Roll. No. _____

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Shree Damodar College of Commerce & Economics, Margao-Goa
SYB.Voc.(ST), Semester-III, Semester End Examination November 2022
Data Structures (STG301)

Duration: 2 hrs **Max Marks: 60**

Instructions:

1) Start each question on a fresh page.
2) Figures to the right indicate maximum marks.
3) All Questions are compulsory, however internal choice is available.

Q.1 Answer ANY 5 of the following: **5X2=10**

a) How is Binary Search better than Linear Search?
b) Write one benefit of Merge Sort.
c) What is the use of strlen function in Strings?
d) How can one identify the last node in a Linked List?
e) Define Circular Linked List.
f) Define an underflow situation in a queue.
g) What is a Postfix expression?

Q.2. Answer ANY 5 of the following : **5x2=10**

a) Indicate the number of elements in a stack if the value of Top of the Stack is 3?
b) Interpret the purpose of the two ends of a Queue.
c) Compare a General Tree and a Binary Tree.
d) Show an example of parent-child nodes in a Tree data structure.
e) Cite an application of Graph Data Structure.
f) Show an example of a connected graph having 4 vertices.
g) Discuss the benefit of having a Spanning Tree for a Graph.

Q.3 Answer the following :

A) Apply Linear Search method to search the number 28 in the given list. Show the step by step method.
24, 56, 88, 99, 12, 34, 67, 28, 34, 67

OR **(5)**

B) Perform Bubble Sort on the following list of unsorted numbers , to get a list of ascending numbers. Show the Step by Step method.
25, 75, 35, 85, 90, 10

C) Interpret the information in the given Array and answer the questions below: (Array begins from element 2) (5)

2	7	8	26	15

(i)What is the index of the Last Element in the Array?

(ii) If Linear Search is performed to find the number 26, how many comparisons are required to be done?

(iii) If the above array's size was 25 and all places had elements, then what is the index of the second last number in the Array?

Q.4. Answer the following :

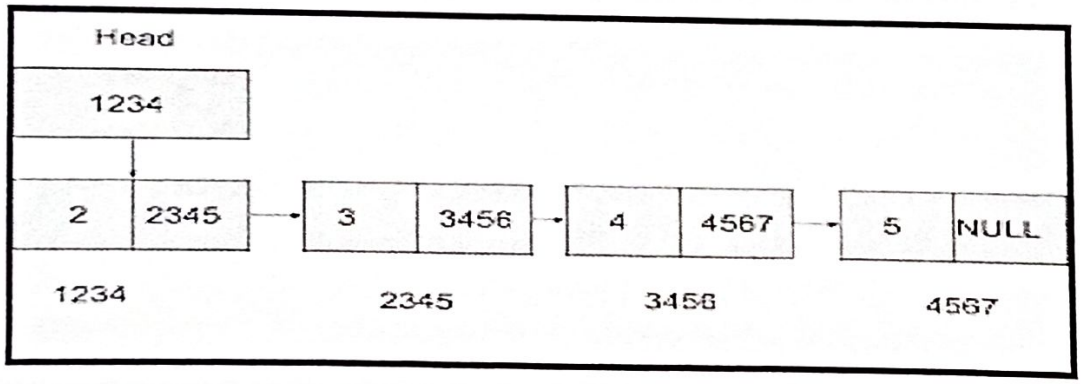
A) Illustrate the various parts of the Structure of a node in a Doubly linked list and mention its benefits.

OR

(5)

B) Illustrate any two operations on a Linked List with your own labeled example.

