OR	iii.	Write answers about the following design patterns: (a) Analyze the effectiveness of using the Adapter pattern to integrate third-party software. (b) What is the primary purpose of the Factory Method? (c) Identify a scenario where the Singleton pattern is beneficial.	**8**	03	1, 2	4	
Q.6		Attempt any two:					
	i.	Design a domain model for Library Management system, by identifying the essential classes (e.g., Book, Member, Transaction) and their relationships.	**5**	03	1, 2	4	
	ii.	Identify and outline the primary goals and requirements for the Satellite-Based Navigation system.	**5**	01	1, 2	5	
	iii.	Create a use case diagram representing the core functionalities of the Traffic Management System. What are the primary entities, and how do they interact to achieve real-time traffic monitoring and control?	**5**	03	1, 2	4	

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Total No. of Questions: 6 *Total No. of Printed Pages:4*

Enrollment No.....

Faculty of Science / Engineering
End Sem Examination Dec 2024
CA3EL07 Object Oriented Analysis & Design

Programme: BCA / BCA-MCA (Integrated) Branch/Specialisation: Computer Application

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

			Marks	BL	PO	CO	PSO
Q.1	i.	Which UML diagram focuses on the interaction between a user and a system in OOAD? (a) Use Case Diagram (b) Activity Diagram (c) Class Diagram (d) Deployment Diagram	**1**	01	1, 2	2	
	ii.	The Inception phase of the Unified Process is primarily focused on- (a) Detailed design and implementation (b) Testing and deployment (c) High-level requirements and risk assessment (d) Iterative development and feedback	**1**	01	1, 2	1	
	iii.	In object-oriented analysis, which approach is used to identify conceptual classes? (a) Analyzing use case diagrams (b) Reviewing user stories and requirements (c) Conducting interviews with stakeholders (d) All of these	**1**	01	1, 2	2	
	iv.	What type of relationship does composition depict in a class diagram? (a) A relationship where one class can exist independently of another (b) A relationship where one class is a part of another class and cannot exist without it (c) A relationship indicating a generalization (d) A one-to-many relationship between classes	**1**	01	1, 2	1	

v.	In UML, what is the significance of a "package" in a package diagram? (a) To represent a class instance (b) To group related classes and components together (c) To illustrate the flow of data (d) To show user interactions with the system	**1**	01	1, 2	2
vi.	What is the role of a ‘guard condition’ in an activity diagram? (a) To define the starting point of the activity (b) To control the flow based on specific conditions (c) To indicate the end of the activity (d) To represent the decision points	**1**	01	1, 2	3
vii.	The Adapter design pattern is used to- (a) Convert the interface of a class into another interface clients expect (b) Allow the creation of multiple instances of a class (c) Control access to class instances (d) Manage the state of an object	**1**	01	1, 2	2
viii.	What type of relationship is represented in the Observer pattern? (a) Aggregation (b) Composition (c) One-to-many (d) Inheritance	**1**	01	1, 2	2
ix.	Which UML diagram is used to show the relationships between different classes in a library management system? (a) Activity Diagram (b) Sequence Diagram (c) Use Case Diagram (d) Class Diagram	**1**	01	1, 2	2
x.	In the context of a point-of-sale system, which of the following is a primary use case? (a) Generate sales reports (b) Process customer payments (c) Manage inventory levels (d) All of these	**1**	01	1, 2	3

Q.2	i.	Define "actor" and "system" in the context of a use case. List the components of a use case diagram.	**4**	01	1, 2	1
	ii.	Describe the benefits of using object-oriented design in software development.	**6**	02	1, 2	2
OR	iii.	Name the four phases of the Unified Process Model. Design an iterative plan based on Unified Process phases for a University Management application.	**6**	03	1, 2	1
Q.3	i.	Identify and list potential conceptual classes in an online shopping system with brief description.	**3**	01	1, 2	4
	ii.	Analyze how refinement contributes to reducing complexity in a large-scale model by giving a suitable example.	**7**	04	1, 2	3
OR	iii.	Differentiate between the usage scenarios of aggregation and composition.	**7**	04	1, 2	2
Q.4	i.	Describe the role of "fork" and "join" nodes in parallel activity modeling.	**3**	02	1, 2	2
	ii.	Create a detailed System Sequence Diagram (SSD) for a restaurant management system that illustrates the interactions between the system and external actors.	**7**	03	1, 2	4
OR	iii.	Define a UML State Diagram and its primary purpose. Construct a basic state diagram illustrating the states and transitions of an ATM Transaction System.	**7**	03	1, 2	4
Q.5	i.	Define "visibility" in the context of software design.	**2**	01	1, 2	1
	ii.	Explain how achieving low coupling and high cohesion contributes to the maintainability and scalability of a system.	**8**	02	1, 2	3

Marking Scheme
CA3EL07 (T) Object Oriented Analysis & Design (T)

Q.1	i)	a) Use Case Diagram	**1**
	ii)	c) High-level requirements and risk assessment	**1**
	iii)	d) All of the above	**1**
	iv)	b) A relationship where one class is a part of another class and cannot exist without it	**1**
	v)	b) To group related classes and components together	**1**
	vi)	b) To control the flow based on specific conditions	**1**
	vii)	a) Convert the interface of a class into another interface clients expect.	**1**
	viii)	c) One-to-many	**1**
	ix)	d) Class Diagram	**1**
	x)	d) All of the above	**1**

Q.2	i.	Define "actor" and "system" in the context of a use case=2 Marks. List the components of a use case diagram =2 Marks	**4**
	ii.	Benefits of using object-oriented design in software development.	**6**
OR	iii.	Name the four phases of the Unified Process Model= 2 Marks Design an iterative plan based on Unified Process phases for a University Management application. = 4 Marks	**6**
Q.3	i.	Identify and list potential conceptual classes in an online shopping system= 1 Mark Brief Description= 2 Marks	**3**
	ii.	Analyze how refinement contributes to reducing complexity in a large-scale model= 4 Marks Example= 3 Marks	**7**
OR	iii.	Differentiate between the usage scenarios of aggregation and composition.	**7**
Q.4	i.	Role of "fork" nodes in parallel activity modeling= 1.5 Mark Role of “join" nodes in parallel activity modeling= 1.5 Mark	**3**
	ii.	Detailed/Fully Dressed (SSD) for a restaurant management system	**7**
OR	iii.	Define a UML State Diagram and its primary purpose=3 Marks Construct a basic state diagram illustrating the states and transitions of an ATM Transaction System= 4 Marks	**7**
Q.5	i.	Definition of “visibility" in the context of software design.	**2**
	ii.	Explanation about low coupling =4 Marks Explanation about high cohesion = 4 Marks	**8**
OR	iii.	a) Analyze the effectiveness of using the Adapter pattern to integrate third-party software. = 3 Marks b) What is the primary purpose of the Factory Method? = 3 Marks c) Identify a scenario where the Singleton pattern is beneficial= 2 Marks	**8**

Q.6

	i.	Design a domain model (Elaboration phase) for Library Management system	**5**
	ii.	Inception Phase of Satellite-Based Navigation system.	**5**
	iii.	Use case diagram =3 Marks Primary entities, and how do they interact to achieve real-time traffic monitoring and control= 2 Marks	**5**

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