THE OPEN UNIVERSITY OF SRI LANKA
DEPARTMENT OF COMPUTER SCIENCE
B.Sc. DEGREE PROGRAMME : LEVEL 03
CPU1142- DATA STRUCTURES AND ALGORITHMS
NO BOOK TEST II – 2016/2017

DURATION:One Hour (1 Hour)

Date: 29.10.2017 **Time: 4.00 p.m. – 5.00 p.m.**

Answer All Questions.

Write your answers in the answer sheets provided.

1. Fill in the blanks with appropriate terms.

   a) For a circular queue if(q.front== q.rear) checks the queue ..... condition.
   b) The ..... of a node is all the nodes along the route from the root to that node.
   c) In strictly binary trees a node representing an ..... is a non-leaf node.
   d) If every edge of the graph is an ordered pair of vertices, we call it as a ..... graph.
   e) A ..... is a path in which first and last vertices are the same.
   f) If there is a path from every vertex to every other vertex, we call it as a ..... graph.
   g) If the root of a tree is removed, the resultant is a..... .
   h) The maximum degree of a node in a binary tree is..... .
   i) When each node in the tree is visited exactly once in a systematic manner, we call it as ..... .
   j) The number of ..... of a node is called as its degree.

2.

Array implementation of a queue can be declared in C language as follows.

```
# define MAXSIZE 100
Struct queue {
        int front;
        int rear;
        int items [MAXSIZE];
        };
Struct queue q;
```

By using the above declaration, answer the following questions.

   a) Show the **enqueue** operation of the queue using C programming language. Clearly show the required conditions and actions.
   b) Show the **dequeue** operation of the queue using C programming language. Clearly show the required conditions and actions.

3.

a) Construct a binary search tree for the following set of integers.
60, 10, 80, 15, 100, 05, 70, 110, 65, 02, 20, 90, 08, 75, 12

b) What will be the output when you traverse the above constructed binary search tree in the following orders?

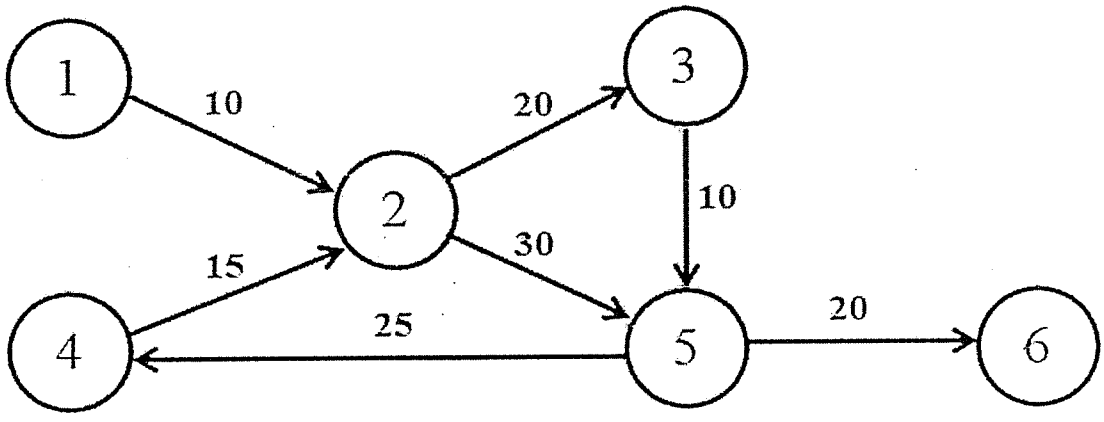
I. Pre order
II. In order
III. Post order

b) Is the above constructed binary tree a complete binary tree? Give reasons.

c) What are the leaf and non-leaf nodes of the above constructed binary tree?

4.

a) Draw the corresponding **Adjacency matrix representation** for the following weighted digraph.



5.

a) Consider the following expression in **infix** form and convert it into the **postfix** form. Clearly show the 7 steps required for the conversion.

A+B*C$D-E$F/G-H