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P.E.S. College of Engineering, Mandya - 571 401
(An Autonomous Institution affiliated to VTU, Belgaum)
Second Semester - Master of Computer Applications (MCA)
Semester End Examination; June/July - 2015
Data Structures using C

Time: 3 hrs   *Max. Marks: 100*

Note: Answer **FIVE** Full questions, selecting **ONE** full question from each unit.

UNIT - I

1. a. Define ADT. Write ADT for rational numbers with following operations: making – rational, add – rational, multiply–rational and equality–rational.   10

   b. What is a pointer variable? Give example.   2

   c. Explain the dynamic memory allocation functions in C.   8

2. a. Demonstrate the row-major representation of a two dimensional array with an example.   8

   b. Explain structures and unions with example.   12

UNIT - II

3. a. Write a C program to implement operations of stack.   12

   b. Convert the following Infix expressions to prefix and postfix expressions.

   i) $(A+B)*(D-C)$ ii) $\left(\left(6+(2-3)*2\char`\^4\right)+8\right)$

   iii) $A\$B*(H-J*K)+P/K*G$ iv) $(A+B\char`\^C\char`\^D)*(E+F/D)$ 8

4. a. List the applications of stack and show the stack representation to evaluate the postfix expressions : $88+382/*2+-$ 9

   b. Write a recursive C program to solve Tower of Hanoi problem and also trace the function for 3 disks.   11

UNIT - III

5. a. Distinguish between linear queue and circular queue. Write C functions to insert an element and delete an element from a linear queue.   10

   b. Demonstrate the working of a circular queue with an example.   10

6. a. Write 'c functions to implement following operations in singly linked list.

   i) Add a node to the front

   ii) Add a node at end

   iii) Delete a node at end

   iv) Display contents of linked list.   12

b. Write C code to insert a node and delete a node from a doubly linked list.   8

UNIT - IV

7 a. List the types of searching with their advantages.   10

b. Write C program to search a number using a linear search technique.   10

8 a. Explain different types of tree traversals with C function.   10

b. Write short notes on: i) Binary tree   ii) Threaded Binary Tree.   10

UNIT - V

9 a. Illustrate the bubble sort method with example.   10

b. Write C routine to sort numbers using merge sort method and trace the function for the data set. 60, 50, 25, 10, 35, 25, 75, 30   10

10 a. What is heap? Construct an ascending heap for the following list of numbers:

22 56 47 32 15 97 84 35   10

b. Write a C program to sort numbers using Insertion sort method.   10

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