

(b) What are the advantages of Threaded Binary Tree over Binary Tree ? Explain with example. 5

7. Write short notes on the following : 15

- (a) Insertion Sort
- (b) Hashing
- (c) Breadth First Search.



Roll No.

Total Pages : 04

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**B. Tech. (EL) (Re-appear) (Sixth Semester)
Data Structure and Algorithm (ELOE-102)**

Time : 3 Hours]

[Maximum Marks : 75

Note : It is compulsory to answer all the questions (1.5 marks each) of Part A in short. Answer any *four* questions from Part B in detail. Different sub-parts of a question are to be attempted adjacent to each other.

Part A

1. (a) Differentiate between linear data structures and non-linear data structures. 1.5
- (b) For a given sorted array, which searching technique is best and why ? 1.5
- (c) Write ADT of stack. 1.5
- (d) What will be the time complexity of searching an element in a circular queue ? Justify your answer. 1.5
- (e) Write an algorithm to traverse a singly linked list. 1.5

- (f) List any *three* applications of a linked list. **1.5**
- (g) Differentiate between AVL and Binary Search Tree. **1.5**
- (h) How do you find the level and height of a binary tree ? **1.5**
- (i) Compare the best case and worst case time complexities of quick sort and merge sort. **1.5**
- (j) How to represent graph in a memory ? **1.5**

Part B

2. (a) How to analyze an Algorithm ? Discuss by taking suitable example. **8**
- (b) What are the asymptotic notations ? Explain with example. **7**
3. (a) Write an algorithm for binary search. Show step by step procedure to find the element $x = 25$ in the given sorted array. Also analyze its time complexity :
10 20 25 35 45 56 87. **10**
- (b) Discuss different types of operations that can be applied to circular queue. **5**

4. Write an algorithm to convert infix expression to postfix expression. Also analyse its complexity. Convert the following infix expression to postfix expression :

$$x^y / (5 * z) + 2 . \quad \mathbf{15}$$

5. (a) How to insert and delete an element from middle position in the singly linked list ? Explain with example. **10**
- (b) Differentiate between B Tree and B + Tree. **5**
6. (a) Write an algorithm of pre-order, post-order and in-order traversal of a binary search tree. Find pre-order, post-order and in-order traversal of the following given binary search tree : **10**

