C 1272 (Pages : 2) Name.....

Reg. No.....

FOURTH SEMESTER B.TECH. (ENGINEERING) [14 SCHEME] DEGREE EXAMINATION, APRIL 2016

CS/IT 14 403—DATA STRUCTURES AND ALGORITHMS

Time : Three Hours Maximum : 100 Marks

Part A

1. Describe the use of sparse matrices.
2. Explain time and space complexity of algorithms.
3. What is a Queue ? Explain its operations with example.
4. Write the algorithm for converting infix expression to postfix expression.
5. Differentiate between DFS and BFS.
6. Write the recursive tree traversal algorithm for in order, pre order and post order traversals.
7. Write a short note on AVL trees.
8. Sort the following numbers using Merge sort procedure and discuss the time complexity and space complexity of this Algorithm.

   34, 67, 23, 45, 87, 54, 8, 10, 60

9. Briefly explain the various Hashing techniques.
10. Explain the working of sequential search with an example.

(8 × 5 = 40 marks)

Part B

11. How can the complexity of algorithms be evaluated for different algorithms ? Explain with examples

Or

12. What is Recursion ? Explain recursive algorithms with example.
13. Give the prefix and postfix form of the following given expression.

    (i) (A – B*C – D)/(E + F)

    (ii) ((A + B)*C – (D – E)^(F + G))

    (iii) A + B*(C – D)/P

Or

Turn over

14. Write the algorithm for converting infix expression to postfix expression. Convert the following Infix Expression to postfix using stack. ((A – (B + C))*D) + $(E + F).

15. State and explain Dijkstra's algorithm with example

Or

16. What is binary search tree ? Construct a binary search tree by inserting the following data sequentially

    45, 32, 70, 67, 21, 85, 92, 40

17. Sort the following numbers using Quick sort procedure and discuss the time complexity and space complexity of this Algorithm.

    42, 12, -8, 98, 67, 83, 08, 104, 07

Or

18. Explain the Bubble Sort, Insertion Sort and External Sort with examples.

(4 × 15 = 60 marks)