

DATA STRUCTURES
(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 70

PART – A
(Compulsory Question)

1 Answer the following: (10 X 02 = 20 Marks)

- (a) Write an algorithm to delete an element from an array.
- (b) Draw the node structure of a double linked list. Explain the various fields present in it.
- (c) Define hashing. Give example.
- (d) List the types of dequeue.
- (e) In what way a binary search tree differs from a tree? Give example.
- (f) Define balancing factor. Give example.
- (g) Write the worst, average and best case time complexities for shell and quick sorts.
- (h) Distinguish between min and max heaps.
- (i) How can we say that linear search is least efficient search technique? Explain.
- (j) Assume that the given key is 1234. By using mid-square method, find the address required to store it by using 3 digit address.

PART – B
(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

- 2 (a) What is a sparse matrix? What are its drawbacks? Explain lower triangular sparse matrix with suitable example.
- (b) What are different positions that a node can be inserted into a single linked list? Explain them in detail.

OR

- 3 (a) List the advantages of double linked list over single linked list. What are the possible positions that a node can be deleted from a double linked list? Explain.
- (b) Why we need to use arrays? Write the procedure to insert an element into an array.

UNIT – II

- 4 (a) What is a stack? List the applications of stacks. Explain any two applications with suitable example.
- (b) In how many ways a queue can be stored in memory? Explain them.

OR

- 5 (a) List and explain the applications of queues.
- (b) How can we insert and delete an element from a circular queue? Explain.

UNIT – III

- 6 Define binary search tree. Create a binary search tree from {7, 4, 12, 2, 6, 9, 19, 8, 15, 11, 3, 20, 5}. How can we delete an element from the binary search tree? After creation of the tree delete elements 6, 12 and 3. Explain the procedure in detail.

OR

- 7 How can we make an unbalanced tree as a balanced one? Explain various rotations that are involved in it. Give examples for each rotation.

UNIT – IV

- 8 (a) Sort the following set of elements by using insertion sort {S, T, R, U, C, T, U, R, E, S}.
- (b) Distinguish between list and binary insertion sort.

OR

- 9 (a) With the help of algorithm and example, explain the sorting of elements by using quick sort.
- (b) Give brief description about the process of merging the unordered files.

UNIT – V

- 10 (a) Distinguish between binary and linear searching techniques.
- (b) With the help of suitable example, explain the linked list collision resolution technique.

OR