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VELAGAPUDI RAMAKRISHNA
SIDDHARTHA ENGINEERING COLLEGE
(AUTONOMOUS)

II/IV B.Tech. DEGREE EXAMINATION, NOVEMBER, 2019

Third Semester

INFORMATION TECHNOLOGY

17IT3303 DATA STRUCTURES

Time: 3 hours

Max. Marks: 70

Part-A is compulsory

Answer One Question from each Unit of Part-B

Answer to any single question or its part shall be written at one place only

PART-A

10 x 1 = 10M

1.
 - a. Define space complexity.
 - b. Illustrate dynamic array.
 - c. What is stack ADT?
 - d. List the different types of queues.
 - e. Write a linked list to store the first 10 prime number.
 - f. Is it advantageous to save the address of last node as well in a single linked list? Comment.
 - g. Define balance factor in AVL tree.
 - h. What are the various tree traversal techniques?
 - i. What is the best sorting method if the elements are already sorted?
 - j. List any two properties of graphs.

PART-B**4 x 15 = 60M****UNIT-I**

2. a. Illustrate the conversion of the following infix expression into postfix as an application of stack:
 $!(A\&\&!((B<C)||((C>D))))$. **9M**
- b. Give an overview of system life cycle. **6M**

(or)

3. a. Describe how to perform recursive linear search and comment on the best, average and worst case time complexity and space complexity? **10M**
- b. Justify the need for data abstraction. **5M**

UNIT-II

4. a. Write an algorithm to any three possible insertions in a double linked list. **9M**
- b. What functions of linked list can be used to implement push and pop operations of stack? Explain with a suitable diagram. **6M**

(or)

5. a. What are the advantages of circular linked list over single and double linked list. **6M**

- b. Define queue ADT and write an algorithm to implement basic queue operations. **9M**

UNIT-III

6. a. Construct the binary tree. Inorder and preorder of the binary tree are as follows:
 i) 20, 44, 46, 48, 49, 59, 64, 69, 81, 97
 ii) 59, 44, 20, 49, 46, 48, 81, 69, 64, 97 **9M**
- b. How is insertion done in a B tree? **6M**

(or)

7. a. Demonstrate single rotations and double rotations in AVL trees. **10M**
- b. Compare the performance of searching in a height balanced binary search tree and binary search tree. **5M**

UNIT-IV

8. a. Illustrate deletion of any two elements in a max heap with atleast 10 elements. **9M**
- b. Compare the performance of the following sorting methods:
 i) Quick ii) Merge iii) Heap **6M**

(or)

9. a. Draw a graph of 10 nodes. Represent the graph using adjacency matrix and adjacency list. **8M**
- b. What is Hashing? Explain with an example. **7M**