

<b>MIDTERM EXAMINATION</b> SPRING 2007 CS301 - DATA STRUCTURES (Session - 1 )	Marks: 50 Time: 90min
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**Q1. (10)**

Describe the tree in data structure also describe Binary tree with example?

**Q2.(5)**

Consider the following infix expression.

$$3*2^5-1$$

Converts the above expression into postfix and show the step by step process of conversion.

**Q3.(2)**

Queue operations are very similar to stack operations. Which of the following definitions is **not** suitable for both applications?

- 1) Is\_empty – check to see if the application is empty.
- 2) Is\_full( ) – check to see if the application is full.
- 3) Delete( )- remove the most recently inserted item from the application.
- 4) Clear( ) – clear the data structure.

**Q4.(2)**

The following are statements related to queues.

- (i) The last item to be added to a queue is the first item to be removed
- (ii) A queue is a structure in which both ends are not used
- (iii) The last element hasn't to wait until all elements preceding it on the queue are removed
- (iv) A queue is said to be a last-in-first-out list or LIFO data structure

Which of the above is/are related to normal queues?

- i) None of above
- ii) 2 and 4 only
- iii) 1,2 and 4only
- iv) 3 and 2 only.

**Q5.(5)**

Consider the following infix expression:

$$((A+B) * C - (D-E)) ^{(F + G)}$$

Converts the above expression into prefix and show the step by step process of conversion.

**Q6. (2)** Commonly simulation models are

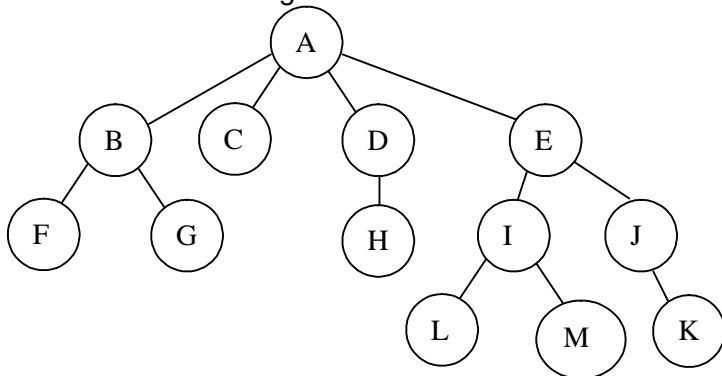
- 1) a & b
- 2) (c)Timeless simulation
- 3) (b) Event based simulation
- 4) (a)time –bases simulation

**Q7.**(2) Which of the following is a stack application in the real world?

- i) Printing jobs from the spooler directory
- ii) Walk in criteria, when one gets into the food line and picks up a tray
- iii) Walk in criteria, when one gets into the food line
- iv) Creating a directory structure in Dos

**Q8.** (2)

Consider the following tree.



The following are (iv) statements about the above tree.

- (i) Depth of the above tree is equal to 4.
- (ii) Height of the above tree is equal to 3.
- (iii) There is only one sibling belonging to Node B.
- (iv) The proper ancestors of I are L and M only.

Which one of the following is correct in respect of the above statements?

- 1) ii. Only
- 2) iii.only
- 3) I,ii,and iii only
- 4) I ;and iii only

**Q9.** (10)

Describes the list implementation with following methods?

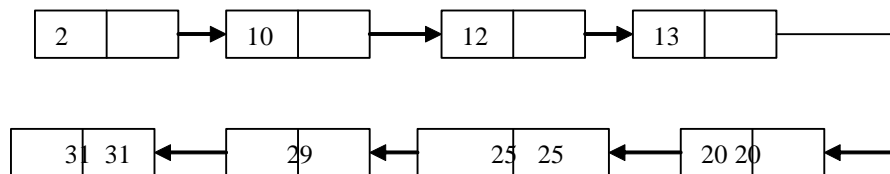
Add method

Find method

Remove method

**Q10.** 6)

Consider the linked list given bellow.



Transformed the above linked list into a binary search tree.

**Q.11** (2)

Consider the following stack with the indicated initials status and series of stack operations.

s
r
q
p

Top=3

- (i) Pop( );
- (ii) Pop( );
- (iii) Push(t);
- (iv) Push(u)
- (v) Push(v);
- (vi) Pop( );
- (vii) Pop( );
- (viii) Pop( );

If the above series of operation is performed, what is final position of top and contents of the top respectively?

- i) 2.u (ii)1,q (iii) 1.t (iv) 1,v

**Q12. (2)**

Consider the following (iv) statements.

- (i) A binary tree can contain at least  $2^L$  Nodes at level L.
- (ii) A complete binary tree of depth d is a binary tree that contains  $2^L$  Nodes at each level L between 0 and d, both inclusive.
- (iii) The total number of nodes ( $T_n$ ) in a complete binary tree of depth d is  $2^{d+1} - 1$ .
- (iv) The height of the complete binary tree can be written as  $h = \log_2 (T_n+1)-1$  where  $T_n$  is Total number of Nodes.

Which one of the following is correct in respect of the above statements regarding the Binary trees?

- 1) ii, iii and iv only
- 2) ii and iii only
- 3) I, ii and iii only
- 4) Iii only