ROLL NO. : .....

A000273(022)

B. Tech. (Hon's) (Second Semester) Examination, Nov.-Dec. 2024

(AICTE Scheme)

(Computer Science and Engg. Branch)

OBJECT ORIENTED PROGRAMMING

(Data Science)

Time Allowed : Three hours

Maximum Marks : 100

Minimum Pass Marks : 35

Note : *Attempt all questions. Part (a) is compulsory. Attempt any* ***two*** *out of part (b), (c) or (d) in all question. The figure in the right-hand margin indicates marks.*

Unit-I

1. (a) What do you mean Abstract class? Explain in brief. 4

(b) Explain the basic principles of Object-Oriented Programming (OOP). How does it differ from procedural programming? 8

(c) Define and elaborate on the following characteristics of OOP : encapsulation, inheritance, polymorphism, and abstraction. Provide examples to illustrate each concept. 8

(d) What is function overloading? Explain its concept with suitable diagram and program code. 8

Unit-II

2. (a) Explain run time and compile time polymorphism. 4

(b) Explain the concepts of constructor and destructor in C++ with suitable examples. Differentiate between a default constructor and a parameterized constructor. 8

(c) What is static class data in C++? Write a program to demonstrate the use of static data members and static member functions in a class. 8

(d) Write a C++ program to demonstrate the implementation of a class student with private member variables for student ID, name, and grade. Include public member functions to set and get these values. Also, explain the role of access modifiers in your programd. 8

Unit-III

3. (a) Discuss the role of member functions in derived classes. 4

(b) Explain the concept of overloading unary operators in C++ with suitable example program. What are the common pitfalls to avoid when overloading operators? 8

(c) Write a program that demonstrates the concept of multiple inheritances. Explain how ambiguities are resolved when the same function is inherited from multiple base classes? 8

(d) Explain how constructors are handled in derived classes in C++. Provide an example program to

illustrate the order of constructor and destructor calls in a class hierarchy? 8

Unit-IV

4. (a) What is a virtual function in C++? 4

(b) Discuss memory management in C++ using 'new' and 'delete' operators. Write a programe that dynamically allocates an array of integers, assigns values to it, and then properly de-allocates the memory? 8

(c) Define and explain the purpose of friend functions and static member functions in C++. Provide an example for each to illustrate their use. 8

(d) Discuss the 'this' pointer in C++ and its usage. What is dynamic type information (RTTI) in C++ and how is it implemented? 8

Unit-V

5. (a) Explain the purpose of 'ifstream', 'ofstream', and 'fstream'. 4

(b) Explain how stream errors are handled in C++. What are the common stream error states and their meanings? 8

(c) Write a program that accepts command line arguments, processes the input, and prints the results to the standard output and to a printer. 8

(d) Discuss exception handling in C++. How are exceptions caught and handled? Provide an example program that uses try, catch, and throw statements? 8