

**B.TECH. DEGREE EXAMINATION, NOVEMBER 2010****Fourth Semester**

Branch—Computer Science and Engineering

**DATA STRUCTURES AND PROGRAMMING METHODOLOGIES (R)**

(Prior to 2007 Admissions—Supplementary)

Time : Three Hours

Maximum : 100 Marks

**Part A***Answer all questions.*

1. What is meant by efficiency of an algorithm ? How it can be improved ?
2. Explain how recursion can be removed.
3. What is a sparse matrix ? Explain with example.
4. Write down the equivalent infix expression for the following post fix expression.  
A, B, C, -, /, A, D, E, +, \*, -.
5. Describe the applications of stack.
6. List and explain the operations that are allowed in a doubly linked list.
7. What is a complete binary tree ? Explain with an example.
8. Explain directed a cyclic graph with example.
9. Differentiate between internal and external sorting.
10. Explain Radix sort algorithm.

(10 × 4 = 40 marks)

**Part B***Answer all questions.*

11. What are recursive algorithms ? How they are analysed ? Explain with example.

*Or*

12. Write notes on :

- (a) Time complexity and space complexity.
- (b) System life cycle.

**Turn over**

13. Describe the implementation of circular queue using array. Bring out advantages compared to priority queue.

Or

14. Write the algorithm which converts the post-fix expression to infix expression. Trace the algorithm with an example showing the status of the stack.
15. A singly linked list is used to represent a circular queue. Write an algorithm to find the duplicate data element in it.

Or

16. What is meant by pattern matching? Explain it with any one algorithm.
17. Write the three tree traversal algorithms and explain it with examples.

Or

18. Write the algorithm to implement BFS of a graph. Explain it with example.
19. Write and explain the Heap sort algorithm with an example. Analyse it and write Best case, average case and worst case time complexities.

Or

20. Write the insertion sort algorithm and explain it with an example. Also analyse the time complexities.
- (5 × 12 = 60 marks)