Reg. No. : | | | | | | | | | | | |

W 6123

M.E. DEGREE EXAMINATION, JANUARY 2008

First Semester

Computer Science and Engineering

CS 1602 — DATA STRUCTURES AND ALGORITHMS

(Regulation 2005)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define TEMPLATE and state its usage.

2. Define POINTER and state its usage.

3. State the advantages of B – Trees over binary trees.

4. State the properties of BINARY SEARCH TREE with a suitable example.

5. List the operations defined on SET data type with an example.

6. List the operations defined on GRAPH with a suitable example.

7. Discuss the advantages of BUDDY system.

8. Discuss the types of memory allocation.

9. Describe the Divide and Conquer method with its generalised algorithm.

10. Define the term Multi-way Merge Sort.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Develop an algorithm for displaying all the values exactly once, the contents of a CIRCULAR LINKED LIST, starting from a user specified starting value. (8)

(ii) Define the concept and advantages of DOUBLY LINKED LIST with an example. (8)

Or

(b) Develop suitable programs or algorithms for initialization, insertion and deletion of names list in alphabetical order. Provide assumptions for register number, name with initials present in the name list. (16)

12. (a) Develop an algorithm for converting a given infix arithmetic expression to its equivalent post-fix expression with a sample conversion. (16)

Or

(b) Develop an algorithm for recursive and non-recursive tree traversals using In-Order traversal method with an example. (16)

13. (a) Develop an algorithm for obtaining shortest path for a given pair of nodes from an adjacency matrix of a graph. For a sample of graph of ten nodes with a degree of 3 each, compute shortest path as per your algorithm. (16)

Or

(b) Develop an algorithm for obtaining a Spanning tree for a given graph and a starting node of a tree. (16)

14. (a) (i) Discuss the issues in memory management. (6)

(ii) Develop an algorithm for identifying freed memory locations and for collecting garbage, in memory management. (10)

Or

(b) (i) Develop an algorithm for implementing compaction of memory locations. (8)

(ii) Develop an algorithm for allocating memory locations in terms of EQUAL sized memory blocks. (8)

15. (a) Develop an algorithm for sorting and computing time requirements for arranging integers of a Vector, in Non-Descending order, using Bin sort Method. (16)

Or

(b) Develop an algorithm for implementing "8 queens problem" using BACKTRACKING method. (16)
