Reg. No.															

Question Paper Code	13646

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2025

Fourth Semester

Computer Science and Business Systems

20CBPC402 - SOFTWARE DESIGN WITH UML

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	Which of the following models is iterative in nature? (a) Waterfall (b) Spiral (c) V-Model (d) Linear Sequential	1	K1	CO1
2.	What characteristic is *NOT* part of quality software? (a) Reliability (b) Maintainability (c) High Cost (d) Usability	1	K1	CO1
3.	In UML, an actor represents_____. (a) System process (b) External entity (c) Database (d) Hardware	1	K1	CO2
4.	Which is *NOT* a design pattern? (a) Singleton (b) Factory (c) Router (d) Observer	1	K1	CO2
5.	In a Use Case diagram, relationships between actors are shown using_____. (a) Aggregation (b) Association (c) Generalization (d) Dependency	1	K1	CO3
6.	A transition in a State Diagram is triggered by: (a) Operation (b) Event (c) Attribute (d) Relationship	1	K1	CO3
7.	In a Sequence Diagram, the vertical dashed line from an object represents: (a) Lifeline (b) Message (c) Link (d) Interaction	1	K1	CO4
8.	In Class Diagram, which relationship shows "is-a" relation? (a) Association (b) Dependency (c) Generalization (d) Aggregation	1	K1	CO4
9.	In a Package Diagram, packages are connected through: (a) Attributes (b) Interfaces (c) Associations (d) Dependencies	1	K1	CO5
10.	Which diagram focuses on system's physical deployment across hardware? (a) Use Case (b) Sequence (c) Deployment (d) Component	1	K1	CO5

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

		Marks	K – Level	CO
11.	Compare Waterfall and Spiral software development models.	2	K2	CO1
12.	Define Software Crisis and its causes.	2	K1	CO1
13.	Explain the characteristics of Quality Software.	2	K2	CO1
14.	List and explain the basic elements of UML Language.	2	K2	CO2
15.	What is a Design Pattern? Show one example.	2	K1	CO2
16.	Explain Distributed Systems in the context of Object-Oriented Development.	2	K2	CO2
17.	Outline a sample Use Case Diagram for a Library Management System.	2	K2	CO3
18.	Compare State Diagram and Activity Diagram.	2	K2	CO3
19.	Tell the purpose of an Interaction Diagram.	2	K1	CO4
20.	Recall the significance of Multiplicity in Class Diagrams.	2	K1	CO4
21.	What are the uses of Package Diagrams?	2	K1	CO5
22.	Name any two key aspects shown in a Deployment Diagram.	2	K1	CO5

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a)	Illustrate with neat diagrams how Object-Oriented Analysis differs from Structured Analysis.	*11*	*K2*	*CO1*
		OR			
	b) (i)	Explain the importance of multiple configurations in Classes.	*8*	*K2*	*CO1*
	(ii)	Outline the role of inheritance in Object Modeling.	*3*	*K2*	*CO1*
24.	a)	Explain the steps involved in Object-Oriented Software Development process using UML.	*11*	*K2*	*CO2*
		OR			
	b)	Explain any three Design Patterns with suitable examples.	*11*	*K2*	*CO2*
25.	a)	Build a Use Case Diagram for an Online Banking System showing the actors, use cases, and their relationships. Also draw an Activity Diagram to represent the user login process.	*11*	*K3*	*CO3*
		OR			
	b)	Model a State Machine Diagram for a student course registration system. Describe each state and event involved in the process, and explain how it reflects the system's dynamic behavior.	*11*	*K3*	*CO3*
26.	a)	Rephrase how the process of transferring from analysis to design is carried out in the characterization stage, and examine its role in supporting system development.	*11*	*K2*	*CO4*
		OR			
	b)	Classify the steps involved in identifying objects using a Collaboration Diagram, and evaluate how these steps interrelate to achieve accurate object discovery.	*11*	*K2*	*CO4*
27.	a)	Explain the differences between the white-box and black-box views in a Component Diagram. Construct application using a healthcare information system as a case study.	*11*	*K2*	*CO5*
		OR			
	b)	Illustrate a Deployment Diagram for an online ticket reservation system and explain its components.	*11*	*K2*	*CO5*
28.	a) (i)	Model a class diagram for a “Banking System”. State the functional requirements you are considering.	*6*	*K3*	*CO4*
	(ii)	Apply the concept of a package diagram by illustrating its purpose and basic concepts with an appropriate example.	*5*	*K3*	*CO5*
		OR			
	b) (i)	To buy a book electronically from chapters.com, a customer needs to select the book from a list provided by Chapters’ E-Commerce system, provide credit card information to the system, then the system gets authorization from the bank for the payment, and – if positive – confirms the sale. The order is then sent to the orders department and when the book becomes available, it is shipped to the customer. Also, the order department charges the customer’s credit card by informing the bank of the amount. Draw a sequence diagram that models this process. Make sure that the model has all relevant actors and the interactions between them. Do show explicitly the time intervals when different actors actively participate in the modelling process.	*6*	*K3*	*CO4*
	(ii)	Construct a package diagram for the Track Order Service of an online shopping store.	*5*	*K3*	*CO5*