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

(Regulation 2009)

Second Semester

**CSE102: DATA STRUCTURES**

(Common to CSE/IT)

**Time: Three Hours**                                      **Maximum Marks: 100**

**Answer all the Questions:-**

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

1. Term Data Structure refers to _____ and interrelationship between them.

   a) Organization of the element      b) None of these

   c) Coding standards      d) Programming language standards

2. The complexity of multiplying two matrices of order m*n and n*p is_____

   a) mnp      b) mp

   c) mn      d) np

3. Which of the following operations is performed more efficiently by doubly linked list than by singly linked list?

   a) Deleting a node whose location is given      b) Searching of an unsorted list for a given item

   c) Inverting a node after the node with given location      d) Traversing a list to process each node

4. Which one of the following is true in case of circular linked list _____

   a) components are all linked together in some sequential manner      b) there is no beginning and no end.

   c) components are arranged hierarchically.      d) forward and backward traversal within the list is permitted.

5. A data structure where elements can be added or removed at either end but not in the middle _____

a) Linked lists      b) Stacks

c) Queues      d) Dequeue

6. Which data structure is needed to convert infix notation to postfix notation?

a) Graphs      b) Queue

c) Tree      d) Stack

7. What is the minimum number of queues needed to implement the priority queue?

a) 1      b) 3

c) 2      d) 5

8. The time required in best case for search operation in binary tree is _____.

a) $O(n)$      b) $O(\log n)$

c) $O(2n)$      d) $O(\log 2n)$

9. Merging 4 sorted files containing 50, 10, 25 and 15 records will take ____ time.

a) $O(175)$      b) $O(100)$

c) $O(125)$      d) $O(200)$

10. In a selection sort of n elements, how many times is the swap function called in the complete execution of the algorithm?

a) 1      b) n-1

c) n logn      d) $n^2$

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

11. What do exponential growth functions means?
12. Write an algorithm for finding the n-th factorial number?
13. Write an algorithm to find whether link list has a loop or not.
14. State whether Linked List is linear or nonlinear data structure. Justify in terms of access and storage strategies.
15. Differentiate between PUSH and POP?
16. Define double ended queue.
17. Compare binary tree and binary search tree.
18. What do you mean by structure property in a heap?
19. Justify the complexity of insertion sort?
20. Compare internal and external sortins.

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

21. a) Define the term 'complexity of an algorithm; and explain best case, worst-case and average case analysis of an algorithm with suitable example.

    **(OR)**

    b) (i) Give a short note on top down approach. (8)

    (ii) Explain various steps for analysing an algorithm. (6)


22. a) (i) Produce the correct routines to implement addition and subtraction of two polynomials. (9)

    (ii) Give a note on array ADT with neat explanation. (5)

    **(OR)**

    b) Explain the need of singly linked list and explain the operations with example.


23. a) Summarize the view about stack? Explain two different representations of stack. List the operations performed on a stack and write functions for implementing operations.

    **(OR)**

    b) What is Queue develop functions to implement queue.


24. a) With example explain AVL insertion algorithm.

    **(OR)**

    b) (i) Traverse the given tree using In _order, Pre_order and Post_order traversals and write algorithms. (6)

    (ii) Explain the importance of Binary heap with simple example and explain its implementation. (8)


25. a) (i) Perform heap sort for the following. (8)

    96,31,27, 42,34,76, 61,10,4

    (ii) Illustrate the concept of external sorting. (6)

    **(OR)**

    b) Write a program to sort the element whose worst case is $O(n^2)$ and average case is $O(n \log n)$ and sort the given example.

    35, 45, 25, 11, 6, 85, 17, 34

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