

DATA STRUCTURES
(Computer Science and Engineering)

Time: 3 hours

Max. Marks: 70

PART – A
(Compulsory Question)

- 1 Answer the following: (10 X 02 = 20 Marks)
- Define data structure. Mention any two applications of data structures.
 - What is a double linked list? Name the three fields of double linked list.
 - What is the best case and worst case time complexity of bubble sort and insertion sort?
 - List the steps in pre-order traversal.
 - Define adjacent nodes.
 - What is a dictionary?
 - List the applications of priority queues.
 - Define Max heap.
 - What is a splay tree?
 - Mention the purpose of B-Trees.

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

UNIT – I

- 2 (a) Explain system life cycle with a neat diagram.
(b) Write an algorithm to perform the following operations on a single linked list.
(i) Insert new node at the beginning of list. (ii) Count the number of nodes.

OR

- 3 Explain how queues can be implemented using arrays.

UNIT – II

- 4 State and explain the algorithm to perform Heap sort. Also analyze the time complexity of the algorithm.

OR

- 5 Define binary search tree. Explain the various operations with an example.

UNIT – III

- 6 (a) How to pass array elements as arguments to function? Explain with one example.
(b) Write a C program to read names, marks of a class and calculate the total marks, average and percentage.

OR

- 7 What is meant by sorting? Write the algorithm for Selection sort and illustrate with an example.

UNIT – IV

- 8 Explain the path and adjacency multi-list representations of a graph with example.

OR

- 9 (a) Differentiate between static and dynamic hashing.
(b) With an example, explain how skip list can be represented.

UNIT – V

- 10 Explain Red-Black trees in detail.

OR

- 11 Explain the operations on B⁺ - tree with examples.
