H-90-21 **Roll No……...**

Annual Examination, 2021

M.C.A III (New Course)

B.C.A.-305

Paper V

(Data Structure)

Time : 3 Hours] [Maximum Marks : 80

Note : *Attempt any two parts from each unit. All questions carry equal marks.*

Unit I

1. (a) What is Data structure ? Write a brief note on classification of data structure.

(b) What do you mean by algorithmic complexity ? Explain Time complexity and space complexity in brief.

(c) Write a brief note on the following :

(i) Data structure operations,

(ii) Asymptotic Notations.

Unit II

2. (a) Write an algorithm to insert and delete an element from an array. Explain your algorithm by suitable example.

(b) What is pointer ? How it is used to access elements of an array ? Explain the concept by suitable example.

P.T.O.

(c) Write a brief note on the following :

(i) Representation of records in memory,

(ii) Representation of one-dimonssional array in memory.

Unit III

3. (a) What is linked list ? How it is represented in memory ? Briefly explain header linked list.

(b) (i) What is stack ? What are the basic operations associated with stack ?

(ii) Convert following arithmetic infix expression into postfix by using stack :

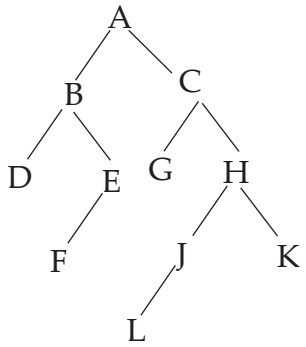
$$A*(b + c) + (b/d) * a + z * u$$

(c) What is Queue ? Explain linked representation of Queue.

Unit IV

4. (a) Define binary search tree. Write an algorithm to search an element in Binary search tree.

(b) Write a brief note on Traversing a binary tree. Find the preorder and postorder traversal of following tree.



(c) Suppose the following list of letters is inserted in order into an empty binary search tree :

J, R, D, G, T, E, M, H, P, A, F, Q

(i) Find the final Tree T.

(ii) Find the preorder, inorder and post order traversal of T.

Unit V

5. (a) Explain binary search algorithm by suitable example. Discuss the complexity of Binary search algorithm.

(b) Explain Insertion sort in details. Write an algorithm for it. Discuss the complexity of insertion sort. Compare the complexity with delection sort.

(c) Write a brief note on Hasing. Explain Hash functions in details.

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