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P.E.S. College of Engineering, Mandya - 571 401
(An Autonomous Institution affiliated to VTU, Belagavi)
Third Semester, B.E. - Computer Science and Engineering
Semester End Examination; Dec - 2017/Jan - 2018
Data Structures

Time: 3 hrs   *Max. Marks: 100*

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

UNIT - I

1 a.	Write ADT for varying-length characters strings.	5
b.	Write the Postfix form of the following infix expression. Show each step clearly;	5
	(i) A$B*C-D+E/F/(G+H) (ii) ((A+B)*C-(D-E))$(F+G).	
c.	Write a program to convert an expression from infix to postfix.	10
2 a.	Define stack. Implement PUSH and POP operations.	8
b.	Write recursive program for Tower of Hanoi problem. Trace the program by taking 4 disks.	12

UNIT - II

3 a.	Give at least four differences between static memory allocation and dynamic memory allocation.	4
b.	Write a function to perform the following operations :	
	(i) To insert an element at the end of a list	8
	(ii) To delete all nodes whose info field contains same value	
c.	Write a program to add two long positive integers using circular singly linked list.	8
4 a.	Write an algorithm to perform the following on DLL :	
	(i) To concatenate two lists	
	(ii) To reverse a list	12
	(iii) To place the elements of a list in increasing order.	
b.	Write an algorithm to delete and insert a node at a given position with header node using DLL.	8

UNIT - III

5 a.	Write a node structure for linked representation of polynomial. Write and explain the algorithm to add two polynomials represented using linked lists.	12
b.	What is the advantage of circular queue over ordinary queue? Mention any two applications of queues. Write an algorithm Circular Queue Insert (CQInsert) for static implementation of circular queue.	8
6 a.	Write a function to perform the following operations using linked list :	
	(i) To insert an element into a queue	8
	(ii) To delete the element from a queue and returns in value.	

b. Write a function that merges two ordered lists into one list. When two lists are merged, the data in the resulting list are also ordered. The two original lists should be left unchanged; that is, the merged list should be new list. Use linked list implementation.   12

UNIT - IV

7 a. Define the following with example :

(i) Binary tree   (ii) Height of Binary trees   8

(iii) Balanced factor   (iv) Complete binary tree.

b. Write an algorithm for the following :

(i) Post order traversal of a binary tree

(ii) To find largest node in a BST   12

(iii) Add node to BST.

8 a. Draw the expression tree and find prefix and postfix expression for the following infix expression $((a*b+c))+d)$.   6

b. Write an algorithm to insert an element into threaded binary tree.   8

c. List and explain the properties of binary tree and also give the operations that can be performed on binary tree with an example.   6

UNIT - V

9 a. Write a program to sort the elements using quick sort method.   10

b. Given a list of number, sort them using merge sort. Show the steps clearly;   10
List: 25,57, 48, 37, 12, 92, 86, 33.

10 a. Write a program to search whether the given name is present in the list of 'N' names using binary search method.   10

b. Write a program to search for the given data using probability search.   10

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