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

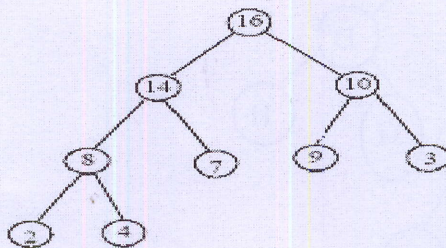**Q1 A) Answer in one or two lines.**   (5mks)
     a) What is a circular queue ?
     b) When is an algorithm recursive ?
     c) Give differences between Linear Search & Binary search.
     d) What is internal sorting?
     e) Name the sorting technique using Tree data structure.

B) For the Given Tree Structure below answer the following.   (5mks)
     a) Name the leaf Nodes.
     b) What type of Binary tree is it.Justify your answer.
     c) What is Left Subtree. Name the nodes of Left Subtree.
     d) Represent the Tree using Array representation.
     e) Define Depth of tree.What is depth of given tree.

Q2) Answer the following.
     A) Differentiate between Stack & Queue data Structures.   (2 mks)

     B) Linked List are preferred over Arrays Data structure. Give Reasons.   (3 mks)

     C) For given input explain how Binary Search Technique will be implemented to search
        value 9 .
        Input Data :   3 , 5, 9, 12, 21, 34, 45, 75,120   (5 mks)

Q3) Answer the following.
     A) Draw an Expression Tree for the given expression
        (B + C) - (D – F) – G   (2 mks)
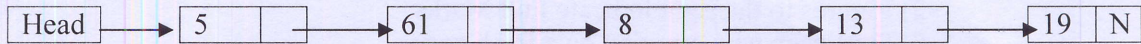
     B) Write the algorithm for the Linked List
        i) Add Node At Front   ii)Delete Node At End   (3 mks)

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 the next operation.

a) Delete a node from head
b) Insert node with key 59 before node with key 8
c) Insert node with key 63 at head
d) Delete node with key 19
e) Insert node with key 88 at end

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Head ──▶ 5 │ ─┼──▶ 61 │ ─┼──▶ 8 │ ─┼──▶ 13 │ ─┼──▶ 19 │ N
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N indicates NULL.   **(5 mks)**

Q4) Answer the following

A) What do you mean by Binary Search Tree.   **(2mks)**
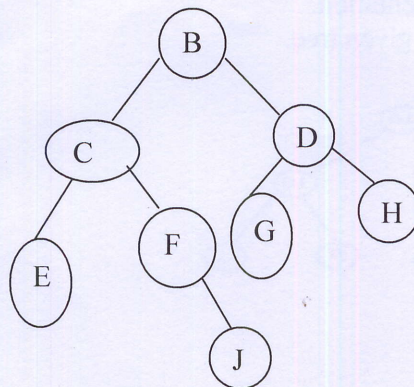
B) Construct heap tree for given inputs
20, 45, 33, 12, 78, 6, 4, 90   **(3mks)**

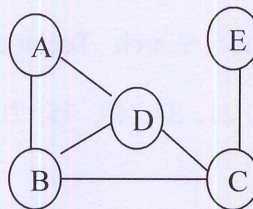C) For the Given TREE Structure give the following Tree traversal outputs . i)In-order Traversal   ii) Post-order Traversal   **(5 mks)**

Q5) Answer the following.

A) What is a Spanning Tree of a Graph? Draw two possible Spanning tree for the graph that is shown below.   **(2 mks).**

B). For above given Graph
a) Give adjacency Matrix.   b)Adjacency List   **(3mks)**

C)Explain the terms with diagrams wherever required.   **(5mks)**

i)   Weighted graph   ii) Graph Traversal
iii) Expression Tree   iv) Doubly Linked List
v)   Cylic graph

---Best of luck---