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**PRESIDENCY UNIVERSITY**

**Bengaluru**

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| **End - Term Examinations – JANUARY 2025** |
| Date: 07 – 01- 2025 Time: 01:00 pm – 04:00 pm |

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| **School:** SOCSE/SOE | **Program:** B.Tech CSE-(All Programs) | |
| **Course Code :** CSE2001 | **Course Name :** Data Structures and Algorithms | |
| **Semester**: III | **Max Marks**: 100 | **Weightage**: 50% |

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| **CO - Levels** | **CO1** | **CO2** | **CO3** | **CO4** | **CO5** |
| **Marks** | **20** | **20** | **20** | **20** | **20** |

**Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *Do not write anything on the question paper other than roll number.*

**Part A**

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| --- | --- | --- | --- | --- |
| **Answer ALL the Questions. Each question carries 2marks. 10Q x 2M=20M** | | | | |
| **1** | Explain the purpose of data structure. | **2 Marks** | **L2** | **CO1** |
| **2** | Explain the notion of an algorithm. | **2 Marks** | **L2** | **CO1** |
| **3** | Define recursion with a suitable example. | **2 Marks** | **L2** | **CO1** |
| **4** | Explain the advantages of a linked list over arrays. | **2 Marks** | **L2** | **CO1** |
| **5** | Outline the queue status in the following situations: Front == Rear, Front > Rear. | **2 Marks** | **L2** | **CO1** |
| **6** | Contrast the characteristics of primitive and non-primitive data structures. | **2 Marks** | **L2** | **CO1** |
| **7** | Explain the properties of algorithms. | **2 Marks** | **L2** | **CO1** |
| **8** | Explain the concept of order of growth. | **2 Marks** | **L2** | **CO1** |
| **9** | What is basic operation? Why is it important to identify in an algorithm? | **2 Marks** | **L2** | **CO1** |
| **10** | Explain the concept of worst case with an example. | **2 Marks** | **L2** | **CO1** |

**Part B**

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| **Answer the Questions Total 80 Marks.** | | | | | |
| **11.** | **a.** | Write code snippets to implement the following stack operations: push(), pop(), peek(), display(). | **10 Marks** | **L3** | **CO2** |
| **b.** | Implement code snippets to insert and delete an element at a particular position in an array. | **10 Marks** | **L3** |
| **Or** | | | | | |
| **12.** | **a.** | Write code snippets to implement the following queue operations: enqueue(), dequeue(), display() | **10 Marks** | **L3** | **CO2** |
| **b.** | Construct the postfix conversion for the following infix expression:  A +(( B – C) \* D /( E + F)). | **10 Marks** | **L3** |
|  |  |  |  |  |  |
| **13.** | **a.** | Construct a code snippet to perform the following operations in a singly linked list: Display, Search for an element. | **10 Marks** | **L3** | **CO3** |
| **b.** | Develop a code snippet to:  i) Insert a new node at the beginning of a circular list.  ii) Delete a node at the beginning of a circular list. | **10 Marks** | **L3** |
| **Or** | | | | | |
| **14.** | **a.** | Build a code snippet to:  i) Insert a new node at a given position in a Singly linked list.  ii) Delete a node at a given position in a Singly linked list. | **10 Marks** | **L3** | **CO3** |
| **b.** | Use a code snippet :  i) to solve the 'Tower of Hanoi' problem using recursion  ii) Fibonacci series using recursion. | **10 Marks** | **L3** |

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| **15.** | **a.** | Construct the Binary search tree using the following elements  100,-1,-2,999,210,34,45,78,98,99,90,35,46,67,66  And Perform In-order ,Pre-order and Post-order traversal on constructed tree | **10 Marks** | **L3** | **CO4** |
| **b.** | Illustrate the insertion operation in the Binary search tree with code snippet | **10 Marks** | **L3** |
| **Or** | | | | | |
| **16.** | **a.** | Develop code snippets for the following operations   1. In-order traversal 2. Post or pre-order traversal. | **10 Marks** | **L3** | **CO4** |
| **b.** | Develop code segment for the following operations in DLL   1. Insertion of a new node in the beginning 2. Deletion of node at the End | **10 Marks** | **L3** |

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| **17.** | **a.** | Develop a code snippet to implement the Linnear search algorithm and mention the time complexity | **10 Marks** | **L3** | **CO5** |
| **b.** | Develop a code snippet to implement the Selection Sort algorithm and mention the time complexity | **10 Marks** | **L3** |
| **Or** | | | | | |
| **18.** | **a.** | Develop a code snippet to implement the Binary search algorithm and mention the time complexity | **10 Marks** | **L3** | **CO5** |
| **b.** | Develop an algorithm for the following problem statement   1. Find the minimum element in a given array 2. Find the prime number in the given array | **10 Marks** | **L3** |

**\*\*\*\*\* BEST WISHES \*\*\*\*\***