(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 2482 Roll No. | | | | | | | | | | |

B.Tech.

(SEMESTER-VI) THEORY EXAMINATION, 2012-13

DATA STRUCTURES

Time : 2 Hours] *[Total Marks : 50*

SECTION – A

1. Attempt **all** question parts : **2 × 5 = 10**

   (a) What is an external sort Algorithm ? What is Hashing ?

   (b) How graphs can be represented in computer memory ?

   (c) Define a Binary Search Tree (BST) & NP-complete problem.

   (d) Differentiate between iteration and recursion.

   (e) Define the MST of an undirected graph. List the applications of queues.

SECTION – B

2. Attempt any **three** question parts : **5 × 3 = 15**

   (a) What is the Stack ADT ? Give any one implementation of Stack and explain clearly the data structure and routines used.

   (b) How a queue does works ? Explain the algorithm for inserting and deleting from a Queue.

   (c) Write down the complete QUICKSORT algorithm and illustrate its working to sort the list (45, 23, 11, 35, 62, 87, 24, 66).

   (d) Draw the AVL tree for the following sequence of insertion :

   14, 10, 17, 12, 11, 20, 18, 25, 8, 22, 23, 66, 50

   (e) Define B-tree of order m. Build a tree by inserting records with the following key sequence F, S, Q, K, C, L, H, T, V, W, M, R, N, P, A, B of order = 4.

SECTION – C

Attempt **all** questions. **5 × 5 = 25**

3. Attempt any **one** part : **5 × 1 = 5**

(a) Write an Algorithm to implement the push, pop and display option of the stack.

(b) Write an Algorithm to sort an array in an ascending order.

4. Attempt any **one** part : **5 × 1 = 5**

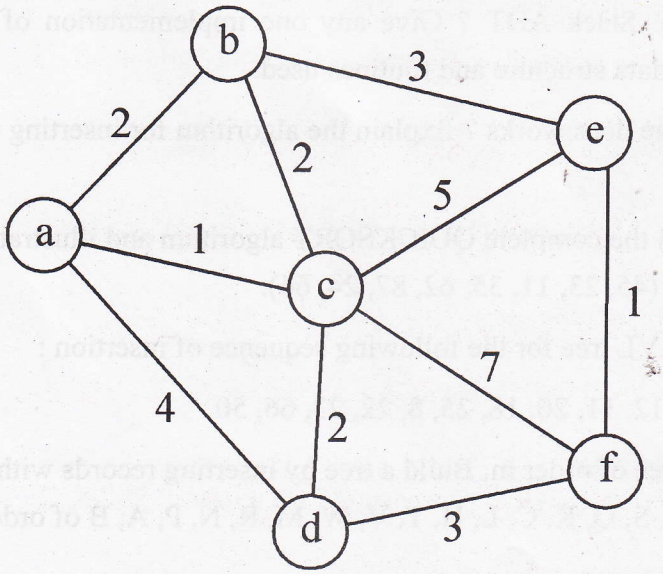
(a) What is doubly linked list ? Explain the algorithm in detail for inserting a node to the left and deleting a node from a doubly linked list.

(b) Write an algorithm and explain how insertions and deletions are carried out in a circular queue implemented using linked list.

5. Attempt any **one** part : **5 × 1 = 5**

(a) Give recursive function for Inorder, Preorder and Postorder traversal of a binary tree.

(b) Find the shortest path using Dijkstra's algorithm for the following weighted graph from node a to node e. Explain the steps.



6. Attempt any **one** part : $5 \times 1 = 5$

(a) Describe the various hash function. What is a hash function ? What should be the characteristics of a good hash function ?

(b) Demonstrate the insertion of keys 28, 5, 19, 15, 33, 12, 17, 77, 20 into a hash table with 9 slots and collision resolved by separate chaining. Let the hash function be $h(k) = k \bmod 9$.

7. Attempt any **one** part : $5 \times 1 = 5$

(a) Compare any three sorting technique with respect to algorithm complexity. Give an algorithm for QUICK sort technique for EVEN number of elements in the series.

(b) Differentiate between the B+ tree index files and B tree index files with example.
