

## FACULTY OF ENGINEERING

B.E. (CSE) III – Semester (AICTE) (Main &amp; Backlog) (New) Examinations, February/March 2024

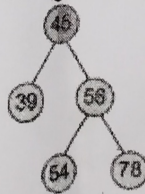
Subject: Data Structures &amp; Algorithms

Time: 3 Hours

Max. Marks: 70

- Note: (i) First question is compulsory and answer any four questions from the remaining six questions. Each question carries 14 Marks.  
 (ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.  
 (iii) Missing data, if any, may be suitably assumed.

1. (a) Discuss various specifications of an algorithm?  
 (b) Compare Single and Double Linked Lists.  
 (c) Define a Queue and list types of queues.  
 (d) Difference between complete binary tree and full binary tree.  
 (e) Define heap data structure and explain min heap and max heap.  
 (f) What is meant by strongly connected in a graph?  
 (g) State the logic of Merge sort.
2. (a) What is recursion? Explain the laws of recursion using an example.  
 (b) Write brief notes on  
 (i) Sparse Matrices (ii) String- ADT
3. (a) Write the postfix form of each of the following infix expression.  
 $A-B+(C \times D) \times (E+F)-G/H$  B)  $K+L-M \times N+(O+P)$   
 (b) Write a C program to perform all the operations of a Queue.
4. (a) Illustrate the concept of Circular Linked List using an example.  
 (b) What is hashing? Write the example if the record 52,68,99,84 is to be placed in a hash table and let us take the table size is 10 using division method?
5. (a) Construct a binary search tree by inserting the nodes with values 12 and 55.



- (b) Construct an AVL tree by inserting the following elements in the given order.  
 63, 9, 19, 27, 18, 108, 99, 81.
6. (a) Explain the algorithm for insertion sort and give a suitable example.  
 (b) Given the list of numbers 20 1 4 16 20 9 0 11 7  
 Use quick sort algorithm to sort them. Show different passes indicating the pivot and partitions formed.
7. (a) What is a stack? What are the basic operations associated with stack?  
 (b) Explain various graph traversals with examples.

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