

VCD 081022

VCD/ SYCS SEM III DATA STRUCTURES 75 MARKS 2^{1/2} HOURS

- N.B**
- 1) All questions are compulsory.
 - 2) Figures to the right indicate marks.
 - 3) Illustrations, in-depth answers and diagrams will be appreciated.
 - 4) Mixing of sub-questions is not allowed.

Q.1 Attempt the following. (Any Four)

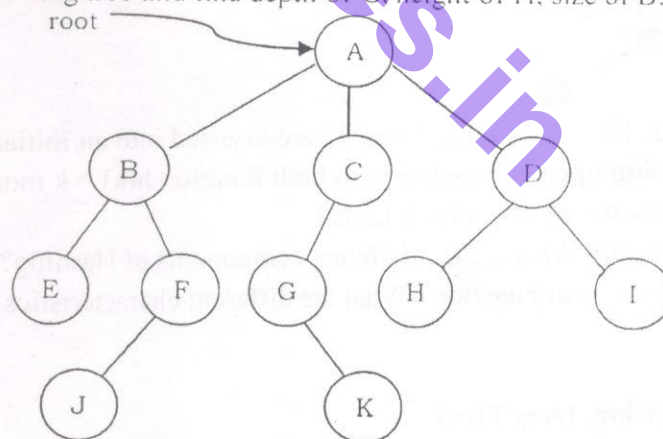
[20Marks]

- a) What is data structures? Explain different types of data structures.
- b) What is ADT? How to create user-specific ADT?
- c) How to use Linked List for polynomial equation? Explain with suitable example.
- d) What is Stack? What are different advantages and disadvantages of it?
- e) Consider following infix expression and convert it into prefix and postfix notation.
 $((A + B) - C * (D / E)) + F - G / H + (I - J) * K$
- f) What is Queue? Explain linked representation of Queue.

Q.2 Attempt the following. (Any Four)

[20Marks]

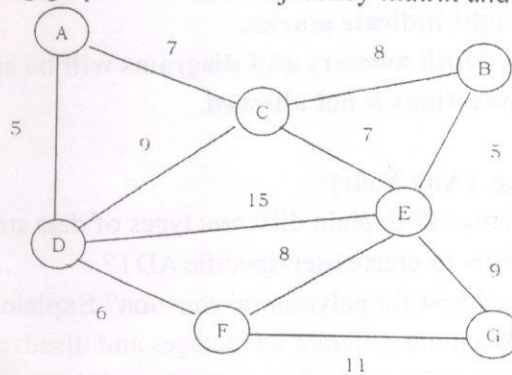
- a) How to delete any node from Doubly Linked List from end?
 - b) Write short note on Balanced Binary Tree.
 - c) Define depth, height and size of any node of a tree.
- Consider following tree and find depth of G, height of H, size of B.



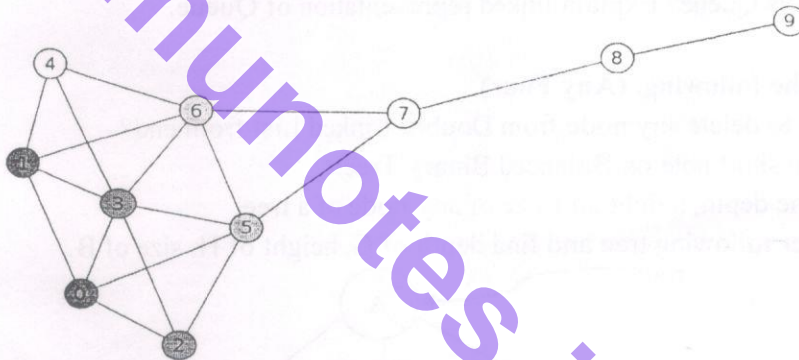
- d) Consider above tree and find inorder, preorder and postorder.
- e) Consider following elements and draw max Heap.
35 33 42 10 14 19 27 44 26 31
- f) What is Priority Queue? Explain applications of it.

Q.3 Attempt the following. (Any Four)**[20Marks]**

- a) What is Graph? What are different operations can be perform on Graph?
b) Consider following graph and draw Adjacency matrix and Adjacency list.



- c) Consider following graph and find out sequence in which all nodes get access using BFS.



- d) The keys 12, 18, 13, 2, 3, 23, 5 and 15 are inserted into an initially empty hash table of length 10 using open addressing with hash function $h(k) = k \bmod 10$ and linear probing. What is the resultant hash table?
e) What is Hashing? What are the different components of Hashing?
f) How to Choose Hash Function? What are different characteristics of good Hash Functions?

Q.4 Attempt the following. (Any Five)**[15Marks]**

- a) What is Singly Linked List?
b) What is reverse polish notation?
c) What is AVL tree?
d) State advantages of Doubly Linked List
e) What are the different traversal techniques of Graph?
f) List down different Collision Resolution Techniques.