Please check that this question paper contains 09 questions and 02 printed pages within first ten minutes.

MORNING

12 JAN 2023

[Total No. of Questions: 09] [Total No. of Pages: 2...]

Uni. Roll No. .....

Program: B.Tech. (Batch 2018 onward)
Semester: 3rd
Name of Subject: **Data Structures**
Subject Code: **PCIT-101**
Paper ID: **16040**

Time Allowed: 03 Hours **Max. Marks: 60**

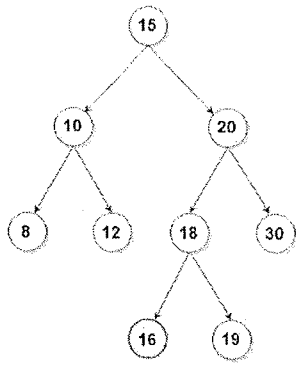
NOTE:

1) Parts A and B are compulsory
2) Part-C has Two Questions Q8 and Q9. Both are compulsory, but with internal choice
3) Any missing data may be assumed appropriately

Part – A **[Marks: 02 each]**

Q1.

a) How Priority Queue is implemented in memory?
b) Differentiate between linear and non linear data structure.
c) Explain why binary search cannot be performed on a linked list.
d) Define Big O notation.
e) Discuss pros and cons of Adjacency matrix representation of a graph.
f) Delete key 20 from the binary search tree given below



Part – B **[Marks: 04 each]**

Q2. Assume that a stack is represented using linked list. Write algorithms for the following operations:- (i) Push (ii) Pop

Q3. How do collisions happen during hashing? Explain different techniques used for

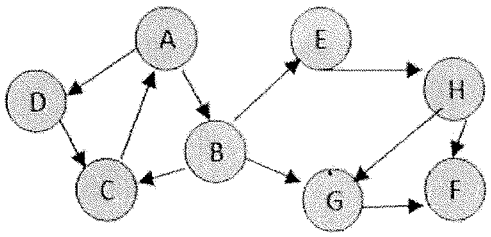
resolving of collisions .

Q4. Write an algorithm to sort an array of integers using merge sort .

Q5. Evaluate the following postfix expression.

24 7 5 - / 4 29 8 + * -

Q6. Consider the following graph. In what order will the nodes be visited using a Breadth First Search?



Q7. Construct a binary tree whose Inorder Traversal is { 4, 2, 1, 7, 5, 8, 3, 6 } and Postorder Traversal is { 4, 2, 7, 8, 5, 6, 3, 1 }. Also, calculate the height of above constructed binary tree.

Part – C **[Marks: 12 each]**

Q8. a) Explain various operations that can be performed on circular queue. Also discuss the advantages of circular queue over linear queue.

b) T[20][50] is a two dimensional array, which is stored in the memory along the row with each of its element occupying 4 bytes, find the address of the element T[15][5], if the element T[10][8] is stored at the memory location 52000.

OR

Design the algorithms to perform following operations :

a) Insert a new node after a given node in a sorted linked list.

b) Delete last node from the singly linked .

c) Count the number of elements in the singly linked list

Q9. Sort the following numbers using heap sort

46 7 86 4 25 17 62 59 33 4.

Show the heap after every iteration.

OR

Construct AVL Tree by inserting following numbers in an empty AVL tree -

50 , 20 , 60 , 10 , 8 , 15 , 32 , 46 , 11 , 48

Also delete key 60 from above constructed AVL tree.

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