Reg. No. : | | | | | | | | | | | | |

Question Paper Code: R3203

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

Third Semester

Computer Science Engineering

R21UCS303– OBJECT ORIENTED PROGRAMMING USING C++

(Common to IT,CSBS , CSD, CSE (AI&ML), IOT & Cyber Security Engineering Branches)

(Regulations R2021)

Duration: Three hours | Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1.	Write a C++ program to swap two numbers without temporary variable.	CO2-App
2.	Write a C++ program to find whether a given year is Leap year or not.	CO2-App
3.	Discuss the use of public, private and protected access specifiers in a class.	CO1-U
4.	Demonstrate the uses of friend function by defining a simple class with one integer as a private data member. Create two objects and add the private data members using a friend function.	CO2-App
5.	What are the rules for operator overloading?	CO1-U
6.	Write a C++ program to compare two objects using less than operator (<).	CO2-App
7.	Explain constructor calling order in single and multilevel inheritance with example.	CO1-U
8.	Develop a C++ program to get a number from the user and display it using virtual base class.	CO2-App
9.	Will exception handling improve the efficiency of programming? Justify your answer.	CO1-U
10.	Is it applicable to handle the situation of uncaught exception? If possible, how it will be achieved?	CO1-U

PART – B (5 x 16= 80 Marks)

11.	(a)	(i) Write a C++ program that produce following outputs. A B C D E A B C D A B C A B A	CO2 – App	(8)
		(ii) Write a C++ Program to find sum of squares of first 'n' natural numbers.	CO2 – App	(8)
		Or		
	(b)	(i) Develop a C++ Program using function to find whether a given number is prime or not.	CO2 – App	(8)
		(ii) Write a C++ program to print the Fibonacci series using functions.	CO2 – App	(8)
12.	(a)	Create a class called 'Employee' with private data members for employee ID, name, and salary. Create an array of objects to store the information about n number of employees of the company. Also write a friend function to find the employee with the highest salary.	CO2- App	(16)
		Or		
	(b)	Create a class called student with private data members for student ID, name, five subjects mark with their credits (using integer array) and estimate the values like total marks, total credits and CGPA. Create an array of objects to store information for n number of students. Also, write a friend function to find the student with the highest CGPA.	CO2- App	(16)
13.	(a)	(i) Explain function overloading with respect to the data types of arguments.	CO1 – U	(4)
		(ii) Write a C++ Program to find the area of different shapes like square, rectangle, circle and Right triangle using the concept of Function overloading.	CO2 – App	(12)
		Or		

(b) (i) Explain function overloading with respect to the number of arguments. CO1 – U (4)

(ii) A cinema theatre charges customers for movie tickets. The ticket price calculation depends on different scenarios: CO2 – App (12)

1. If only the base ticket price is given, calculate the cost for a single person.
2. If the base ticket price and number of people are given, calculate the total cost for the group.
3. If the base ticket price, number of people, and discount percentage are given, calculate the total cost after applying the discount.

Write a C++ program to implement this using function overloading with respect to the number of arguments.

14. (a) Imagine a publishing company that markets both book and audio-cassette versions of its work. Create a class publication that stores the title and price. From this class derive two classes book and tape; book includes one more property: page numbers and tape contains its length in minutes (float). Each of these classes must have getdata( ) functions and putdata ( ) functions to input / output its data. Write a main function to test the book and tape classes. CO2- App (16)

Or

(b) Create three classes Employee, Salary and Shareholder. Employee class stores basic details like, name, employee no, department. The Salary class gets the gross salary and calculates the bonus as 10% of the gross salary. The Shareholder class contains the eligibility of shareholder of an employee. An employee is allowed to own a share only if the total salary exceeds 50,000. Include Info ( ) and writeInfo ( ) functions in all the classes. Use the inheritance concept and display the employee details with bonus and shares eligibility. CO2- App (16)

15. (a) Write a C++ program to implement a generic stack using class templates. CO2 – App (16)

The program should support the following operations:

- Push an element onto the stack.
- Pop an element from the stack.
- Display the top element of the stack.

Demonstrate the usage of the stack for integers, doubles, and characters.

Or

(b) Write a C++ program to find the roots of a quadratic equation. Throw an exception whenever an imaginary root is found. CO2 – App (16)