

Code No: MC2511/25

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY-GURAJADA VIZINAGARAM

MCA I Semester Regular Examinations, December -2025

Data Structures

Time: 3 Hours

Max. Marks: 60

Question Paper consists of FIVE units, each carrying 12 marks  
Each unit has TWO questions; either of them should be answered  
All parts of a question must be answered at one place.

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**UNIT-I**

Marks

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|----|----|--|----|
| 1. | a) | Explain different types of operators in C with examples.                 | 6M |
|    | b) | Write a C program to find the largest and smallest elements in an array. | 6M |

**(OR)**

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|----|----|---|----|
| 2. | a) | Describe the concept of looping structures in C with suitable examples. | 6M |
|    | b) | Explain the syntax and use of various Input/Output statements in C.     | 6M |

**UNIT-II**

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|----|----|--|----|
| 3. | a) | Explain the concept of functions in C. Write a C program to illustrate the use of call by value and call by reference. | 6M |
|    | b) | Discuss the advantages of using structures and unions with examples.   | 6M |

**(OR)**

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|----|----|---|----|
| 4. | a) | Explain file handling operations in C and demonstrate how to read and write data from a file. | 6M |
|    | b) | Define pointers. Explain pointer arithmetic and its applications with examples.               | 6M |

**UNIT-III**

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|----|----|---|----|
| 5. | a) | Define a data structure. Explain the differences between linear and non-linear data structures. | 6M |
|    | b) | Explain the implementation of singly linked list with algorithms for insertion and deletion.    | 6M |

**(OR)**

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|----|----|--|----|
| 6. | a) | Discuss the concept of recursion and explain the difference between linear and binary recursion with examples. | 6M |
|    | b) | Explain the operations of doubly linked list and circular linked list with neat diagrams.                      | 6M |

**UNIT-IV**

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|----|----|--|----|
| 7. | a) | Explain stack operations and implement stack using an array.   | 6M |
|    | b) | Describe the operations of a queue. Write a program for insertion and deletion in a queue using a linked list. | 6M |

**(OR)**

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|----|----|---|----|
| 8. | a) | Define hashing. Explain collision resolution techniques such as linear probing and quadratic probing. | 6M |
|    | b) | Discuss the concept of extendible hashing and its advantages.   | 6M |

**UNIT-V**

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|----|----|---|----|
| 9. | a) | Explain different sorting algorithms: selection sort, bubble sort, and insertion sort with suitable examples. | 6M |
|    | b) | Describe the structure of a binary tree and explain preorder, in order, and post order traversals.            | 6M |

**(OR)**

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|-----|----|--|----|
| 10. | a) | Explain the structure and operations of Binary Search Tree (BST).  | 6M |
|     | b) | Differentiate between AVL trees and Red-Black trees with diagrams. | 6M |