

#### UNIT - IV

- 5 a) Details of students along with their CGPA are stored in an ordered doubly linked list whose first node is denoted by 'start'. Implement the following C routines on the DLL:
- Insert details of a new student.
  - Print the names of students whose CGPA is greater than 7.
- b) Prove that the maximum number of nodes in a binary tree of depth  $n$  is  $2^{n+1} - 1$ .
- c) Write a C routine for iterative inorder traversal of a binary tree.

10

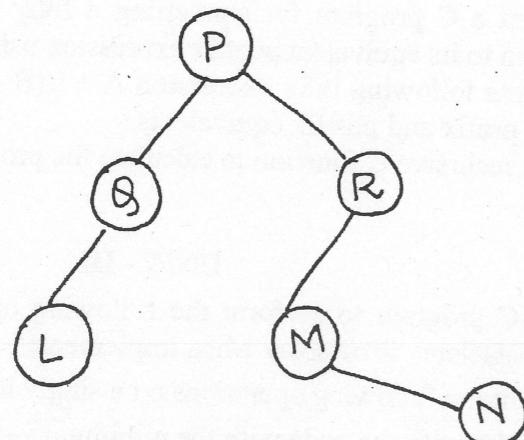
#### UNIT - V

- 6 a) Write a C routine to implement the following operations on a Binary Search Tree 10
- Print decreasing order of values
  - Calculate height
  - Find maximum value
- b) Construct the binary tree from the following tree traversals
- Preorder : FDEHBGAC  
Inorder : EDHFBGAC
- c) In what way is the implementation of a threaded binary tree helpful? Redraw the below binary tree showing its threaded representation. 05

04

06

05

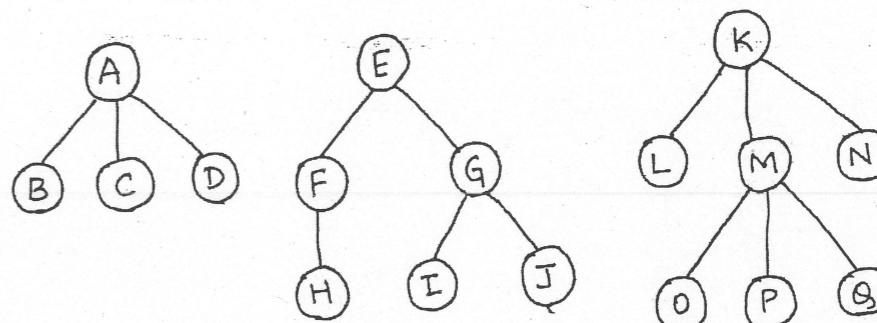


OR

- 7 a) Illustrate with appropriate examples the various scenarios of deletion operation in Binary search tree. 06

- b) Transform the given forest into a binary tree.

06



- c) How do selection trees reduce the number of comparisons needed to merge  $k$  ordered sequences into a single ordered sequence? Explain with an example.

08

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**B.M.S. College of Engineering, Bengaluru-560019**

Autonomous Institute Affiliated to VTU

December 2018 / January 2019 Semester End Main Examinations

**Programme: B.E.**  
**Branch : INFORMATION SCIENCE AND ENGINEERING**  
**Course Code: 15IS3DCDSC**  
**Course Title: DATA STRUCTURES WITH C**

**Semester : III**  
**Duration: 3 hrs.**  
**Max Marks: 100**  
**Date: 03.01.2019**

**Instructions:** 1. Answer any FIVE full questions, choosing one full question from each unit.  
2. Missing data, if any may suitably assumed.

## **UNIT - I**

- 1 a) When is it necessary to use dynamic memory allocation? How is it enabled in C? 07

b) Implement a C routine to transpose a sparse matrix when represented as a set of triples. 07

c) Explain the array-of-arrays representation of multidimensional arrays in C. 06  
Design a routine to dynamically create a two dimensional array.

## **UNIT - II**

- 2 a) Implement a C program for converting a fully parenthesized valid infix expression to its equivalent postfix expression using stacks. 10

b) Convert the following infix expression  $A + (((B - C) * (D - E) + F) / G) \$ (H - I)$  to prefix and postfix equivalents. 04

c) Design a recursive C function to calculate the product of the elements of an array. 06

UNIT - III

- 3 a) Write a C program to perform the following operations on the queue i)  
 Insert ii)Delete iii)Display when implemented using circular linked list. 10

b) Implement the following operations on a singly linked list 10

  - i) Identify the node with the minimum value
  - ii) Insert a value at  $k^{\text{th}}$  position

**OR**

- 4 a) Develop a C program for the implementation of a circular queue using arrays. 08

b) A group of words is to be read from the keyboard and stored in a linked list. Later each word that appears in the input and number of times that it appeared should be printed. Implement a C program to efficiently complete this task. 08

c) Write a C routine to print the alternate nodes in a Singly Linked List. 04