Daffodil International University

Department of Computer Science and Engineering

Faculty of Science and Information Technology

FINAL Examination **Semester: FALL 2019**

Course Code: CSE134 **Course Title: Data Structures**

Section: ALL **Course Teacher: ALL**

Time: 2 hours **Full Marks: 40**

Question 1: 04 + 06

(a) Write the difference between heap and binary search tree. Give example of min-heap and a max-heap.

(b) Consider a situation of a book shop. In a book shop, Book is stored with title, author and price of the book. All the books are stored in an arrangement such that the first book you have to get from the shelf at last. But you can also change the arrangement of the books.

Answer the following questions:

(i) Define a Book data node and create entries for three (3) books linked to one another. (04)

(ii) Propose a data structure for the arrangement of Books in the shop as per the above description. (02)

Question 2: 04 + 06

(a) Why self-referential structure plays a significant role in data structure. Give example.

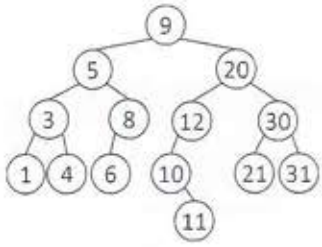
(b) Consider the following code:

```
struct Dictionary {
        double price;
        Struct dictionary *next;
} dict;
Dictionary *head = (dict) malloc(sizeof(Dictionary));
```

Correct all errors which are in the above code segment. Rewrite the corrected code and explain each part of the code in brief.

Question 3: 10

Consider the following binary tree:



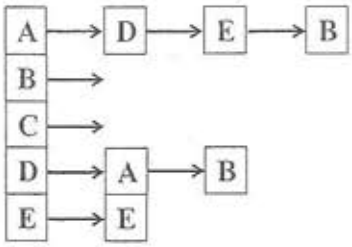
.Answer the questions:

a. Write the order of nodes visited in In-order, Pre-Order and Post-Order traversal (05)

b. Write the degree of tree, the depth and height of the node 20, 12 and 5. What is the size of the tree. (02)

c. Formulate a Min heap from the given tree. (03)

Question 4: 04+06



(a) Draw the directed graph represented by the adjacency list below. Each element in a vertices list is adjacent to the vertex. (04)

(b) Based on the drawing of the graph, find all cycles and represent the graph using adjacency matrix. (03)

(c) Measure the in-degree and out-degree of each vertices. (03)

---------- Good Luck ----------