March 2024

Subject: Data Structures

Time: 3 Hours **Max. Marks: 70**

Note: (i) First question is compulsory and answer any four questions from the remaining six questions. Each question 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) Write notes on Templates in C++.
   (b) What is the prefix form for the following infix notation (A/B*C*D+E)?
   (c) Write an ADT for Queue.
   (d) How are double linked lists better than single linked lists?
   (e) Give some applications of Graph data structures.
   (f) Define complete binary with an example.
   (g) Write C++ code for implementing linear search algorithm.

2. (a) Write a C++ program to demonstrate exception handling in C++.
   (b) Write an algorithm to find factorial of a given number recursively.

3. (a) Write a C++ program to evaluate a postfix expression. Evaluate the given postfix expression 2+5*6/n.
   (b) Write a C++ program to implement the array ADT.

4. (a) Define Hashing? Explain hash function. Write notes on Collision avoidance techniques.
   (b) How polynomials are represented using linked lists? Explain.

5. (a) Define Binary search tree. Explain its features.
   (b) Define AVL tree rotations. Construct AVL tree for the following input sequence – 15, 6, 25, 11, 10, 13, 3, 29, 37.

6. (a) Use merge sort to sort the following sequence of numbers – 66, 48, 57, 92, 24, 65, 83, 72.
   (b) Explain Depth First Search operations on a graph.

7. (a) Explain the Kruskals algorithm using a graph of your choice.
   (b) Write C++ code to implement single linked list ADT using templates.

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