



# P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

**Third Semester, B. E. - Computer Science and Engineering**

**Semester End Examination; March -2021**

**Data Structures**

*Time: 3 hrs*

*Max. Marks: 100*

*Note: Answer FIVE full questions, selecting ONE full question from each unit.*

### UNIT - I

- |      |  |    |
|------|--|----|
| 1 a. | Define Data structure. Explain the different types of Data structures with examples.                                 | 5  |
| b.   | Write a function to convert from infix to postfix expression. Trace it for the expression;<br>( $A + (B - C) * D$ ). | 10 |
| c.   | Define ADT for varying length character string.  | 5  |
| 2 a. | Write a program to evaluate the given postfix expression.  | 10 |
| b.   | Write a recursive program for Tower of Hanoi problem. Trace it for three disks.                                      | 10 |

### UNIT - II

- |      |   |    |
|------|---|----|
| 3 a. | Write a function to search for a key item using SLL.  | 8  |
| b.   | Write a C function to perform the following operations on circular DLL with header node:<br>i) To delete a node whose information field is specified<br>ii) To insert node at the front end of the list | 12 |
| 4 a. | Write a function to create ordered SLL.   | 10 |
| b.   | Write a function using SLL;<br>i) To reverse a given list without creating another list      ii) To concatenate two list  | 10 |

### UNIT - III

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|------|--|----|
| 5 a. | Write a function to add two polynomials.                                       | 10 |
| b.   | Write a program to perform various operations on a circular queue.             | 10 |
| 6 a. | Define priority queue. Write a function to implement ascending priority queue. | 10 |
| b.   | Explain the various operations that can be performed on Double Ended queue.    | 10 |

### UNIT - IV

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|------|--|----|
| 7 a. | Explain the following with example:<br>i) Strictly binary tree                      ii) Complete binary tree<br>iii) Almost complete binary tree      iv) An expression tree | 10 |
| b.   | Write a function for deleting a node from Binary Search tree.  | 10 |
| 8 a. | Write recursive functions for different Tree Traversal techniques.   | 10 |
| b.   | Define Threaded Binary tree. Write a function for inserting a node into Threaded Binary tree.  | 10 |

### UNIT - V

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|-------|---|----|
| 9 a.  | Write a program to sort the elements using quick sort.                  | 10 |
| b.    | Write a program to sort the elements using heap sort.                   | 10 |
| 10 a. | Write a program to search for a given element using sentinel search.    | 10 |
| b.    | Write a program to search for a given element using probability search. | 10 |