Total No. of printed pages = 4

63/2 (SEM-2) MCA 2.1

2022

MCA

(Theory Paper)

Paper Code : MCA 2.1

(Data Structure And Algorithms)

Full Marks –75

Time – Three hours

The figures in the margin indicate full marks for the questions.

1. Answer any *five* from the following questions : 2×5=10

   (a) Why we need a data structure ?

   (b) What do you mean by abstract data type ?

   (c) Explain linear and non-linear data structures.

   (d) Explain Stack ADT and give few applications of Stack ADT.

[Turn over

(e) Define complete binary tree with example.

(f) When an edge is called a Bridge ?

(g) Explain Spanning Tree.

2. Answer the following questions : 3×5=15

(a) Define binary tree and also explain when a binary tree will be a strictly binary tree.

(b) Explain how we can represent graph by using array and linked list.

(c) What is worst-case, best-case and average-case efficiency of Bubble sort.

(d) Define single linked list and doubly linked list.

(e) Explain the following of a graph with example (any *three*) :

(i) Directed and undirected graph

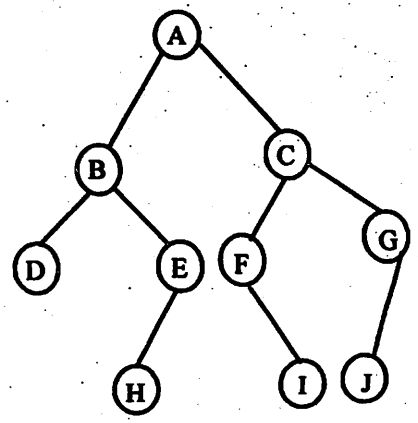
(ii) Weighted graph

(iii) Cyclic graph

(iv) Complete graph.

3. Answer the following questions : 4×5=20

(a) Find out the Pre-order, Post-order and Inorder traversal for the following binary tree :



(b) Explain the three Asymptotic Notation O (Big "Oh"), Ω (Omega), θ (Theta).

(c) Define Binary search tree. Construct a Binary search tree by inserting the following data sequentially :

25, 42, 70, 71, 71, 85, 98, 38

(d) What is hash table ? Explain Open addressing and Separate chaining method of hashing with example.

4. Answer any *five* of the following questions : 6×5=30

(a) Write a program to implement stack by using array.

(b) Write a program to implement queue using linked list.

(c) Write a program to sort n number using insertion sort. (using function)

(d) Write a program to sort n number using bubble sort. (using function).

(e) Write a program to implement binary search method.

(f) Write a program to sort n number using quick sort.

(g) Write a program to find the largest elements by using single liked list.