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

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

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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 program in C++ to overload insertion and extraction operators.	1, 2	3
Q. 2	Design a C++ class named BrowserHistory that simulates the functionality of a web browser's history using a stack data structure implemented as an array of fixed size 10. The class should include the following features which must be demonstrated in main () method: a) Operator Overloading: Overload the += operator to add (push) a new URL string into the history stack. b) Conversion Function: Define a conversion operator operator int() that returns the current number of URLs stored in the history.	2	3
Q. 3	Write a C++ program to create a text file named "data.txt" with the following content: 10 20 30 40 50 Assume that the above file has gone through multiple changes after its creation but it still contains at least two numbers. Write another C++ program that reads the "data.txt" file and displays the second last number from the file.	2	3
Q. 4	Write a base class CBase and its derived class CDerived to accomplish the following: a) CBase is an abstract class having a pure virtual function vFunction (). b) CDerived is derived in public mode from CBase and overrides vFunction () to display *"No legacy is so rich as honesty"*.	2	3

	c) In main () function, implement dynamic binding to invoke vFunction () of CDerived. d) Finally, elaborate the role of virtual table (vtable) and vtable pointer in the aforementioned scenario.		
Q. 5	Implement an abstract class Shape with pure virtual functions for computing the area and displaying the properties of the shape. Create two derived classes, Circle and Rectangle, to implement above functions. Demonstrate the idea of polymorphism in the main () function using pointers to base class Shape.	2	3
Q. 6	Write a C++ program to illustrate the concept of object slicing. Create a base class and a derived class with additional data members. Assign a derived class object to a base class object and show how the extra members of the derived class are sliced off, demonstrating loss of derived class information during such assignments.	2	3
Q. 7	Provide clear and insightful theoretical explanations for the following topics (*max. 6-8 sentences*): a) C++ cannot overload .*, :: and ?: operators. Why? b) File pointers and modes: i) seekg (n, ios:cur) ii) tellp () iii) ios::ate iv) ios::trunc c) C++ supports virtual destructor, but not virtual constructor. Why? d) Diamond problem leads to ambiguity in multiple inheritance. Why?	1, 2	1, 2, 2, 2