D 52013 (Pages 2) Name

Reg. No. . . . . .

FIRST SEMESTER M.Sc. DEGREE EXAMINATION, JANUARY 2009

Computer Science (Main)

CS 102—ADVANCED DATA STRUCTURES

(2005 Admission)

Time : Three Hours Maximum : 80 Marks

Part A

Answer any **five** *questions.*
All questions carry equal marks.

1. (a) Explain the need for analyzing an algorithm with a typical example.

   (b) Explain the application of stack with one example.

2. (a) What are priority queues ? Explain the different representation.

   (b) Define a Graph. Give example.

3. Write an algorithm to count the number of nodes in a singly linked list. The last node has link field 0.

4. Define : (i) B-trees ; (ii) Splay trees.

5. Write routines to implement the basic binary search tree operation.

6. Propose an algorithm to insert M nodes into a binary heap on N elements in 0 (M + log N log N) time.

7. "Dynamic hashing is more powerful than Static Hashing" Comment this statement with example.

(5 x 8 = 40 marks)

Part B

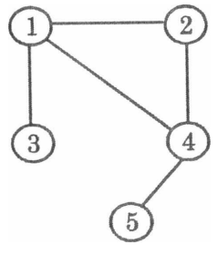
Answer any **four** *questions.*
All questions carry equal marks.

8. (a) Write an algorithm to insert an element and display the elements present in the tree.

   (b) Explain deterministic skip lists.

9. (a) Given an integer k, write a procedure which deletes the kth element from the linked list.

   (b) Draw the memory representation of the given graph. Explain different application of graph.



Turn over

10. **(a) Prove that the depth of a random binary search tree (depth of the deepest node) is 0 $(\log n)$, on average.**

    (b) Write an algorithm to construct the binary tree with given preorder and inorder sequences.

11. **(a) Define Red Black tree. Explain the worst-case height of a red-black tree.**

    (b) Explain Min-Max heap.

12. **Can every recursive algorithm be devised in terms of iterative algorithms ? Can the converse be possible always ? Justify, discuss and illustrate.**

13. **(a) Explain the application of Heaps.**

    (b) Explain the application threaded binary tree.

(4 x 10 = 40 marks)