Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

MCA - SEMESTER–II • EXAMINATION – SUMMER 2013

Subject Code: 2620001 **Date: 03-06-2013**

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)** Do As Directed. **07**

(1) Define primitive data structure.
(2) Write application of priority queue.
(3) Define siblings.
(4) Define path matrix.
(5) Explain use of flag variable in bubble sort.
(6) Show the node structure to represent polynomial using single link list.
(7) Define big O notation.

(b) (i) Write the similarity and difference between tree and graph. Name the method use to traverse unweighted graph. **03**

(ii) Write formula to find address of A[i,j] th element for row major and column major array. Where given array A[m : n] having element size S and A0 as base address. **04**

Q.2 **(a)** Compare algorithm of selection sort and bubble sort using algorithm analysis techniques based on time. Demonstrate all necessary calculation for best case, worst case and average case. Write your conclusion. **07**

(b) Differentiate continues memory allocation method used for array and linked memory allocation method used for linked list. Write algorithm to insert new node at front into single link list. **07**

OR

(b) Define Stack. List applications of stack. Write algorithm to push and pop using array representation. **07**

Q.3 **(a)** Write the advantages of circular linked list. Write algorithm to insert and traverse singly circular link list. **07**

(b) Explain the searching efficiency of binary search tree. Create binary search tree for given data. Also write steps for inorder traverse using recursion. [22, 78, 54, 86, 68, 98, 87, 10] **07**

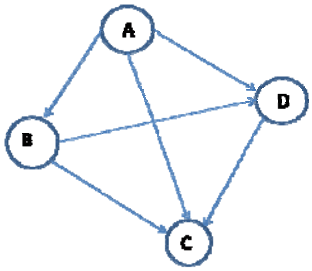
OR

Q.3 **(a)** Define queue. Write algorithm to insert and delete value for circular queue using array representation. **07**

(b) Explain how height balance tree improves searching process compare to binary tree. How balance factor for height balance tree is calculated? Explain LL and RR rotation suitable example. **07**

Q.4 **(a)** Write two important characteristics of complete binary tree, binary search tree, m-ary tree and B tree. **07**

(b) What is spanning tree? Show adjacency list representations for following graph. Obtain spanning tree using BFS and DFS for given graph. **07**

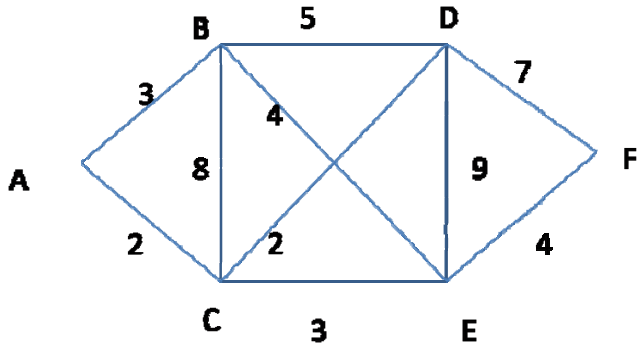


OR

Q.4 **(a)** Show tracing to convert following expression into suffix expression. **07**
(a+b)*c-d/e

(b) Write algorithm to concatenate two single link list. And find minimum value from single link list. **07**

Q.5 **(a)** What is use of Prim's and Krushkal's algorithms? Apply Krushkal's algorithm for following graph. Demonstrate all intermediate steps and final result properly. **07**



(b) Show tracing to sort following values into descending order using quick sorting technique. **07**
[50, 30, 82, 18, 93, 60, 75]

OR

Q.5 **(a)** Define min heap tree. Demonstrate creation of min heap tree for the following data. **07**
[65, 80, 45, 70, 95]

(b) Explain hash function and collision resolution techniques with suitable example. **07**

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