PAPER ID-310911

Subject Code: BCS054

Roll No: | | | | | | | | | | | | | |

BTECH

(SEM V) THEORY EXAMINATION 2024-25

OBJECT ORIENTED SYSTEM DESIGN WITH C++

TIME: 3 HRS **M.MARKS: 70**

Note: Attempt all Sections. In case of any missing data; choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2 x 07 = 14**

Q no.	Question	CO	Level
a.	Describe the significance of modeling in software engineering.	1	K_2, K_4
b.	Define the conceptual model of UML.	1	K_2, K_4
c.	Create a package diagram for a modular library management system.	2	K_2, K_3
d.	Explain how use case diagrams help in capturing system requirements.	2	K_2, K_3
e.	Describe the role of inheritance adjustment in design optimization.	3	K_2, K_3, K_4
f.	Demonstrate the use of enumerations and constants.	4	K_2, K_3
g.	Explain the use of the this pointer in C++.	5	K_2, K_3

SECTION B

2. Attempt any *three* of the following: **07 x 3 = 21**

a.	Explain the concept of encapsulation and information hiding. How do these principles ensure system security and maintainability? Provide a UML example to demonstrate these principles.	1	K_2, K_4
b.	Draw an interaction diagram for a customer service chatbot system. Include time-based interactions and describe how they facilitate system understanding.	2	K_2, K_3
c.	Explain the process of object-oriented analysis and design with a detailed example of a ride-hailing application. Include the steps from requirement gathering to design optimization.	3	K_2, K_3, K_4
d.	Create a C++ program that uses a callback mechanism. Explain how callbacks are implemented in C++ using function pointers or lambda expressions.	4	K_2, K_3
e.	Write a C++ program to implement operator overloading for matrix addition and subtraction. Include detailed comments on the implementation.	5	K_2, K_3

SECTION C

3. Attempt any *one* part of the following: **07 x 1 = 07**

a.	Compare and contrast object-oriented modeling with structured modeling. Provide a detailed example of a banking system modeled using both approaches.	1	K_2, K_4
b.	Discuss the importance of architecture in object-oriented modeling. Design a UML architecture diagram for a cloud-based file-sharing system.	1	K_2, K_4

4. Attempt any *one* part of the following: **07 x 1 = 07**

a.	Develop a UML class diagram for a hospital management system. Explain the rationale behind your design choices.	2	K_2, K_3

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b.	Explain the concept of polymorphism in collaboration diagrams. Design a collaboration diagram for an online learning platform to show polymorphism in accessing different types of course materials.	2	K_2, K_3

5. Attempt any *one* part of the following: 07 x 1 = 07

a.	Write a C++ program to demonstrate the concept of combining three models (class, state, and interaction) in the design of a smart home system.	3	K_2, K_3, K_4
b.	Compare and contrast SA/SD and object-oriented analysis and design. Use a case study of an online bookstore to highlight the differences.	3	K_2, K_3, K_4

6. Attempt any *one* part of the following: 07 x 1 = 07

a.	Write a C++ program to demonstrate the use of inline functions. Compare their performance with macros in terms of memory usage and execution speed.	4	K_2, K_3
b.	Create a program in C++ that uses function overloading to calculate the volume of a cube, cylinder, and sphere. Provide detailed commentary on the code.	4	K_2, K_3

7. Attempt any *one* part of the following: 07 x 1 = 07

a.	Explain the concept of static data members and functions. Write a C++ program to track the number of objects created for a class.	5	K_2, K_3
b.	Develop a C++ program to implement hybrid inheritance. Explain how ambiguity is resolved using virtual base classes.	5	K_2, K_3