

3E1652/1612

B.Tech. IIISem.(Main/Back) Examination Dec. - 2016

Computer Science & Engineering.

3CS2A Data Structures and Algorithms

CS,IT,EX,EC, EI

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 26**Instructions to Candidates:**

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Unit - I

- a) What are the differences between Big oh (O), omega (Ω) & theta (θ) notation? (8)
- b) Calculate the address of element $A[3][2]$ in a two dimensional array. $A[3][3]$ stored in row major and column major order in the main memory. Assume the base address to be 100 and that each element requires 2 words of storage. (8)

OR

- a) Why time and space complexity must be considered while writing a code? (8)
- b) Explain the characteristics of an algorithm. (8)

Unit - II

- a) What is STACK? Write algorithms to insert an element in STACK and delete an element from STACK with example. (8)
- b) Convert following infix expression into postfix notation :

$$A + B - (C + D) / E * F - (G + h) / I \quad (8)$$

OR

- a) Explain the implementation of queue with example. (8)
- b) Write an algorithm to delete an element from a circular queue. (8)

Unit - III

3. What is doubly linked list? Explain the algorithms for inserting a node and deleting a node from a doubly linked list. (16)

OR

3. a) Explain polynomial representation using linked list with an example. (8)
b) What is dequeue? Write down the algorithms for the insertion and deletion operations performed on dequeue. (8)

Unit - IV

4. a) Define Binary search tree. Write algorithm to implement insertion operation on Binary Search tree. (8)
b) What is an AVL tree? Explain the rotations of AVL tree. (8)

OR

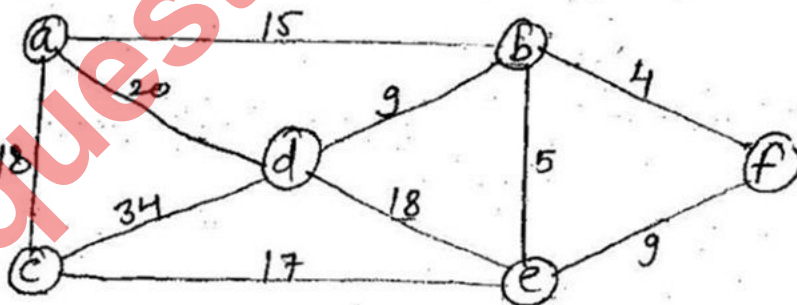
4. a) Explain an algorithm for postorder traversal of a binary tree. (8)
b) What are the basic operations that can be performed on a binary tree? Explain each of them in detail with suitable example. (8)

Unit - V

5. a) Write an algorithm for merge sort and comment on its complexity. (8)
b) Sort the following data in ascending order using Quick sort : (8)
9, 4, 12, 6, 5, 10, 7.

OR

5. a) Using Prim's and Kruskal's algorithm, find minimum spanning tree for the following graph : (10)



- b) Write an algorithm for DFS traversal. (6)

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