U-34/2051 /A 1275/ML

DATA STRUCTURES - (BSCHAI-123)
SEMESTER- II

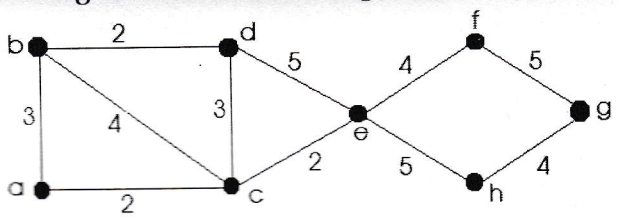
TIME: 3 HOURS M.M. 75

SECTION-A

1. What is a Data Structure? Explain various categories of Data Structures. Also, write the operations that can be performed on these Data Structures. (15)
2. Write an algorithm to convert an expression from infix to postfix using Stack. (15)
3. Define Pointers. Differentiate between pointer to an array and array of pointers. (15)
4. Define a queue data structure. How a linear queue is different from circular queue? Write an algorithm to insert and delete an element from a circular queue. (15)

SECTION-B

5. Define the concept of Binary Search Tree. Explain the procedure of inserting an element in Binary Search Tree. (15)
6. What is a graph ? Name its applications. Describe the various ways used to represent graphs in memory. (15)
7. Write the algorithms to insert a new node at the beginning, at middle position and at the end of a Singly Linked List. (15)
8. Find the minimal spanning tree for the following weighted connected graph: (15)



SECTION-C

9. Attempt the following parts:
   a. What are Sparse Arrays? List various ways to store them in memory. (2)
   b. What is merging in an array? (2)
   c. Describe an Extended Binary tree. (2)
   d. Which data structure is used to perform recursion? Why? (2)
   e. How stacks can match parenthesis in an expression? (2)
   f. What do you mean by Average Case Analysis of an algorithm? (2)
   g. What is a complete binary tree? (1)
   h. What is Big-O notation? (2)