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Third Semester B.E. Degree Examination, Dec.2014/Jan.2015
Data Structures with C

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions, selecting
atleast 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 dynamic allocation is done using malloc()? (10 Marks)
c. What is recursion? What are the various types of recursion? (05 Marks)
- 2 a. Define structure and union with suitable example. (08 Marks)
b. Write a C program with an appropriate structure definition and variable declaration to store information about an employee, using nested structures. Consider the following fields like: ENAME, EMPID, DOJ (Date, Month, Year) and Salary (Basic, DA, HRA). (12 Marks)
- 3 a. Define stack. Give the C implementation of push and pop functions. Include check for empty and full conditions of stack. (08 Marks)
b. Write an algorithm to convert infix to post fix expression and apply the same to convert the following expression from in fix to post fix:
i) $(a * b) + c/d$ ii) $(((a/b - c) + (d * e)) - (a * c))$. (12 Marks)
- 4 a. Define linked list. Write a C program to implement the insert and delete operation on queue using linked list. (10 Marks)
b. Explain the different types of linked list with diagram. (10 Marks)

PART – B

- 5 a. Define the following:
i) Binary tree
ii) Complete binary tree
iii) Almost complete binary tree
iv) Binary search tree
v) Depth of a tree. (10 Marks)
b. In brief describe any five application of trees. (05 Marks)
c. What is threaded binary tree? Explain right and left in threaded binary tree. (05 Marks)
- 6 a. Write C function for the following tree traversals:
i) inorder ii) preorder iii) postorder. (10 Marks)
b. Explain min and max heap with example. (10 Marks)
- 7 a. Implement Fibonacci heap. (10 Marks)
b. What is binomial heap? Explain the steps involved in the deletion of min element from a binomial heap. (10 Marks)
- 8 a. Explain AVL tree. (10 Marks)
b. Explain the red-black tree. Also, state its properties. (10 Marks)