

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

B.Tech. - III Semester (CSE, ECE) | T1 EXAM - 2025

COURSE CODE (CREDITS): 18B11CI311 (3)

MAX. MARKS: 15

COURSE NAME: Object-Oriented Systems and Programming

MAX. TIME: 1 Hour

COURSE INSTRUCTORS: A. Kumar, A. Sharma, D. Gupta (Coord.), E. Puthooran, H. Singh, N. Singla, R. Sharma.

*Note: 1) All questions are compulsory. Marks and COs for each question are indicated. 2) Answer the questions in the given order. 3) Be concise and write neatly.*

Q. No.	Question	CO	Marks
Q. 1	Write a C++ program to design a class Student with a constant maxMarks = 100 and a data member for marks. Initialize marks via a constructor, use a friend function calculatePercentage () to compute percentage, and a static function to display a common message "JUIT 2 <sup>nd</sup> Year Students Marks". Demonstrate with multiple students, ensuring marks do not exceed maxMarks.	1	[3]
Q. 2	Explain the different ways of passing arguments to functions in C++, comparing their efficiency and reliability/robustness. What issues may arise with pass by reference, particularly in large programs or when functions are overloaded, and how can these issues be overcome?	1	[3]
Q. 3	Write a class Test with the following requirements. For each case, state whether it compiles or gives an error, and justify errors: a) A one-argument constructor to initialize value when an object is created. b) A const member function getValue () that returns value. c) A non-const function setValue () that modifies value. d) Call getValue () using a const object. e) Call setValue () using a const object. f) Call setValue () using a non-const object.	2	[3]
Q. 4	Write a C++ program to design a class Employee with data members for name, employee ID, and salary. Implement a default constructor, a parameterized constructor, and a copy constructor. In main (), create employees using each constructor and display their details. Further, explain why a copy constructor is necessary in classes that manage resources dynamically (e.g., memory, file handles).	2	[3]
Q. 5	Write a C++ program with a function printVolume () that calculates and displays the volume of a box using three parameters: length, width, and height, where width and height have default values of 10 and 5. In main (), demonstrate how default arguments work by calling printVolume () with one, two, and three arguments. Further, explain the rules of default arguments in C++ like their positional requirements, compile-time binding nature, and restrictions when combined with function overloading.	2	[3]