10. (a) Write a C program to create a simple node of a singly linked list (containing an integer data and pointer to next node). Only creation and displaying node contents are required. 8

(b) Explain self-referential structures with an example. Why are they important in C? 6

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B.Tech Even Semester Examination, May, 2025

Computer Science & Engineering / Agricultural Engineering / Electronics & Communication Engineering

(2nd Semester)

Course No: ASHE-153/ASH-203

(Programming for Problem Solving)

Full Marks: 70

Pass Marks: 28

Time: 3 hours

Note:

1. Attempt only one question from each unit.
2. Begin each answer in a new page
3. Answer parts of a question at a place
4. Assume reasonable data wherever required
5. The figure in the right margin indicates full marks for the question
6. All the mathematical symbols and abbreviations have their usual meanings.

UNIT-I

1. (a) Describe the different components of a computer with a neat diagram. 6

(b) Write the pseudocode and draw the flowchart for checking whether a given number is prime. 8

2. (a) What is the differences between Syntax Errors and Logical Errors. Briefly explain the storage classes in C programming.2+5

(b) A program to calculate simple interest is to be developed. Write the algorithm and corresponding flowchart for it. 7

Turn Over

UNIT-II

3. (a) Write a C program to calculate the final bill amount after applying a discount based on the following rules:

- If the amount > 5000, discount = 10%
- If 2000 d" amount d" 5000, discount = 7%
- If amount < 2000, discount = 5%
- If the customer is a member (entered as 'y' for yes or 'n' for no), apply an additional 2% discount to the final bill after the initial discount.
- If the amount entered is negative, display an error message. 8

(b) Explain how strings are stored in memory in C. Write a program to count the number of vowels in a given string. 6

4. (a) Write a menu-driven program in C to perform the following operations on an integer array of size 5:

(i) Insert an element

(ii) Display all elements 7

(b) Explain the difference between 'while' and 'do-while' loops with suitable examples. 7

UNIT-III

5. (a) Write a C program to search for a given number in an array entered by the user. Display appropriate messages if found or not found. 7

(b) Explain Call by Value and Call by Reference with suitable C code examples. 7

6. (a) Write a C program using a function to calculate the sum of elements of an integer array. Pass the array and its size as arguments to the function. 8

(b) Write a C program to input 10 numbers into an array and count how many times each number appears. Display the frequency of each distinct number. 6

UNIT-IV

7. (a) Write a C program to find the factorial of a number using recursion. 7

(b) Create a structure BANK to maintain customer records with fields: CUST_ID, NAME, ACC_TYPE, BALANCE. Write a menu-driven program to:

(i) Add a new customer record

(ii) Display all customer records 7

8. (a) Write a C program to generate the first 'n' Fibonacci numbers using recursion. 7

(b) Define a structure STUDENT with fields: roll_number, name, and marks. Write a C program to input data for 3 students and display their details. 7

UNIT-V

9. (a) Define a pointer. Write a C program to swap two numbers using pointers. 7

(b) Differentiate between Arrays and Pointers in C programming with suitable code examples. 7