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06CS35

Third Semester B.E. Degree Examination, December 2010
Data Structures with C

Time: 3 hrs.

Max. Marks:100

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

PART - A

- 1 a. What is a pointer? How do you declare and initialize the pointers? How do you access the value pointed to by a pointer? (05 Marks)
- b. What is static and dynamic memory allocation? Explain with examples, the dynamic memory allocation functions. (10 Marks)
- c. What is the output of the following code?


```
int num[5] = { 3, 4, 6, 2, 1 };
int *p = num;
int *q = num + 2;
int *r = &num[1];
Printf("%d %d", num[2], *(num + 2));
Printf("%d %d", *p, *(p + 1));
Printf("%d %d", *q, *(q + 1));
Printf("%d %d", *r, *(r + 1));
```

 (05 Marks)
- 2 a. Explain the following string functions, with examples:
i) STRTOK ii) STRCMP iii) STRTOL iv) STRSTR (12 Marks)
- b. Write a C program to represent a complex number, using structure and multiply 2 complex numbers. (08 Marks)
- 3 a. Define stack. List the operations on stack. Write the C implementation of these operations. (12 Marks)
- b. Implement reversing a string, using a stack in C. (08 Marks)
- 4 a. Write an algorithm for evaluating a valid postfix expression. Trace the same on
1 2 3 + * 3 2 1 - + * (10 Marks)
- b. What is the advantage of circular queue over linear queue? Write C routines for inserting and deleting an element from the circular queue. (10 Marks)

PART - B

- 5 a. What is recursion? Write recursion function for finding maximum of n numbers. (08 Marks)
- b. Briefly explain the structures of different types of linked lists. Write a C function to count number of elements present in a singly linked list. (12 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

- 6 a. How can an ordinary queue be represented, using a singly linked list? Write C functions for linked implementation of ordinary queue insertion and deletion. (10 Marks)
- b. Write a C program to perform the following operations on doubly linked list:
- Insert a node
 - Delete a node.
- (10 Marks)
- 7 a. What are binary trees? Mention different types of binary trees and explain briefly. (06 Marks)
- b. Write C functions for the following tree traversals:
- Inorder
 - Preorder
 - Postorder.
- (06 Marks)
- c. Write an algorithm to construct a binary tree for the inputs
14, 15, 4, 9, 7, 18, 3, 5, 16, 4, 20, 17, 9, 14, 5
indicating a message for duplicate members. Draw the tree constructed by the above program. (08 Marks)
- 8 Write short notes on:
- Unions
 - Circular lists
 - Threaded binary tree
 - Types of files.
- (20 Marks)
