

B.E/B.TECH. DEGREE EXAMINATIONS: NOV/DEC 2010

Second Semester

U07CS201: DATA STRUCTURES

(Common to Computer Science and Engineering & Information Technology)

Time: Three Hours

Maximum Marks: 100

Answer ALL Questions:-

PART A (10 x 1 = 10 Marks)

1. The standard notation developed to represent functions which bound the computing time for algorithms is
A) Order Notation B) Complexity Notation C) Time Notation D) Space Notation
2. In which problem solving method the solution is obtained via sequence of intermediate steps?
A) Greedy method B) Dynamic Programming
C) Divide and Conquer D) Backtracking
3. Abstract Data Types are _____ abstractions
A) Mathematical B) Structural C) Physical D) Data
4. The function *malloc()* returns an/a
A) Integer B) Float C) Pointer D) Void
5. A node of a binary tree can have maximum of _____ sub trees.
A) Three B) One C) Two D) Zero
6. The leaves of an expression tree will have
A) Operators B) Operands C) Static Constant D) Pointer Variable
7. If the input is presorted, the running time of insertion sort is _____
A) $O(n)$ B) $O(n^2)$ C) $O(n \log n)$ D) $O(\log n)$
8. Shell sort uses _____ sequence
A) decrement B) quadratic C) log D) increment
9. If a graph consists of ordered pair (v,w) then the graph is called as _____ graph
A) directed B) undirected C) cyclic D) acyclic
10. If the graph has _____ edge cost then the Dijkstra's algorithm will not work
A) zero B) negative C) positive D) minimum

PART B (10 x 2 = 20 Marks)

11. Define worst case complexity
12. Give the basic idea with divide and conquer strategy
13. Define Abstract Data Type (ADT)
14. What is the prime objective of going to doubly linked list ?
15. Define a tree
16. What do you mean by collision in hashing?
17. Give the average and worst case running time of quick sort
18. In heap sort, how can you control the increase in space complexity due to an extra array?
19. Define shortest path
20. List the two important key points of depth first search.

PART C (5 x 14 = 70 Marks)

21. a) Explain the top down design method of computer problem solving in detail.
(OR)
 - b) (i) List the properties of a good algorithm (10)
 - (ii) What is meant by trading storage for efficiency gains (4)
22. a) Write routines to add and multiply 2 polynomials using array
(OR)
 - b) Convert the following infix expression into postfix expression
$$a + b * c + (d * e + f) * g$$
23. a) Write and explain the routine for deleting any node of a binary search tree and explain its operation.
(OR)
 - b) Write the initialization routine for open hash table.
24. a) (i) Write the algorithm for insertion sort and explain its operation after each pass. (10)
(ii) Perform the analysis of insertion sort algorithm (4)
(OR)
 - b) (i) List the four steps to perform quicksort (8)
 - (ii) Discuss the choices of picking the pivot in quick sort (6)
25. a) Write the pseudocode to perform topological sort.
(OR)
 - b) Discuss in brief about Dijkstra's algorithm with an example.
