**Assignment one due date 30/09/2022**

**Question one**

Use the following algorithms and show clearly how they are implemented using an appropriate example:

1. Greedy algorithm **[4]**
2. best case algorithm **[4]**
3. Shortest path algorithm **[4]**
4. breadth first algorithm **[4]**
5. depth first algorithm **[4]**

**Question two**

a. Describe and explain giving appropriate examples of four factors, in the measurement of an algorithm **[8]**

b. Implement the Huffman algorithm of the String below and show clearly each stage in the huffman algorithm:

{BDDFCGGGGBBYYCMLF} **[12]**

**SECTION B**

**Question three**

a. Write an algorithm to do the following:

I. Returns an nth value from a fibonacci series using method of recursion **[4]**

ii. Removes an element from a stack **[4]**

b. List 4 functional operations of a queue **[2]**

c. I. Create a binary tree for the arithmetic expression below:

w\*y/z-x **[4]**

ii. Traverse the tree using the preorder, inorder, and post order methods and list the elements **[6]**

**Question 4**

Write algorithms method of inserting values in the data structures below and how to read values from these data structures:

1. Map **[4]**
2. Hashtable **[4]**
3. LinkedList **[4]**
4. Tree **[4]**
5. List **[4]**

**Question five**

a. Write an algorithm of bubble sort method algorithm and implement it on the array below: **[12]**

{10,4,5,3,100,30,85,15,70}

b. Define the following terms graph:

1. undirected graph **[2]**
2. directed graph **[2]**
3. edge attribute  **[2]**

c. State two applications of a graph**[2]**

**Question six**

Below is an undirected graph, use Greedy algorithm to find the subgraph tree with the most weights. The number on each edge denotes its weight, and the letter is a unique label you should use in your answer to specify that edge. Provide the edges in the order in which they would be found by Greedy algorithm. Break any ties using the alphabetical label. [20]

