C

Reg. No. :

Question Paper Code:R1207

B.E./B.Tech. DEGREE EXAMINATION, DEC 2025

First Semester

Computer Science and Engineering

R21UCS107- PROBLEM SOLVING AND C PROGRAMMING

(Common to ECE, IT, CSBS, AI&DS, CSD, CSE(AIML), IOT & CYBER SECURITY)

(Regulations R2021)

Duration: Three hours Maximum: 100 Marks

Answer All Questions

PART A - (5x 1 = 5 Marks)

1. Which of the following is not a characteristic of a computer? CO1-U

   (a) Speed (b) Intelligence (c) Automation (d) Versatility

2. _____ keyword transfers control to a labeled statement? CO1-U

   (a) goto (b) break (c) auto (d) continue

3. Which is the valid string data? CO1-U

   (a) 'A' (b) A (c) "A" (d) none of these

4. What does the term "void" mean in the context of a function declaration? CO1-U

   (a) It indicates that the function returns no value

   (b) It signifies the function is undefined

   (c) It implies the function can accept any data type

   (d) It restricts the function from accepting arguments

5. Union can store _____ number of values at a time CO1-U

   (a) All its members (b) Only one (c) 2 (d) Cannot hold value

PART – B (5 x 3= 15 Marks)

6. What is the purpose of scanf( ) and printf( ) functions? CO1- U

7. Differentiate while and do-while statement. CO1- U

8. Differentiate arrays and strings. CO1- U

9.		Define functions.	CO1- U	
10.		Define malloc() in C.	CO1- U	

PART – C (5 x 16= 80 Marks)

11.	(a)	(i) You have recently joined Bright Future Finance Ltd. as a software trainee. The company deals with various types of short-term and long-term loans. Your manager has asked you to develop a small C program that helps the loan department quickly calculate the Simple Interest (SI) for client.	CO2-App	(8)
		(ii) A school wants to find whether a student has passed or failed based on 5 subject marks. Write an algorithm to compute the total, average, and result.		(8)
		Or		
	(b)	(i) A fitness training centre records the total number of days each member participates in a training program. For monthly reports, the manager wants to convert the total days into months and remaining days. Write a C program that inputs the total number of days and converts it to months and days using arithmetic operators.	CO2-App	(8)
		(ii) An online exam system needs to record the key pressed by the student for MCQ options (A/B/C/D). To process the answer, the system first converts the selected option into its ASCII value. Write a C program to input a character and display its ASCII value.		(8)
12.	(a)	(i) A student app includes a built-in calculator to help learners practice arithmetic. Write a program that prompts the user to enter two numbers and then displays a menu offering four basic operations: addition, subtraction, multiplication, and division.	CO3-App	(8)
		(ii) In a computer game, a player earns 1 point on the first level, 2 points on the second level, and so on up to level 10. Write a C program using a for loop to calculate the total points earned after completing 10 levels.		(8)
		Or		
	(b)	(i) The college administration is preparing the academic calendar for the upcoming year. To accurately plan holidays and working days, they need to know whether February has 28 or 29 days. Write a C program to check whether a given year is a leap year so the system can automatically generate the correct academic calendar.	CO3-App	(8)
				(8)

(ii) A bank wants to enhance ATM security by generating a reverse PIN code as a temporary authentication step. For example, if a user enters 9876, the system should convert it to 6789. Write a C program to reverse the entered 4-digit PIN using a loop.

13. (a) (i) The Sports Committee of your college is recording players' performance scores during a selection trial. Each player receives multiple scores from judges. Create a C program that inputs several scores and calculates the average. CO4- App (8)

(ii) A movie theater maintains a seating chart in a matrix (2D array) where each value represents whether a seat is booked (1) or available (0). Develop a C program that stores this seating arrangement in a 2D array and prints the entire seating layout so the manager can view the status of all seats. (8)

Or

(b) A digital image processing system uses matrices to represent pixel data.For some transformations like rotation or mirror alignment, the software must compute the transpose of the pixel matrix. Develop a C program that accepts a 2D matrix and displays its transpose CO4- App (16)

14. (a) A professor stores marks from two assessments and wants the total. To understand function calls, first-year students must write a program using all four function type. Write a C program to calculate total internal marks using all four function call methods. CO4-App (16)

Or

(b) (i) A robot moves in steps that follow a Fibonacci pattern. If asked to move n steps, it needs to know the n-th Fibonacci term to determine its movement strategy. Develop a recursive C program to compute the n-th Fibonacci step for robot motion planning. Illustrate how recursion works for n = 5. CO4-App (8)

(ii) An AI-based ranking system multiplies student scores using factorial-based calculations. To test different modules, the factorial must be calculated in two ways. Write a C program using pass-by-value to calculate factorial. (8)

15. (a) Create a C program using Union called Employee which stores the name, id, basic pay, HRA and DA as members. Find the total pay of the employee. CO4-App (16)

(b) Write a C Program using Structure to create a library catalogue with the following fields: Access Number, Author's Name, Title of the Book, Year of publication, Publisher's Name, Price. CO4-App (16)