RV University

School of Computer Science and Engineering

B.Tech Degree Examination

Semester : I

Course Code : CS1005

Course Title : Programming in C

Duration : 2 Hours

Max. Marks: 30

Instructions to Students:

1. Answer all Questions
2. Mobile Phones, Smart Watches or other internet-enabled devices are treated as malpractice.

Sl. No.	PART A – Max Marks(10)	Marks	L1-L6	CO
1.	a) Explain the differences between a loader and a linker in the context of program execution. Provide examples to support your explanation.	2	L2	CO1

	b) Solve the following C code snippet, interpret the evaluation of the expression & demonstrate the final values of x, y, and z. Explain each step of the evaluation process.
	`#include <stdio.h>`
	`int main()`
	`{`
	`int x = 5, y = 10, z;`
	`z = x++ + --y * 2 - (x + y) % 3;`
	`printf("x = %d, y = %d, z = %d\n", x, y, z);`
	`return 0;`
	`}`
		3	L3	CO2

2.	a) Given the following C code snippet, estimate the output and identify any issues with the use of pointers:
	`#include <stdio.h>`
	`void updateValue(int *ptr)`
	`{`
		3	L3	CO3

	*ptr = *ptr + 5;
	}
	int main()
	{
	int num = 10;
	updateValue(&num);
	printf("Updated value: %d", num);
	return 0;
	}
	
	b) Examine a C program that checks whether the macro VERSION is defined before compiling. If VERSION is not defined, the program should produce a compile-time error with a custom message saying "Required version not defined!" using the #error directive. If VERSION is defined, the program should print "Version is defined." to the console.
		2	L4	CO3

Sl. No.	PART B – Max Marks (20)	Marks	L1-L6	CO
3.	a) You are a software developer tasked with writing a C program to help a company analyse the performance of various products based on their sales figures. Each product's sales data is stored in an array, where each element represents the sales figure of a particular product. Your manager has asked you to write a program that: • **Takes user input** for the number of products and the sales data for each product. • **Identifies the highest sales figure** from the entered data, which will represent the best-selling product. • **Displays the highest sales figure** to help the team determine which product is performing the best. Write a C program that: • Prompts the user to input the number of products. • Accepts the sales data (integers) for each product in an array. • Finds and displays the highest sales figure from the array.	5	L3	CO3
	b) You are a software engineer working for a healthcare analytics company. The company is developing a system to analyze and predict trends in patient data. One of the key algorithms your team needs to implement is a	5	L4	CO3

	recursive function to generate a **Fibonacci sequence**, which is commonly used in various mathematical models, such as population growth predictions and biological processes. Your team needs a function that can compute the **nth Fibonacci number**. The Fibonacci series begins with 0 and 1, and each subsequent number is the sum of the previous two numbers. Your manager has asked you to create a program that: • **Takes an integer input n** representing the number of terms to generate. • **Prints the Fibonacci series** up to the nth term, where each term is calculated recursively. Your task is to create a C program that: • Accepts an integer n (number of terms in the Fibonacci series) from the user. • Uses recursion to calculate and print the Fibonacci sequence up to the nth term.			
4.	**a)** Demonstrate a C program that performs the following tasks: **i) Create and write to a file:** The program should create a file named sample.txt and write the following text into it: Hello, World! File operations in C are fun! **ii) Read from the file:** After writing the content, the program should open the same file (sample.txt) for reading and display its contents on the console.	**5**	**L3**	**CO4**
	b) Analyze a C program that uses an array of structures to store information about 5 students. Each student has the following information: • Name (a string of 50 characters) • Roll number (an integer) • Marks in 3 subjects (3 integers) The program should: 1. Accept the data for 5 students (name, roll number, and marks). 2. Display the information of all students.	**5**	**L4**	**CO4**