



B.E/B.TECH DEGREE EXAMINATIONS: NOV/DEC 2022

(Regulation 2018)

Third Semester

COMPUTER SCIENCE AND ENGINEERING

U18CSI3201 - Data Structures

COURSE OUTCOMES

- CO1:** Develop applications using stack and queue data structures [K5, S2]
CO2: Develop applications to retrieve records from database using hashing techniques [K5, S2]
CO3: Compare efficiency of various searching techniques using different tree data structures. [K4, S2]
CO4: Compare efficiency of various sorting techniques using different data structures. [K4, S2]

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 2 = 20 Marks)

(Answer not more than 40 words)

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|--|-----|-------------------|
| 1. List down the properties of asymptotic notations. | CO1 | [K ₁] |
| 2. Enqueue and Dequeue operations can be performed in Front and Rear pointers respectively. Explain. | CO1 | [K ₂] |
| 3. List the operations performed on data appearing in data structures. | CO2 | [K ₁] |
| 4. Interpret the hashing technique for the given statement
"when multiple elements are hashed into the same slot index, then these elements are inserted into list which is known as a chain" | CO2 | [K ₁] |
| 5. List the advantages of a doubly linked list over a singly linked list. | CO2 | [K ₁] |
| 6. Explain the term threaded binary tree. | CO3 | [K ₂] |
| 7. Show the complexity analysis of the AVL tree is better than the binary search tree. | CO3 | [K ₁] |
| 8. List the representations of the graph with an example. | CO3 | [K ₁] |
| 9. Outline the advantages of Merge sort with its complexity. | CO4 | [K ₂] |
| 10. Infer the knowledge about heap sort. | CO4 | [K ₂] |

Answer any FIVE Questions:-

PART B (5 x 16 = 80 Marks)

(Answer not more than 400 words)

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|--|----|-----|-------------------|
| 11. a) Convert the following expression from Infix to Prefix and Infix to Postfix expression. Infix: $6 + (5 * 3 / 5)$. | 6 | CO1 | [K ₂] |
| b) List the steps involved in the implementation of stack using an array. | 10 | CO1 | [K ₁] |

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|-----|----|---|----|-----|-------------------|
| 12. | a) | Demonstrate the advantages and applications of circular queue | 8 | CO1 | [K ₃] |
| | b) | Build an algorithm for evaluating postfix expression using stack. | 8 | CO1 | [K ₃] |
| 13. | a) | Analyze the best, worst and average case efficiency on an algorithm for finding the maximum element in an array. | 16 | CO2 | [K ₄] |
| 14. | a) | Illustrate an algorithm for the following operations of binary search tree | 16 | CO3 | [K ₂] |
| | | i. Searching | | | |
| | | ii. Insertion | | | |
| | | iii. Deletion | | | |
| 15. | a) | Build an algorithm to sort a set of 'N' numbers using merge sort and compare complexity of merge sort with other sorting techniques | 16 | CO4 | [K ₃] |
| 16. | a) | Perform insertion of values 8, 15, 32, 46, 11, 48 in the following AVL Tree. | 16 | CO3 | [K ₃] |