C) Perform the below mentioned Operations on the given Linked List and show the change in nodes . (5)



(i) Perform deletion of the last node and redraw the Linked List.
(ii)Perform adding a node in between the 2nd and 3rd node.(Assume the address of the new node as 2300 with data as 88)

Q.5 Answer the following:

A) Illustrate the following sequential steps for a Stack of size 5 :

(All Steps to be shown along with Value of TOP)

(i) PUSH 10,20,30,40,50

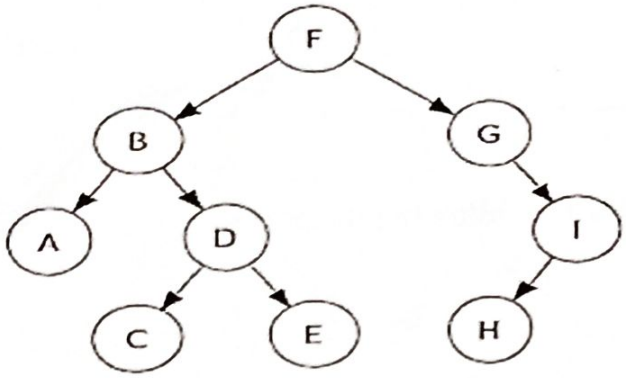
(ii) POP 3 elements

(iii) PUSH 100,120.

(iv) POP until the Stack becomes empty.

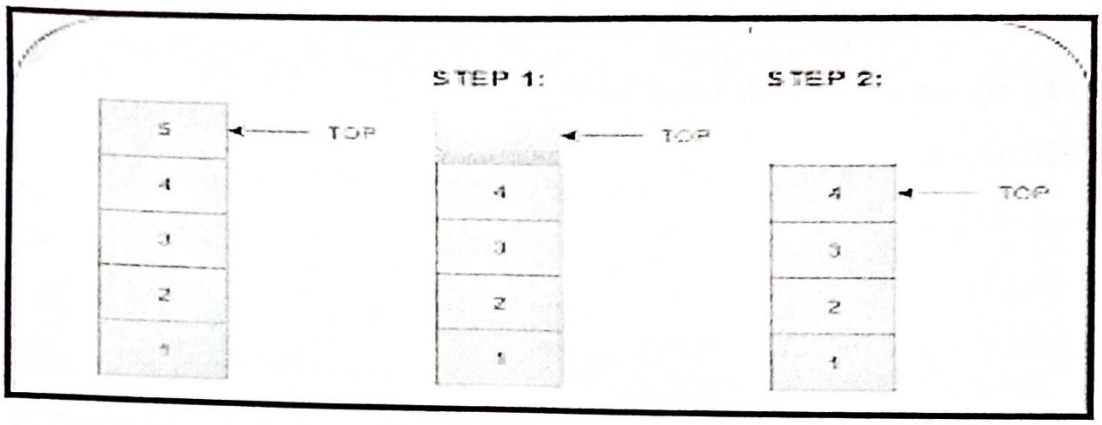
OR **(5)**

B) Identify the labeled parts in the Tree Data structure by answering the below questions:.



(i) Mention the names of all the Leaf nodes in the Tree.
(ii)Write two pairs of sibling nodes.
(iii) How many more nodes can make this Binary Tree as a Strictly Binary Tree?

C) Interpret the given Stack and answer the questions below: (5)



(i)Specify the number of POP operations required on the stack after Step 2 so that the TOP of the Stack is 2.

(ii) If the maximum size of the stack is 5 , then after Step 1, how can an Overflow situation occur in this stack.

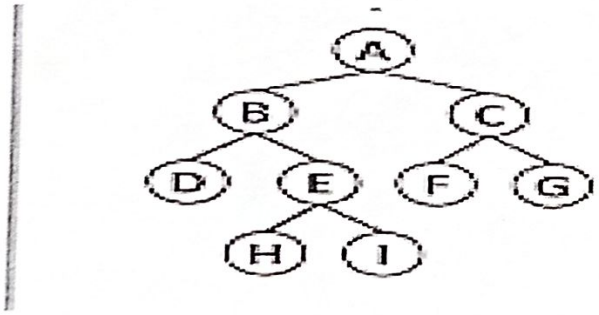
Q.6 Answer the following:

A) Construct a Binary Search Tree (BST) for the following numbers : 22,45,78,12,56,99,15,19,66,5

OR

(5)

B) Find the Balance of all the Nodes in the given Binary Tree and Perform Inorder Traversal .



C) Construct the adjacency Matrix for the below given graph. Also find shortest path from b to e. (5)