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Third Semester B.E. Degree Examination, January 2013
Data Structures with C

Time: 3 hrs.

Max. Marks:100

**Note: Answer FIVE full questions, selecting
at least TWO questions from each part.**

PART – A

- 1 a. What are pointer variables? How to declare a pointer variable? (05 Marks)
b. What are the various memory allocation techniques? Explain how memory can be dynamically allocated using malloc ()? (10 Marks)
c. What is recursion? What are the various types of recursion? (05 Marks)
- 2 a. What is the difference between int *a and int a[5] and int *[5]? (06 Marks)
b. What is a structure? How to declare and initialize a structure? (06 Marks)
c. Write a program in C to read a sparse matrix of integer values and search this matrix for an element specified by the user. (08 Marks)
- 3 a. Define stack. List the operations on stack. (08 Marks)
b. Obtain the postfix and prefix expression for $((A + (B - C) * D) ^ E) + F$. (06 Marks)
c. What is system stack? How the control is transferred to or from the function with the help of activation record? (06 Marks)
- 4 a. What is a linked list? Explain the different types of linked list with diagram. (10 Marks)
b. Write a function to insert a node at front and rear end in a circular linked list. Write down sequence of steps to be followed. (10 Marks)

PART – B

- 5 a. What is a tree? Explain: i) root node, ii) child, iii) siblings, iv) ancestors using structure representation. (06 Marks)
b. What is a binary tree? How it is represented using array and linklist? (10 Marks)
c. What is a heap? Explain the different types of heap? (04 Marks)
- 6 a. What is a binary search tree? Draw the binary search tree for the following input: 14, 5, 6, 2, 18, 20, 16, 18, -1, 21. (10 Marks)
b. What is a forest? Explain the different method of traversing a tree with following tree:

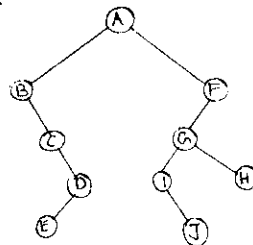


Fig.Q6(b)

(10 Marks)

- 7 a. What is priority queue? Explain the various types of priority queues. (08 Marks)
b. Write short notes on: i) Binomial heaps, ii) Fibonacci heap. (06 Marks)
c. What is leftist tree? Explain different types of leftist trees. (06 Marks)
- 8 a. What is an AVL tree? Write the algorithm to insert an item in to AVL tree. (08 Marks)
b. Write short notes on: i) Red-Black tree, ii) Splay trees. (06 Marks)
c. Explain the different types of rotations of an AVL tree. (06 Marks)