THE OPEN UNIVERSITY OF SRI LANKA
DEPARTMENT OF MATHEMATICS & COMPUTER SCIENCE
B.Sc. DEGREE PROGRAMME : LEVEL 03
CPU1142- DATA STRUCTURES AND ALGORITHMS
NO BOOK TEST II – 2015/2016

DURATION:One Hour (1 Hour)

Date: 05.11.2016 **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) A queue is logically ..... type of a list.
   b) When an element is dequeuer from the list, the ..... counter is increased by one.
   c) For a queue if (rear < front) checks the queue ..... condition.
   d) The nodes that have degree zero are called ..... nodes.
   e) A tree with no nodes is called a ..... tree.
   f) If every non-leaf node in a binary tree has non empty left and right sub trees then the tree is termed as a ..... tree.
   g) If a binary search tree is traversed ..... the output is in the ascending order.
   h) ..... of vertex means the number of edges directed towards the vertex.
   i) To represent adjacency matrix of a graph need to use a ..... array.
   j) If every edge of the graph is assigned some value, we call it as a ..... graph.

2. Pointer implementation of a queue can be declared in C language is as follows.

```
struct queue
{
int info;
struct queue *next;
};
typedef struct queue NODEPTR;
NODEPTR *front;
NODEPTR *rear;
```

   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.
25 , 30 , 15 , 45 , 05 , 10 , 50 , 03 , 55 , 60 , 20 , 22 , 18 , 35 , 12

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

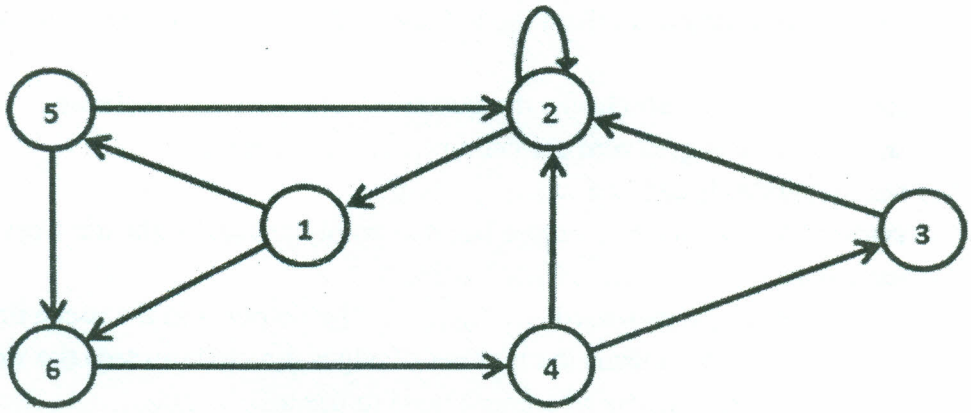
I. Pre order
II. In order
III. Post order

c) What is the depth of the above constructed binary tree?

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

4.

a) Draw the corresponding **Multi-list representation** for the following 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)