

**Final Assessment Test – April 2025**

Course: BCSE102L - Structured and Object-Oriented Programming

Class NBR(s): 4093 / 4096 / 4098 / 4100

Slot: C1

Max. Marks: 100

Time: Three Hours

- KEEPING MOBILE PHONE/ANY ELECTRONIC GADGETS, EVEN IN 'OFF' POSITION IS TREATED AS EXAM MALPRACTICE
- DON'T WRITE ANYTHING ON THE QUESTION PAPER

Answer ALL Questions

(10 X 10 = 100 Marks)

1. An electricity board charges consumers based on their electricity usage as follows:
- for the first 200 units: 80 paise per unit
 - for the next 100 units (201–300): 90 paise per unit
 - beyond 300 units: Rs. 1 per unit

Additionally, all users are charged a minimum meter charge of Rs. 100. If the total bill exceeds Rs. 400, a surcharge of 15% on the total amount is applied. Write a C program using conditional statements for the below given problem.

- Read the name of the user and the number of units consumed.
- Calculate and display the total electricity charges.

2. How can one-dimensional and two-dimensional arrays be declared and initialized? Write a C program that accepts N integers from the user and sorts them in ascending order.
3. Describe the various types of user-defined functions based on parameter passing and return type, providing examples. Write a C program that uses functions to generate the Fibonacci series.
4. Describe how to declare and initialize a pointer variable. Write a C program that uses pointers to compute the sum and mean of all elements in an array.
5. Describe the syntax for declaring a structure with an example. Additionally, explain nested structures with an example. Write a C program that utilizes structures to read, store, and compute the average marks of N students. The program should also identify and display students who scored above and below the average marks.
6. Differentiate between Structured Programming and Object-Oriented Programming. Explain the concept of the Object-Oriented Paradigm with an example application of your choice.

7. A book shop maintains the inventory of books that are being sold at the shop. The list includes details such as author, title, price, publisher and stock position. Whenever a customer wants a book, the salesperson inputs the title and author and the system searches the list and displays whether it is available or not. If it is not, an appropriate message is displayed. If it is, then the system displays the book details and requests for the number of copies are required. If the requested copies are available, the total cost of the requested copies is displayed; otherwise, the message "Required copies not available in stock" is displayed. Write a C++ program using a class called books with suitable static members, inline member functions, constructors and destructor.
8. What are the features of friend function? How can an external function be made a friend of a class? Explain with an example.
- 9.a) Consider an example of a Banking System. Design a class called Bank that has data members such as those representing account number, name, A/c type, branch, Balance Amount, etc. Derive a 'Deposit' class from Bank for depositing the amount into that account and to maintain the balance. Also, derive a 'Withdrawal' class from Bank for withdrawing the amount from that account and to maintain the balance. Now, derive a 'statement' class from both 'Deposit' class and 'Withdrawal' class to print the complete bank statement of the specific account holder with all the transactions. Write an interactive C++ program for 'N' customers using appropriate inheritance mechanism?

OR

- 9.b) Explain the different forms of polymorphism in C++ with examples. What is a Pure Virtual Function? Explain with a suitable example.
- 10.a) Define a function template that determines the maximum of two values of any data type. Demonstrate its functionality using int, double, and char data types.

OR

- 10.b) Create a class template 'Box' that stores a single value of any data type. Include a constructor to initialize the value and a member function getValue() to return it. Instantiate the class template for int and string types and display the stored values?

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