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F.Y.B.C.A, Semester II, End Semester Examination, April 2019

Data Structures - (BCA-201)

Duration: 2 Hours

Total Marks: 50

Instructions:

- 1) All Questions are **Compulsory**.
- 2) Figures to the right indicate Full Marks.
- 3) Start each new question on a fresh page
- 4) Number of pages 02

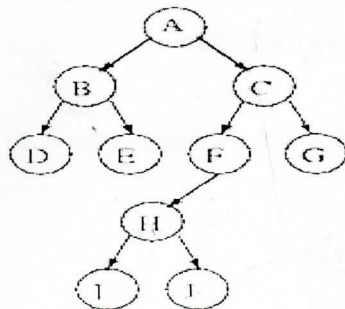
Q1. A) Define the following in 1-2 lines.

[5]

- | | |
|-------------------------------|----------------------------|
| a) Non linear data structure. | b) Circular linked list. |
| c) Spanning tree | d) PUSH operation on stack |
| e) Graph | |

Q1. B) Answer the following based on the tree structure as given below.

[5]



- a) Define level of tree. Obtain the level of node H .
- b) Write the pre-order traversal of the tree.
- c) Define ascendant. Name the ascendant nodes of F.
- d) Name the descendant nodes of node C
- e) Define degree of a node . Write the degree of node B

Q2.) Answer the following.

- i) How is linked list different from arrays ? [2]
- ii) Write an algorithm to insert an element in the an array . [3]
- iii) Apply Binary search algorithm to search a value=34 in the given array .Write the proper sequence of search involved . [5]

12	23	29	34	38
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Q3.) Answer the following.

- i) Explain the concept of Max heap tree and Min heap tree. [2]
- ii) For given set of data construct binary search tree . Also give the post order traversal data : 45, 67 , 20, 20, 70, 39 , 1, 45 , 100 [3]

iii) Write an algorithm to implement *enqueue* & *dequeue* operations of queue. [5]

Q4.) Answer the following

a) Transform the following in-fix expression to pre-fix expression showing all the steps.

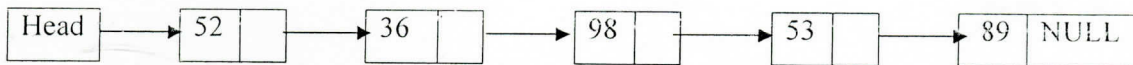
$$P / (Q - R) * S ^ 2 + T \quad [2]$$

b) Write an algorithm to insert a node at the end of the linked list. [3]

c) Consider the linked list given below and show how to do the following operations one after the other.

Take resultant list of the previous operation as input to next the operation. [5]

- Insert node with key 59 before node with key 36
- Insert node with key 63 at head
- Insert node with key 88 at tail
- Delete node with key 98
- Delete a node from head



Q5) Answer the following considering the graph shown in fig i .

i) What is a Spanning Tree of a Graph ? If Node V₈ is deleted from graph with its edges, what type of data structure it changes to. Justify. [2]

ii) Give the adjacency list for the graph . [3]

iii) Explain Breadth -First Search traversal on the graph given below showing all steps. Consider V₁ as the source node. [5]

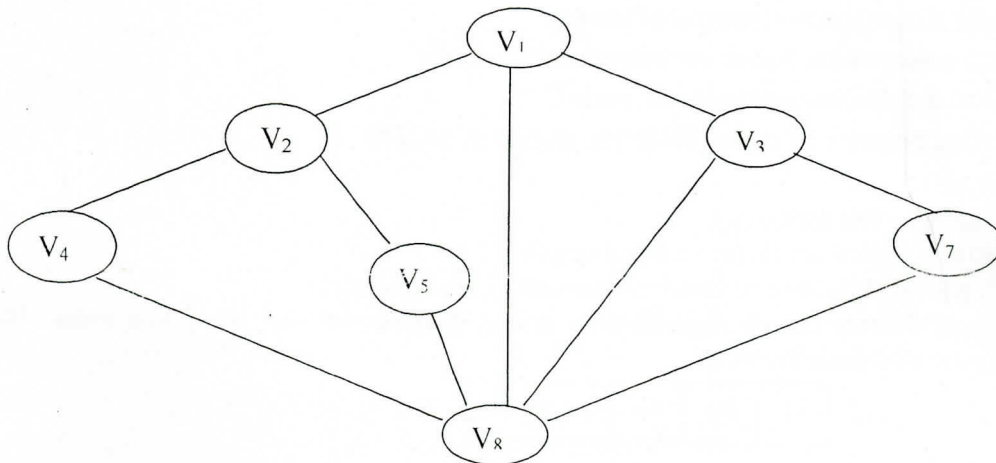


Fig i