

**THE KAVERY ENGINEERING COLLEGE***(An Autonomous Institution)***B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL/MAY 2026***Third Semester**Electronics and Communication Engineering***UCST24304 / CS3353 - C Programming and Data Structures****(Common to Electrical and Electronics Engineering)***Regulations – 2024 & 2021**Duration : 3 Hrs**Maximum : 100 Marks***PART – A (ANSWER ALL QUESTIONS) (Marks 10\*2=20)**

| <i>Q.No</i> | <i>Questions</i>                                                                                    | <i>BTL</i> | <i>CO</i> | <i>Marks</i> |
|-------------|-----------------------------------------------------------------------------------------------------|------------|-----------|--------------|
| 1.          | List the fundamental data types available in C.                                                     | L1         | 1         | 2            |
| 2.          | Differentiate between a single and a multi-dimensional array.                                       | L2         | 1         | 2            |
| 3.          | What is a preprocessor directive?                                                                   | L1         | 2         | 2            |
| 4.          | State the concept of a pointer to a function with a simple example.                                 | L2         | 2         | 2            |
| 5.          | What is a List Abstract Data Type (ADT)?                                                            | L1         | 3         | 2            |
| 6.          | Describe the key difference between a queue and a stack in terms of their data handling principles. | L2         | 3         | 2            |
| 7.          | What is a Binary Search Tree (BST)?                                                                 | L1         | 4         | 2            |
| 8.          | Illustrate the concept of open addressing in hashing.                                               | L2         | 4         | 2            |
| 9.          | What is the fundamental difference between linear search and binary search?                         | L1         | 5         | 2            |
| 10.         | State the basic principle of Insertion Sort with a small example.                                   | L2         | 5         | 2            |

**PART – B (ANSWER ALL QUESTIONS) (Marks 5\*16 = 80)**

| <i>Q.No</i> | <i>Questions</i>                                                                                                                                                    | <i>BLT</i> | <i>CO</i> | <i>Marks</i> |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------|--------------|
| 11.         | a    What is a function in C? Explain how to define and call a function with an example.                                                                            | L2         | 1         | 16           |
|             | Or                                                                                                                                                                  |            |           |              |
|             | b    Describe the different types of conditional statements in C. Using a suitable example, explain how these statements help in controlling the flow of a program. | L2         | 1         | 16           |
| 12.         | a    What are structures and unions in C? Explain the differences between them with clear examples.                                                                 | L2         | 2         | 16           |
|             | Or                                                                                                                                                                  |            |           |              |
|             | b    i    Explain the various file handling operations in C.                                                                                                        | L2         | 2         | 8            |
|             | ii    With a C code, describe how pointers variable are declared and referred on a function.                                                                        | L2         | 2         | 8            |

|     |   |                                                                                                                                                                                                                                                                                                          |    |   |    |
|-----|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|---|----|
| 13. | a | Given a stack with elements `{A, B, C, D}` (D is the top), analyze the effect of performing the following sequence of operations: push(E), pop(), pop(), push(F).<br>(i) Draw the stack after each operation<br>(ii) Write a C program to implement a stack and perform the above sequence of operations | L4 | 3 | 16 |
|     |   | Or                                                                                                                                                                                                                                                                                                       |    |   |    |
|     | b | Implement a queue using an array of size 5. Initially, the queue contains {10, 20, 30, 40, 50} (10 at front, 50 at rear). Perform the operations: dequeue(), dequeue(), enqueue(60), enqueue(70). Draw the queue after each operation and write a C program to perform these operations.                 | L4 | 3 | 16 |
| 14. | a | Construct a Binary Search Tree (BST) using the numbers {40, 20, 60, 10, 30, 50, 70}. List the order in which the nodes are traversed using In-order, Pre-order, and Post-order traversals.                                                                                                               | L3 | 4 | 16 |
|     |   | Or                                                                                                                                                                                                                                                                                                       |    |   |    |
|     | b | Construct a hash table of size 7 using the hash function $h(k) = k \text{ mod } 7$ . Insert the keys {10, 22, 31, 4, 15, 28, 17} using<br>(i) Linear Probing<br>(ii) Separate Chaining<br>Show the final state of the hash table in both methods.                                                        | L3 | 4 | 16 |
| 15. | a | Compare Merge Sort and Quick Sort. Which one is better for large datasets and why? Explain your answer.                                                                                                                                                                                                  | L5 | 5 | 16 |
|     |   | Or                                                                                                                                                                                                                                                                                                       |    |   |    |
|     | b | Explain how Binary Search works with a suitable example. Evaluate its efficiency compared to Linear Search and justify why it is preferred for large sorted datasets.                                                                                                                                    | L5 | 5 | 16 |