Seat No.: _____   Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
MCA - SEMESTER–II • EXAMINATION – WINTER 2013

Subject Code: 2620001   **Date: 24-12-2013**
Subject Name: Data Structures
**Time: 10.30 am - 01.00 pm**   **Total Marks: 70**
Instructions:
    1. Attempt all questions.
    2. Make suitable assumptions wherever necessary.
    3. Figures to the right indicate full marks.

Q.1 **(a)** Answer the following.   **07**
    1. Define the following terms.
       Binary tree, Height of the tree.
    2. If node having two children is deleting from binary tree, it is
       replaced by it.
    3. Why it is not feasible to create a circular stack.
    4. What is the postfix form of the following prefix form *+AB-CD.
    5. Define priority queue.
    6. Which traversal of Binary search tree gives the data elements in
       ascending order?
    7. What is a dequeue?

    (b) Write an algorithm to convert infix expression to postfix form and **07** explain which data structure would be used to convert the infix to postfix form. Trace the algorithm for the following infix expression.
A^B*C-C+D/A/ (E+F).

Q.2 **(a)** Write an algorithm for insert and delete operation in circular queue. **07** What are the advantages of a circular queue over a simple queue?

    (b) Write an algorithm to implement following operation in singly link list. **07**
    1. Delete the node whose value =X
    2. Insert the node after the node whose value=Y

OR

    (b) Explain how polynomial can be represented in singly link list. Write an **07** algorithm to perform addition of two polynomials.

Q.3 **(a)** Write an algorithm to implement quick sort. Also so different passes of **07** quick sort for the following set of data.
42,23,74,11,65,58,94,36,99,87

    (b) Explain Big 'Oh' notation. What is best case, average case and worst **07** case of algorithm? Compare bubble sort, selection sort, merge sort, quick sort methods using their average case and worst case.

OR

Q.3 **(a)** Explain string manipulation application.   **07**

    (b) Write a sort note on Threaded binary tree with its advantage. And **07** construct min heap for the following data.
33,9,65,82,75,88,92,4,12,41.

Q.4 **(a)** Show the steps to construct an expression tree for given expression. **07**
((A*B)+(C-D))/(C-E)

    (b) Insert the following values into a BST in the following order. **07**
1,3,5,8,0,9,12,4,2,15.
Draw tree again after deleting 5,3,9,15 and 0.(Delete in this order)

Q.4 **(a)** Construct AVL tree for the following set of subject in computer stream. **07**
MP,MBS,MMT,NCP,AI,ACA,OOCS,DC,DS,OOP,OOMD.

(b) Answer the following. **07**
1. Generate Binary tree using following traversal.
   Inorder :   H,D,B,I,E,A,F,J,C,K,G,L
   Postorder : H,D,I,E,B,J,F,K,L,G,C,A
2. Give difference between B tree and B+ tree. Draw the node structure
   of B tree for order of 4.

Q.5 **(a)** What is minimal spanning tree? Difference between ST and MST. Apply **07**
prim's algorithm for the following graph and construct MST.(Show
separate diagram for each stage)
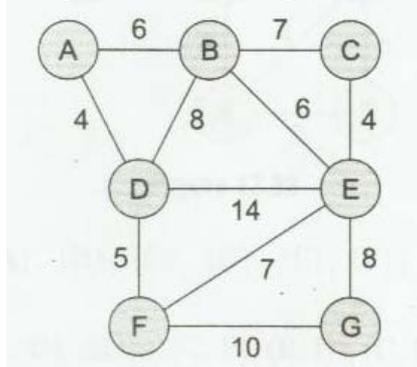
(b) Define graph. Explain different representation of graph with example. **07**
Also discuss advantage and disadvantage of all method.

OR

Q.5 **(a)** Give difference between BFS and DFS. For the following graph give the **07**
result for Depth first search (DFS) and Breadth first search (BFS).
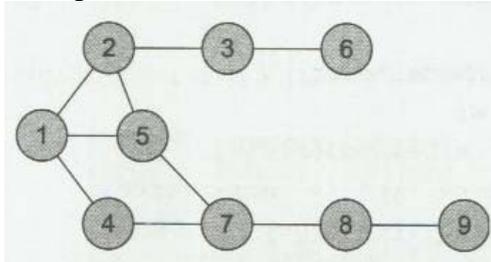
(b) What is collision resolution? Write drawback of close hashing. Explain **07**
Linear probing, Rehashing and Quadratic probing with example.

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