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P.E.S. College of Engineering, Mandya - 571 401
(An Autonomous Institution affiliated to VTU, Belagavi)
Second Semester, Master of Computer Applications (MCA)
Semester End Examination; May/June - 2018
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. Differentiate between static memory allocation and dynamic memory allocation. Explain the various dynamic memory allocation and deallocation functions in C with suitable examples.   10

  b. What is an Abstract Data Type (ADT)? Give ADT for Rational numbers with following operations: making-rational, add-rational, equality-rational and multiply-rational.   10

2 a. Differentiate between arrays and structures. Write a program to add two complex numbers using structures and functions.   10

  b. Define a structure data type called "date" containing three numbers day, month and year. Develop a program that would assign the values to the individual members and display the date in the following format: day-month-year.   6

  c. Bring out the differences between structures and unions with appropriate examples.   4

UNIT - II

3 a. Differentiate between stacks and queues. Write C functions for Push, Pop and Display functions of stack.   11

  b. Write recursive function for binary search.   3

  c. Convert the following infix expression to postfix and prefix form :
     i) A+B/D*Y   ii) A/Y/Z*M)/(P*Y)   iii) (M-P/Y)*Z/Y   6

4 a. Write C program to evaluate valid postfix expression using stack. Trace the same on :

9	3	/	5	-	9	-	2	*

    10

  b. Write program to convert infix expression to postfix form.   10

UNIT - III

5 a. What is the advantage of circular queue over simple queue? Write C functions to perform insertion, deletion and display operations on a circular queue using arrays.   10

  b. Write C functions to perform insertion and deletion operations on simple queue using arrays.   6

  c. What are priority queues?   4

6 a. Write C functions for :

      i) Push operation of stack using singly linked list   10

      ii) Pop operation of stack using singly linked list

  b. Write C functions for :

      i) Insertion at last position in doubly linked list   10

      ii) Search a key in singly linked list

UNIT - IV

7 a. Construct BST for the given data and write the outcome of Pre-order, In-order and   10
Post-order tree traversal. Data: 55, 44, 88, 77, 33, 11, 66.

  b. Explain the interpolation search.   5

  c. Write C program to search a key using sequential search.   5

8 a. What is Hash Collision? Explain the methods for resolving Hash Collision.   7

  b. Write recursive C functions for Post-order and In-order binary tree traversal.   6

  c. Define Binary Search Tree (BST). Write C routine to search a key in BST.   7

UNIT - V

9 a. Write C program to sort *N* numbers using Quick sort.   10

  b. Write C program to sort *N* numbers using Bubble sort. Trace the working of Bubble sort for
the following data :   10

    100, 40, 80, 70, 60, 30, 20, 10, 50

10 a. Trace the working of Radix sort for the following data :   5

    145, 891, 675, 543, 324, 678, 879, 123, 245

  b. Write C routine to sort numbers using Selection sort. Trace the working of Selection sort
for the given data :   10

    55, 99, 44, 88, 77, 33, 11, 66, 22

  c. Trace the working of Shell sort for the following data :   5

    100, 40, 80, 70, 60, 30, 20, 10, 50

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