Third Semester B.E. Degree Examination, January 2013
Data Structure 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. Write the output for the following program:

```
void main( )
{
    int a = 7, b = 8, *p, *q;
    p = &a;
    q = &b;
    printf("%d", ++a);
    printf("%d", ++(*p));
    printf("%d", —(*q));
    printf("%d", —b);

}
```
(04 Marks)

   b. What is a pointer variable? Explain Lvalue and Rvalue expression, with example. (06 Marks)
   c. Give atleast two differences between
       i) Static memory allocation and dynamic memory allocation
       ii) malloc( ) & calloc( )   (04 Marks)
   d. Write a C program using pass by reference method to swap two characters.   (06 Marks)

2 a. Explain the following string manipulation functions:
       i) strcpy   ii) strcmp   iii) strchr   iv) strtok   (04 Marks)
   b. Define: i) Nested structures   ii) Array of structure.
       Write a program by making use of the above concept to store student information and
       display the same.   (10 Marks)
   c. Explain the following function with suitable example:
       i) fseek( )   ii) ftell( )   iii) rewind( )   (06 Marks)

3 a. Define a stack explain the operations that can be performed on stack and give the C
       implementation of the operations.   (10 Marks)
   b. Convert the following infix expression to postfix expression:
       i) (A + B) * (c $ (D – E) + F) – G
       ii) A + (((B – C) * (D – E) + F) / G) $(H – J)   (06 Marks)
   c. Write the algorithm that evaluates postfix expression.   (04 Marks)

4 a. What is recursion? Write a C function to find n^{th} Fibonacci numbers. Trace the program for
       n = 5.   (10 Marks)
   b. Write a C program to perform Insert, Delete and display operations on a circular queue.
                                                                                                     (10 Marks)

PART – B

5 a. Explain how linked list can be represented using arrays. **(04 Marks)**

b. Write a C function to insert and delete an element at the rear end of the singly linked list.
(06 Marks)

c. Write a C program to simulate a priority queue using singly linked list. **(10 Marks)**

6 a. Explain the following:
i) Circular list   ii) Doubly linked list, using suitable diagrams. **(06 Marks)**

b. Write a C routine to perform the following operations using circular linked list.
i)   to place the elements of a list in increasing order
ii)   to find the sum of integers and the number of elements in a list. **(10 Marks)**

c. What is meant by header node? Explain with an example. **(04 Marks)**

7 a. Define the following with respect to tree. Mention an example of each.
i)   Binary tree   ii) Strictly binary tree   iii) Complete binary tree
iv) Leaf node   v) Internal node. **(10 Marks)**

b. Enumerate the 3-types of traversals of the following B-tree. [Refer Fig.Q7(b)] **(06 Marks)**
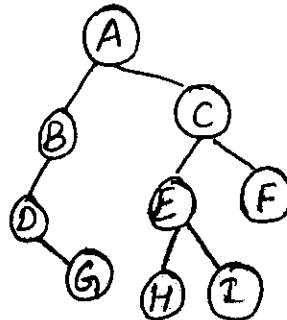

Fig.Q7(b)

c. Describe any four applications of trees. **(04 Marks)**

8 a. Write an algorithm to insert an element into a binary tree for the input 14,15,4,9,7,18,3,5,16,20,17,2. Draw the tree constructed by the above function. **(10 Marks)**

b. Write a routine to implement inorder traversal of a right-in threaded binary tree. Give example. **(10 Marks)**

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