

**SUBJECT CODE NO:- P-17**  
**FACULTY OF ENGINEERING AND TECHNOLOGY**  
**S.E.(CSE/IT) Examination MAY/JUNE-2016**  
**Data Structures using C**  
**(Revised)**

[Time: Three Hours]

[Max Marks:80]

- N.B i) Q.No.1 from section A and Q.No.6 from section B are compulsory.  
 ii) Solve any two questions from each section from remaining questions.

**Section A**

- Q.1 Solve any five. 10
- a) Define algorithm. Give any two criteria's to be satisfied by any algorithm.
  - b) Show that pointers can be dangerous.
  - c) Explain self-referential structure.
  - d) What is sparse matrix?
  - e) Convert following expression in prefix and postfix form.  $A|B|C*(E+F)\$G$ .
  - f) What is multiple stack?
  - g) Write addq() function to add an element in queue.
  - h) What are the advantages of linked representation over sequential representation?
- Q.2 a) What is necessity of an ADT? Explain functions necessary to create an ADT. 07  
 b) Write c program for transpose of sparse matrix. 08
- Q.3 a) What is pointer? Explain various functions used in c for dynamic memory allocation. 08  
 b) Write an ADT polynomial. 07
- Q.4 a) Evaluate give postfix expression using stack 07  
 $4 \quad 2 \quad + \quad 3 \quad * \quad 3 /$
- b) Write c function to perform following operations on liner linked list. 08
- i) Insert a node into front of list.
  - ii) Insert a node at end of list.
- Q.5 a) Show how to represent polynomials using linked list. Add A and B using linked representation. 07  
 $A = 5x^4 - 2x + 3, \quad B = 6x^5 - 3x^4 + 2x^2 - 1.$
- b) Write c program to implement stack using dynamic array. 08

**Section B**

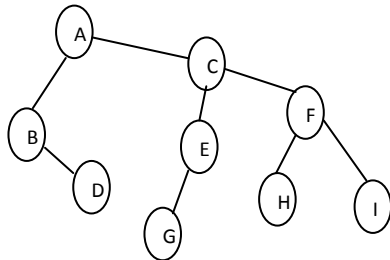
- Q.6 Solve any five 10
- a) Construct binary tree for a given sequence of preorder and inorder  
 Preorder : A B D G C E H I F  
 Inorder : D G B A H E I C F
  - b) Explain following tree terminologies
    - i) Degree of node
    - ii) Sibling
  - c) Explain full binary tree.
  - d) Create min heap for following keys 82, 7, 14, 2, 5.
  - e) Define single & double ended priority queue.
  - f) Define paring heap.
  - g) Write property of red-black tree.
  - h) Construct distinct binary search tree for following keys 5, 10, 15.

Q.7 a) Build an AVL tree with the following values: 08

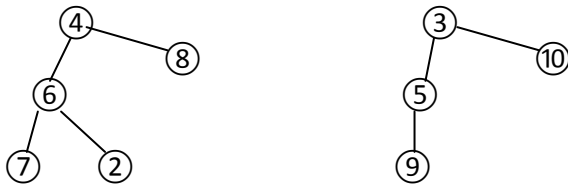
15,20,24,10,13,7,30,36,25

b) Define binary tree. Write an ADT for binary tree 07

Q.8 a) Explain inorder, preorder, postorder and level-order traversal for given binary tree. 08



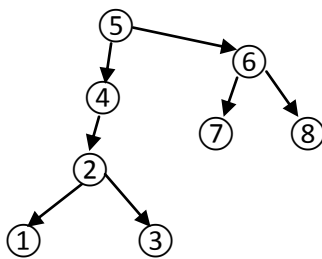
b) Explain leftist tree. Explain melding operation on two following HBL T's: 07



Q.9 a) Explain bottom-up splay tree with example. 07

b) What is threaded binary tree? 08

Show threaded binary tree representation of the given binary tree.



Q.10 a) Define binary search tree. Write recursive function to search any key in BST. 08

b) Write note on disjoint set union and find (i). 07