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)**

a) What is the difference between flowchart and algorithm?
b) Write the rules to name an identifier in C.
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));
}
```

d) List out some advantages and disadvantages of linked list over array data structure.
e) Briefly explain the difference between while and do-while loop.
f) 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);
}
```

g) What is file and explain its different modes.
h) Define a complete binary tree and strictly binary tree with suitable example.
i) Write overflow and underflow conditions of stack.
j) 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)**

a) Explain switch statement with its syntax and example.
b) Write a program to check whether a number is palindrome or not.
c) 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, 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