MCA/M08
Data Structure Using 'C'
MCA -201

Time : 3 Hours MM:50

Note:- Attempt Five questions in all, selecting One question from each unit.

UNIT-I

1(a) Write an example of a 4x4 triangular matrix and explain its representation in memory. 4

(b) Suppose 10-element array A contains the values a1, a2…….a10.Find the value in A after each loop. Write the syntax in 'C' for this data structure.

(i) Repeat for K=1 to 9
Set A[k+1] = A[K]

(ii) Repeat for K=9 to 1 by -1
Set A[K+1]=A[9] 6

2(a) Consider the pattern P=abcabc. Write the table used in second pattern matching algorithm. 5

(b) Write first pattern matching algorithm to find all occurrences of a pattern P in the text T. 5

3(a) Describe the structure for storing a string and manipulation of a string in a 'C' program. 4

(b) Describe the structure in a 'C' program to store the following data for each student in class of 20 students:
Name, Three tests, Grade
Here grade is a 2-character entry like B+ etc. 6

UNIT-II

4(a) Write algorithm to delete the first node N from a linked list, which contains a given item of information. Explain the algorithm with suitable example. 6

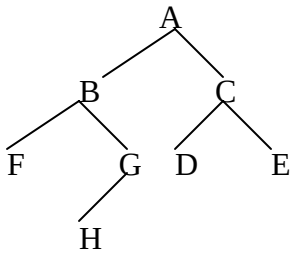
(b) Write an algorithm to insert an item of information as the first node in the linked list. 4

5(a) Write algorithm for insertion of an element into a stack and into a queue and for deletion of an element from a stack and from a queue respectively. 8

6 Describe heap sort and its complexity. Explain it for the data as follows:
60, 30, 55, 20, 35, 45, 33, 50, 40, 70, 90, 85 10

7(a) Construct a Huffman tree for the following data items:
A,B,C,D,E,F,G,H,I,J with weight 2,3,6,7,11,12,15,16,19,21 respectively and give its memory representation. 5

(b) Write algorithm for pre-order traversal of a binary tree and apply the algorithm to the following tree:



5

8(a) Write algorithm to find an edge from a node A to the node B in a graph G. 5

(b) Write algorithm to find indegree and ont degree of each node in a group G. 5

9 Describe briefly hashing, collision and resolution. 10

10 Write algorithm for quick sort and derive its complexity. 10