

B.TECH. DEGREE EXAMINATION, MAY 2014**Fourth Semester**

Branch : Computer Science and Engineering

DATA STRUCTURES AND PROGRAMMING LANGUAGE METHODOLOGY (R)

(Old Scheme—Prior to 2010 Admissions)

[Supplementary/Mercy Chance]

Time : Three Hours

Maximum : 100 Marks

Part A*Answer all questions.**Each question carries 4 marks.*

1. Define Algorithm. What are the characteristics of an algorithm ?
2. What is meant by time complexity of an algorithm ? Explain.
3. Give *two* applications of stack.
4. What is a priority queue ? Explain.
5. Write algorithms to perform push and pop operations on a linked stack.
6. Write an algorithm to reverse a singly linked list using only one pass through the list.
7. How can we represent a binary tree using array ? Give an example.
8. Write an algorithm to count the number of nodes in a Binary tree.
9. Give insertion sort algorithm.
10. What is external sorting ? Give an example.



(10 × 4 = 40 marks)

Part B*Answer all questions.**Each question carries 12 marks.*

11. What is recursion ? Write a recursive algorithms to find the *n*th Fibonacci number. Analyze the time and space complexity of your algorithm.

Or

12. Give an algorithm for binary search. What is it time complexity ?
13. What are sparse matrices ? Write an algorithm to add two sparse matrices.

Or

14. Write the algorithm for expression evaluation. Explain with an example.

Turn over

15. Write a function to merge two ordered singly linked lists of integers into one ordered list.

Or

16. Write algorithm for pattern matching in strings.

17. Write a function to construct the binary tree with a given inorder and postorder traversal.

Or

18. Give the non-recursive Breadth First Search graph traversal algorithm. Explain with an example.

19. Differentiate bubble sort and selection sort. Give the traces of the algorithms for the input :

8 3 5 7 4 2.

Or

20. Give quick sort algorithm. Explain the working of the algorithm with an example. Prove that the worst case time complexity of the algorithm is $O(n^2)$.

(5 × 12 = 60 marks)

