

Registration No.:

--	--	--	--	--	--	--	--	--	--

Total Number of Pages: 02

Course: IDD (B.Tech and M.Tech)

Sub_Code: 23ES1003

2nd Semester Regular/Back Examination: 2024-25

SUBJECT: Programming in C and Data Structure

BRANCH(S): AE, AEIE, AERO, AUTO, BIOTECH, C&EE, CHEM, CIVIL, CSE, CSEAI, CSEAIML, CSEDS, CSEIOT, CSIT, CST, ECE, EEE, EEVDT, ELECTRICAL, ELECTRICAL & C.E, ETC, IT, MECH, MINERAL, MINING, MME

Time: 3 Hours

Max Marks: 100

Q.Code: S489

Answer Q1 (Part-I) which is compulsory, any eight from Part-II and any two from Part-III.

The figures in the right hand margin indicate marks.

Part-I

Q1 Answer the following questions: (2 x 10)

- What is the difference between flowchart and algorithm?
- Write the rules to name an identifier in C.
- What is the output of the program?

```
void main()
{
    int a=10,b=20;
    printf("%d", (a>b)&&(a>c));
    printf("%d", (a>b)||(a>c));
}
```
- List out some advantages and disadvantages of linked list over array data structure.
- Briefly explain the difference between while and do-while loop.
- What is the output of the program?

```
void main()
{
    int x=5;
    printf("x=%d",x);
    printf("x=%d",x++);
    printf("x=%d",x);
    printf("x=%d",--x);
}
```
- What is file and explain its different modes.
- Define a complete binary tree and strictly binary tree with suitable example.
- Write overflow and underflow conditions of stack.
- What is main difference between structure and union?

Part-II

Q2 Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve) (6 x 8)

- Explain switch statement with its syntax and example.
- Write a program to check whether a number is palindrome or not.
- Explain about different parameter passing mechanisms in function with examples.

- d) Write a program to swap two numbers using pointer concept.
- e) Explain about different file operations that can be performed on files. How to read from and write to a file? Explain with examples
- f) Write a program in C to print count the odd numbers present in between 1 to 100.
- g) Write a program to create a file and store some information.
- h) Briefly explain the functions used in dynamic memory management.
- i) Write a menu driven program using C to perform insert, delete, and display operations in a linear queue.
- j) Create the Binary Search Tree (BST) by inserting the following elements in order to an empty BST.
5, 6, 4, 2, 3, 9, 8, 1
- k) Explain the working principle of the binary search algorithm. How is it different from linear search?
- l) Sort the given elements in ascending order using bubble sort and write its time complexity
2, 1, 4, 0, 7, 3

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

(16 x 2)

- Q3**
 - a) Define recursion. Write a program to calculate factorial of a number using recursion (8)
 - b) What are variables and constants? What are the rules for declaring the variables? (8)
- Q4**
 - a) What is array? How to declare an array? Explain with suitable example. (8)
 - b) Write a program to display the result of 3 x 3 matrix multiplication using an array. (8)
- Q5**
 - a) Given a linked list with elements 10, 20, 30, 40, 50. Write the steps to perform the following operations from the single linked list. (8)
 - I. Deletion from the beginning
 - II. Deletion from the end
 - III. Display the list after deletion
 - b) Convert the following expression written in infix form into its equivalent postfix form using stack by showing each step. (8)
Infix: $K + (L * M - (N / O ^ P) * Q) * R$
- Q6**
 - a) Let A is the array of the following elements $A = \{2, 4, 6, 8, 9, 10, 12, \text{ and } 13\}$. Search the element 12 using binary search technique. Write its time complexity. (8)
 - b) Discuss the worst case and average case time complexity of quick sort. Apply Quick sort on the following data and show the contents of the array every pass: (8)
48, 7, 26, 4, 13, 23, 98, 57, 10, 5, 32