UNIT – I

PART – A

a) Discuss operations performed with polynomials. (2M)

b) List different ways of implement polynomial ADT. (2M)

c) Define sparse matrix. (2M)

d) Define polynomial ADT. (2M)

PART – B

1 a) Explain how to implement polynomial ADT using array. Discuss its advantages and disadvantages. (7M)
b) Explain polynomial addition using arrays. (7M)

2 a) Define data structure. Explain different types of data structure. (7M)
b) Explain representation of arrays along with their advantages and disadvantages. (7M)

3 a) Explain sparse matrix representation using array with an example. Discuss the advantage and disadvantages of this method. (7M)
b) Discuss matrix multiplication with an example. (7M)

4 a) Define data structure. Discuss different types of data structure, their implementations, applications. (7M)
b) What is an array? Discuss different types of array with examples. (7M)

UNIT – II

PART – A

a) Differentiate stack and queue? (2M)

b) List the applications of Queue. (2M)

c) List different types of queue. (2M)

d) List the application of stacks. (2M)

e) Define queue full condition. (2M)

PART – B

1 a) Explain the operations performed on simple queue with an example. (7M)
b) Convert the following expression X+(Y * Z) – ((N * M + O)/ P) into post form. (7M)

2 a) Explain the evaluation of prefix expression. Find the equivalent prefix of: 8 6 3 + * 1 2 3 - / -. (7M)
b) Explain basic operations of queue. List the steps to implement queue using stack. (7M)

3 a) Write an algorithm to insert and delete a key from circular queue. (7M)
b) Explain the procedure to convert infix expression to postfix expression with the following expression: ((A – (B+C) * D) / (E+F)). (7M)

4 a) Write an algorithm for basic operations of stack. (7M)
b) Explain the procedure to evaluate postfix expression. Evaluate the following postfix expression 7 3 4 + - 2 4 5 / + * 6 / 7 +. (7M)

UNIT – III

PART – A

a) List advantages of circular linked list over single linked list? (2M)

b) List advantages of linked list over arrays. (2M)

c) State different types of linked lists. (2M)

PART – B

1 a) Write an algorithm to push and pop an element from linked stack? (8M)
b) Discuss sparse matrix representation using linked list? (6M)

2 a) Write an algorithm to delete an element anywhere from doubly linked list. (7M)
b) Write applications of single linked list to represent polynomial expressions. (7M)

3 a) List various operations of linked list and explain how to insert a node anywhere in the list. (7M)
b) Show how to reverse a Single Linked List. (7M)

4 a) Write recursive algorithm for lists. (7M)
b) Explain the procedure to insert and delete element from sparse matrix. (7M)

UNIT – IV

PART – A

a) Define heap. (2M)

b) Define full Binary tree. (2M)

c) List the different tree traversals. (2M)

d) Define path in a tree. (2M)

PART – B

1 a) Construct max heap for the following:
140, 80, 30, 20, 10, 40, 30, 60, 100, 70, 160, 50, 130, 110, 120. (7M)
b) Explain in-order traversal of threaded binary tree with an example. (7M)

2 a) What operations can be performed on Binary trees? Discuss. (7M)
b) Write in-order, pre-order and post-order traversal of a binary tree. (7M)

3 a) Explain binary tree ADT. (6M)
b) Discuss representation of binary tree using arrays and linked list. (8M)

4 a) Define binary search tree. Show how to insert and delete an element from binary search tree. (7M)
b) Write algorithm to insert and delete an element from binary search tree. (7M)

UNIT – V

PART – A

a) List and explain types of graphs. (2M)

b) List any two differences between trees and graphs. (2M)

c) Define a graph. (2M)

d) Find spanning trees of a graph. (2M)

e) Define spanning tree. (2M)

f) Define in-degree and out-degree of a graph. (2M)

g) What is the degree of a graph? (2M)

h) What is planer graph? (2M)

PART – B

1 a) What are connected components of graph? Is there a method to find out all the connected components of graph? Explain. (7M)
b) Explain Prim's algorithm with an example. (7M)

2 a) Discuss Kruskal's algorithm with an example. (7M)
b) Explain how to represent a graphs. (7M)

3 a) Explain Warshall's algorithm to find transitive closure of a graph with a suitable example. (7M)
b) Write Prim's algorithm. (7M)

4 a) What is a graph? Explain the properties of graphs. (7M)
b) Write breadth first traversal algorithm. Explain with an example. (7M)

UNIT – VI

PART – A

a) What is the time complexity of merge sort? (2M)

b) Evaluate time complexity of insertion sort. (2M)

c) What is the best sorting technique? Why? (2M)

d) Give the time complexity of quick sort. (2M)

PART – B

1 a) Explain algorithm for merge sort. (7M)
b) Discuss how to sort elements using merge sort with suitable example. (7M)

2 a) State and explain heap sort with example. (7M)
b) Evaluate time complexity and space complexity of an algorithm. (7M)

3 a) State and explain insertion sort with example. (7M)
b) Differentiate between iterative merge sort and recursive merge sort. (7M)

4 a) Rearrange following numbers using quick sort: 10, 6, 3, 7, 17, 26, 56, 32, 72. (7M)
b) Write a program to sort the elements using radix sort. (7M)