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

# Question Paper Code : 51337

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2014.

Third Semester

Computer Science and Engineering

CS 2201/CS 33/080230007/10144 CS 302 — DATA STRUCTURES

(Regulation 2008/2010)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Write an ADT for insertion in a stack.

2. List the applications of Stack and Queue.

3. Give the expression tree for $(a+b)*((c+d^*e)*f)$

4. How to convert binary tree into Threaded binary tree? Give example.

5. What is B —Tree? Give example.

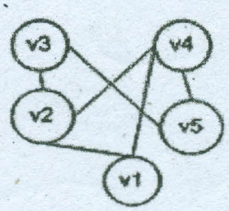
6. What is heap order property?

7. What is Rehashing?

8. List the properties of equivalence relation.

9. What is Biconnectivity? Give example.

10. Find the adjacency matrix and adjacency list for the following graph.



PART B — (5 × 16 = 80 marks)

11. (a) (i) Write an ADT for Enqueue and Dequeue (6)

(ii) Given two sorted lists, $L_1$ and $L_2$, write a procedure to compute $L_1 \cap L_2$

$L_1 \cup L_2$ using only the basic list operations. (10)

Or

(b) Write a C program that uses functions to perform the following operation on doubly linked list

(i) Creation

(ii) Insertion

(iii) Deletion

(iv) Traversal in both ways (16)

12. (a) What is binary Search tree? Write a C program to perform the following operations in a binary Search tree

(i) Insert

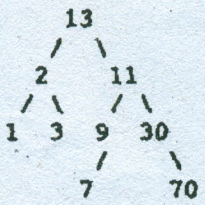
(ii) Delete

(iii) Find Min

(iv) Find Max (16)

Or

(b) (i) Write an ADT for Inorder, Preorder and Postorder traversals. Traverse the given tree using Inorder, Preorder and Postorder Traversals (12)




(ii) Write short notes on the application of trees (4)

13. (a) Explain the following routines in AVL tree with example. (16)

(i) Insertion

(ii) Deletion

(iii) Single rotation

(iv) Double rotation

Or

(b) (i) Write a program that performs the following operations in a binary heap

(1) Insert

(2) DeleteMin

(3) Build Heap

(4) FindMin (8)

(ii) Explain the various rotations in Splaying strategy. Also explain insertion and deletion in a Splay tree with example (8)

14. (a) Given Input (4371,1323,6173,4111,4299,9669,1989) and a hash function $h(X) = X(\text{mod } 10)$ show the result of (16)

(i) Separate chaining hash table.

(ii) Open addressing hash table using linear Probing

(iii) Open addressing hash table using quadratic Probing

(iv) Open addressing hash table with second hash function

$h2(X) = 7 - (X \ MOD \ 7)$

Or

(b) (i) Explain the Smart union algorithms with example. (8)

(ii) Write a program to determine the effects of path compression and various union strategies. (8)

15. (a) (i) Write a program to find an Euler circuit in a graph. Trace the algorithm with example. (6)

(ii) Write the Pseudo code for Dijkstra's shortest path algorithm. Give suitable example to trace the algorithm. (10)

Or

(b) (i) Write and trace the following algorithms with suitable example.

(1) Breadth-first Traversal

(2) Depth-first Traversal (10)

(ii) Write a pseudo code for Prim's algorithm. Also give an example to construct a minimum spanning tree. (6)

---