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P.E.S. College of Engineering, Mandya - 571 401
(An Autonomous Institution affiliated to VTU, Belgaum)
Third Semester, B.E. - Information Science and Engineering
Semester End Examination; Dec - 2016/Jan - 2017
Data Structure

Time: 3 hrs   *Max. Marks: 100*

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

UNIT - I

1 a. Define stack with an example. 4

  b. Implement push and pop functions for stacks using arrays. 8

  c. Convert the following postfix expression to infix and prefix expressions,

   i)   AB + C * DE – FG + $ 8

   ii) ABC DE $ * / -

2 a. Define recursion. List the types of recursion and write a recursive function to implement 'Tower of Hanoi'. 8

  b. Convert the infix expression to postfix expression, A $ B * C - D + E / F / (G + H).
  Write a C function to evaluate postfix expression and apply the same to evaluate. 12
  A = 5, B = 6, C = 4, D = 3, E = 9, F = 3, G = 2, H = 1.

UNIT - II

3 a. Differentiate between singly linked list and doubly linked list. 4

  b. Write a C function to implement circular singly linked list. 8

  c. Implement the insert and delete operation on a queue using linked list. 8

4 a. Write a C function to insert a node at front and rear end in a circular linked list. 10

  b. Explain Dynamic memory allocation and deallocation with examples. 6

  c. Write a C routine to delete a node from a DLL. 4

UNIT - III

5 a. Explain the reversing of a string using doubly linked list with a C routine. 10

  b. Write a C function to add two polynomials using singly linked list. 10

6 a. Explain the three primitive operations that can be applied to a queue. 10

  b. Explain the implementation of priority queues for insertion and deletion. 10

UNIT - IV

7 a. Write C routines to traverse a binary tree in preorder and post-order. 10

  b. Using node representation of binary trees, implement binary tree operations in C. 10

8 a. Illustrate the following expression and its tree representations:

   -(A + B) * (C + log(D+E!) – f(G, H, I, J)) 10

   Show the general traversal of the trees.

b. Write a recursive procedure that accepts a pointer to an expression tree and replaces the tree with a tree node containing numerical result of the expression's evaluation.　　10

UNIT - V

9 a. Illustrate Quicksort with a program to sort a list of *N* numbers.　　10

b. Write the method involved in Binary tree sort and write a C routine to sort an array of *n* elements using Binary tree sort.　　10

10 a. Illustrate sentinel search with example.　　10

b. Write a C routine to search for a given key using ordered list search.　　10

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