# AB–2002

Seat No._____

## Second Year B. C. A. (Theory) Examination

April / May – 2003

## Data & File Structures

Time : **3** Hours] [Total Marks : **50**

**Instructions :** (1) Make and **state** necessary assumptions.
(2) Figures on **right** indicate **full** marks.

**1** Answer the following : **5**

(a) Attempt any **one** :

(i) Write algorithm for selection sort and give its comparison with bubble sort.

(ii) Write algorithm for Quick sort.

(b) Attempt any **one** : **5**

(i) Write algorithm for binary search method. What is prerequisite for performing binary search. Show the tracing of algorithm for the following data :

15 19 23 77 81 104 109 600 805

(ii) Write algorithm for linear search method and give its comparison with binary search method.

**2** Answer the following :

(a) (i) Write an algorithm to delete an element from array. **3**

(ii) Give formula to find starting address of any element for Row-major order and Column-major order in two dimensional array. **2**

**OR**

(a) (i) What are the advantages and disadvantages of linklist over array. **3**

(ii) Write down the algorithm for insertion sort using arrays. **2**

(b) (i) Give the definition and application of any two of following : **2**

1. Circular Queue
2. Priority Queue
3. Deque.

(ii) Write an algorithm to insert an element in a circular Queue using array. **3**

**3** Answer the following :

(a) Attempt any **one** : **5**

(i) What is stack ? Explain all operations on stack with algorithms.

(ii) Convert the expression *((A–(B / C))^D) / (E – F)* to postfix expression by showing the status of stack as well as output when every character is scanned from left to right.

(b) Attempt any **one** : **5**

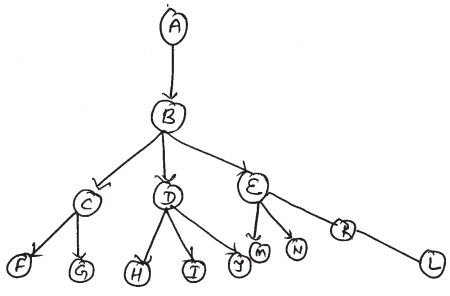
(i) Explain all operations on singly linklist.

(ii) Explain all operations on circular linklist.

**4** (a) Attempt any **two** : **8**

(i) What is threaded binary tree ? Give difference between thread and structured link. Also explain different ways to represent thread.

(ii) Convert the following tree into binary tree :




Given the traversal orders for converse pre-order, converse postorder, converse in order.

(iii) Define the following :
(a) *AVL* tree
(b) B-tree
(c) Expression tree
(d) Height and depth of tree.

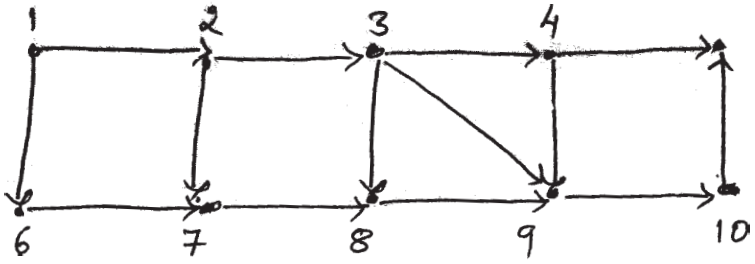
(b) Explain spanning trees with suitable example. **2**

**5** Answer the following :

(a) Attempt any **one** : **5**

(i) Write and explain algorithm for *DFS*. What is articulation point ?

(ii) Given a graph. Show the topological sorting order using *BFS*.




(b) Attempt any **one** : **3**

(i) Explain index sequential file organization

(ii) Explain sequential file organization in detail.

(c) Attempt any **one** : **2**

(i) Write a short-note on garbage collection

(ii) Write a short note on compaction.

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