14/ 12-pm

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

B.Tech. - III Semester | MAKE-UP EXAM - NOVEMBER 2025

COURSE CODE (CREDITS): 18B11CI311 (3) MAX. MARKS: 25

COURSE NAME: Object-Oriented Systems and Programming (OOSP) MAX. TIME: 90 Min.

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	Discuss the key limitations (*at least three each*) of friend functions and function overloading in C++.	1, 2	3
Q. 2	Define two user-defined classes - Celsius and Fahrenheit, to represent temperatures in celsius and fahrenheit respectively. Write a program that demonstrates how to convert an object of one user-defined type class Celsius to an object of another user-defined type class Fahrenheit using a constructor and a conversion function. Note: $F = (C * 9/5) + 32$	2	4

Q. 3	Write a program to create a file - MyJournal.txt and write the following text into it:
	Always give your best!
	Now use following file pointers (new line separated) with corresponding file stream object, close the file and finally, find the output denoting the file pointer positions:
	tellp();
	seekp (-5, ios::cur);
	tellp();
	seekg (10, ios :: beg);
	tellg();
		2	3

Q. 4	Design and implement an abstract base class Shape that declares pure virtual functions for computing the area, perimeter, and displaying the properties of a shape. Derive two classes, Circle and Rectangle, from Shape, each implementing the virtual functions appropriately. Demonstrate the concept of runtime polymorphism by creating an array (or list) of base class pointers that can store the addresses of different derived class objects. Use dynamic allocation (new keyword) and invoke the overridden functions through base class pointers.	2	4

(39)

Q. 5	Create a base class, and a derived class with additional data members and overridden member functions. Create both base and derived class objects, then assign a derived class object to a base class object to illustrate how slicing removes the derived-specific attributes and behavior. Further, compare this behavior with the use of pointers or references to the base class to show how polymorphism prevents slicing and preserves dynamic behavior.	2	3
Q. 6	Provide clear and insightful theoretical explanations for the following topics (*max. 6-8 sentences*): a) Differentiate between deep copy and shallow copy. b) Discuss the key limitations (*at least three each*) of sequential and random (direct) file access methods in C++. c) What's the significance of virtual table (vtable) and vtable pointer. d) How the operands are passed (*i.e. passed by reference or passed by value or both*) while overloading increment or decrement operators using a friend function? Justify your answer.	1, 2	2*4 = 8