



Register Number: .....

**B.E DEGREE EXAMINATIONS: DEC 2014**

(Regulation 2009)

Third Semester

**CSE201: DATA STRUCTURES AND ALGORITHMS**

(Common to ECE/EEE/EIE)

**Time: Three Hours**

**Maximum Marks: 100**

**Answer all the Questions:-**

**PART A (10 x 1 = 10 Marks)**

1. Two main measures for the efficiency of an algorithm are
  - a) Processor and speed
  - b) Complexity and capacity
  - c) Time and space
  - d) Data and space
2. The time factor when determining the efficiency of algorithm is measured by
  - a) Counting microsecond's
  - b) counting the number of key operations
  - c) counting the number of statements
  - d) counting the kilobytes of algorithm
3. Which data structure allows deleting data elements from front and inserting at rear?
  - a) Stacks
  - b) Queues
  - c) Deques
  - d) Binary search tree
4. Which of the following data structure is linear type?
  - a) Graphs
  - b) Lists
  - c) Files
  - d) Tree
5. The maximum number of children of a binary search tree is
  - a) 2
  - b) 3
  - c) 1
  - d) 0
6. The in order traversal of tree will yield a sorted listing of elements of tree in
  - a) Binary trees
  - b) Binary search trees
  - c) Heaps
  - d) Balanced tree
7. Which of the following sorting algorithm is of divide-and-conquer type?
  - a) Bubble sort
  - b) Insertion sort
  - c) Selection sort
  - d) Merge Sort

8. The complexity of Bubble sort algorithm is
- a)  $O(n)$
  - b)  $O(\log n)$
  - c)  $O(n^2)$
  - d)  $O(n \log n)$
9. A connected graph T without any cycles is called
- a) directed graph
  - b) Undirected graph
  - c) Tree
  - d) Ordered Graph
10. If every node u in G is adjacent to every other node v in G, A graph is said to be
- a) Isolated
  - b) Complete
  - c) Finite
  - d) Strongly connected

**PART B (10 x 2 = 20 Marks)**

- 11. What is an algorithm?
- 12. Why we need to analyze the time complexity of an algorithm?
- 13. What is ADT? List any two examples.
- 14. What are the essential operations that can be done in stack ADT?
- 15. What is tree traversal? What are its types?
- 16. State the purpose of linear probing.
- 17. What is pivot point in sorting? In which sorting is it essential?
- 18. What are the advantages of quick sort?
- 19. What is depth first search? Give one application of depth first search.
- 20. What is directed graph? Give one example.

**PART C (5 x 14 = 70 Marks)**

21. a) (i) Define and give appropriate examples: Big-oh, Big-omega and Theta notations.  
(ii) Write an algorithm for biggest among three numbers and state its order of complexity.

**(OR)**

- b) Write a recursive algorithm to compute the fibonacci of a given number and state its time complexity.
22. a) List the various types of linked lists and their advantages and disadvantages.

**(OR)**

- b) Write a C implementation of the QUEUE ADT using an array.

23. a) Write the C code for implementing the Binary Search Tree ADT.

**(OR)**

b) Explain the different tree traversal procedures with neat example.

24. a) Illustrate the MERGESORT algorithm on the following input: 10, 15, 12, 8, 5, 9, 16, 18, 2, 4. Also write an algorithm.

**(OR)**

b) State an algorithm for External Sorting. Illustrate with an example.

25. a) What are the uses of Dijkstra's algorithm? Explain with example.

**(OR)**

b) What is minimum spanning tree? Explain the algorithm to construct the minimum spanning tree.

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