



MARRI LAXMAN REDDY INSTITUTE OF TECHNOLOGY AND MANAGEMENT

(AN AUTONOMOUS INSTITUTION)

(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)

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I B.Tech II Sem Regular/Supply End Examination, September 2022

Data Structures

(CSC, CSD, CSE, CSI, CSM, ECE, IT, MECH)

Time: 3 Hours.

Max. Marks: 70

Note: 1. Question paper consists: Part-A and Part-B.

2. In Part - A, answer all questions which carries 20 marks.

3. In Part - B, answer any one question from each unit.

Each question carries 10 marks and may have a, b as sub questions.

PART- A

(10*2 Marks = 20 Marks)

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|-------|---|----|-----|-----|
| 1. a) | How do you write a singly linked list? | 2M | C01 | BL1 |
| b) | What are the advantages of circular linked list? | 2M | C01 | BL1 |
| c) | What are the applications of stack? | 2M | C02 | BL1 |
| d) | Transform the infix expression into its equivalent post fix expression: $(A-B)*(D/E)$. | 2M | C02 | BL3 |
| e) | What is the best sorting technique? Why? | 2M | C03 | BL1 |
| f) | What is the time complexity of merge sort? | 2M | C03 | BL1 |
| g) | What is binary tree? | 2M | C04 | BL1 |
| h) | Write steps for inorder, preorder and postorder traversals. | 2M | C04 | BL1 |
| i) | What is graph? Explain its key terms | 2M | C05 | BL1 |
| j) | Define in-degree and out-degree of a graph. | 2M | C05 | BL1 |

PART- B

(10*5 Marks = 50 Marks)

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|------|--|----|-----|-----|
| 2 a) | Write a program for the implementation of double linked list | 5M | C01 | BL3 |
| b) | Explain the how to insert node in the middle of the single linked list | 5M | C01 | BL4 |

OR

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|------|---|----|-----|-----|
| 3 a) | Define data structure. Explain different types of data structure and its applications | 5M | C01 | BL4 |
| b) | Write a program that uses function to perform the following operations on circular linked list: (i) creation (ii) Insertion | 5M | C01 | BL4 |
| 4 a) | Convert given Infix expression: $(a + b * c ^ d) * (e + f / g)$ to Postfix expression using Stack and show the details of Stack at each step of conversion. (Note: ^ indicates exponent operator) | 5M | C02 | BL3 |
| b) | Explain the operations of queue with suitable algorithms and examples. | 5M | C02 | BL4 |

OR

- 5 a) Explain the procedure to evaluate postfix expression $6\ 2\ 3\ +\ -\ 3\ 8\ 2\ /\ +\ * 2\ +\ 3\ +$ 5M C02 BL4
b) Explain the basic operations of queue with pseudo code. 5M C02 BL4

- 6 a) Sort the following list of elements by using insertion sort
35, 19, 66, 14, 8, 10, 57, 100 5M C03 BL3
b) Differentiate between iterative merge sort and recursive merge sort. 5M C03 BL2

OR

- 7 a) Arrange the following list of elements in ascending order using Merge Sort A, L, G, O, R, I, T, H, M, S Clearly show the sorting process at each step. 5M C03 BL3
b) How to select pivot element in quick sort? Explain how partition is done in quick sort with example. 5M C03 BL4

- 8 a) Explain the process of displaying the nodes of a binary tree at a particular level. 5M C04 BL4
b) Sketch the binary search tree resulting after inserting the following integer keys 49, 27, 12, 11, 33, 77, 26, 56, 23, 6. 5M C04 BL3
i) Check whether the tree is almost complete or not?
ii) Determine the height of the tree
iii) Write post order and preorder traversals.

OR

- 9 a) A binary tree has seven nodes. The Preorder and Postorder traversal of the tree are given below. Can you draw the tree? Justify.
Preorder : GFDABEC
Postorder : ABDCEFG 5M C04 BL3
b) Create binary search tree for the following elements (23, 12, 45, 36, 5, 15, 39, 2, 19). Discuss about the height of the above binary search tree. 5M C04 BL6

- 10 a) What is a graph? Explain the properties of graphs. 5M C05 BL4
b) Write breadth first traversal algorithm. Explain with an example. 5M C05 BL4

OR

- 11 a) Compare trees and graphs with applications. 5M C05 BL2
b) Explain how to represent graphs. 5M C05 BL4

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