

Registration No.:

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Total Number of Pages: 02

Course: B.Tech/IDD  
Sub\_Code: 23ES1003

1<sup>st</sup> Semester Regular/Back Examination: 2024-25

SUBJECT: PROGRAMMING IN C AND DATA STRUCTURE

BRANCH(S): PLASTIC, MINING, METTA, MECH, ME, MANUTECH, ELECTRICAL, ELECTRICAL & C.E., EEE, ETC, ELECTRONICS & C.E., ECE, CST, CSEDS, CSEAIML, CSEAI, CSE, AUTO, AEIE, AERO, AE, BIOMED, BIOTECH, CHEM, CIVIL, CE

Time: 3 Hours

Max Marks: 100

Q.Code: R511

Answer Question No.1 (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 a global variable and a local variable? Give an example.
- Define a symbolic constant. Give an example. Why is it used?
- What are *getchar ()* and *putchar ()* functions and why they are used?
- List the different types of errors that occur during the execution of a C program.
- Differentiate between postfix and prefix operators with an example.
- Distinguish between compiler and interpreter.
- Differentiate between *while* and *do-while* loops.
- Distinguish between homogeneous and heterogeneous data structures.
- Explain pointer to function with an example.
- Difference between a binary tree and a binary search tree with an example.

**Part-II**

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

- Difference between Linear Search and Binary Search. Write the pseudocode to implement binary search. Search the value "14" from the following sequence of numbers:  
2, 5, 10, 14, 15, 30, 38
- What is dynamic memory allocation? Write and explain the different dynamic memory allocation functions in C.
- Write a program to find the area of a rectangle using call-by-reference.
- Write a program to find whether a number is PALINDROME or not.
- Write a C function "*isprime(num)*" that accepts an integer argument and returns 1 if the argument is prime; a 0, otherwise. Write a C program that invokes this function to generate the prime numbers between a given ranges.

- f) Explain what is an algorithm and what is a flow-chart? How are they used as a problem-solving tool? Give an example to justify your answer.
- g) Write a C program to copy the contents from one string to another without using the string functions.
- h) Write a program to read 20 unsorted numbers to an array and pass the address of this array to a function to sort the numbers in ascending order using bubble sort technique.
- i) Explain array of pointers and pointer to array with an example from each.
- j) Can a function return multiple values? Justify with an example.
- k) Differentiate between “break” and “continue” statements with an example.
- l) Construct the binary tree from the given sequence:  
Pre-order: A B D E C F  
In-Order: D B E A F C

### Part-III

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

- Q3** a) Explain about array of structures and structure within a structure with an example. (8+8)  
b) Write a C program to maintain a record of 10 players of Indian Cricket team. Print the scores of each player in 5 matches given the name of each player.
- Q4** a) Explain the two-way selection (*if, if-else, nested if-else*) in C language. (8+8)  
b) Write a C program to read a year as input and find whether it is a leap year or not
- Q5** a) Explain what is a recursive function along with its properties. (10+6)  
b) Write a C program to print the Fibonacci sequence of 10 numbers using recursion.
- Q6** a) Differentiate between an array and a linked-list. (10+6)  
b) Write an algorithm to create a single linked-list of 5 nodes. Insert the elements and display them.