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Question Paper Code	12630
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**B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2024**

Fourth Semester

**Computer Science and Business Systems**

**20CBPC402 - SOFTWARE DESIGN WITH UML**

Regulations - 2020

Duration: 3 Hours

Max. Marks: 100

**PART - A (10 × 2 = 20 Marks)**

Answer ALL Questions

	Marks	K-Level	CO
1. Write the phases in software development process.	2	K1	CO1
2. List out the ISO 9126 standard for software quality.	2	K1	CO1
3. State the types of design patterns.	2	K1	CO2
4. What are the phases involved in the Object-Oriented software development process?	2	K1	CO2
5. List the steps involved in identifying actors.	2	K1	CO3
6. Define the term 'case goal' in the context of requirements analysis using case modeling.	2	K1	CO3
7. Write the uses of structural features in the class diagram.	2	K1	CO4
8. State the types of messages can be used in sequence diagram.	2	K1	CO4
9. What is the purpose of a Component Diagram?	2	K1	CO5
10. List the types of dependencies in the package diagram.	2	K1	CO5

**PART - B (5 × 13 = 65 Marks)**

Answer ALL Questions

11. a) i) Compare and contrast the Waterfall Model and the Spiral Model in software development, highlighting their key characteristics, advantages, and limitations.	7	K2	CO1
ii) Explain inheritance and multiple configurations with suitable examples.	6	K2	CO1
<b>OR</b>			
b) i) Explain the concept of the Software Crisis and its significance in shaping modern software development methodologies.	6	K2	CO1
ii) Compare and contrast the Object-Oriented Analysis (OOA) process with the Structured Analysis Model, highlighting their key principles, methodologies, and advantages in software development.	7	K2	CO1
12. a) i) Discuss the characteristics and advantages of distributed systems compared to centralized systems.	7	K2	CO2
ii) Explain the basic elements of the UML in detail.	6	K2	CO2
<b>OR</b>			
b) Explain the design patterns in detail with suitable example.	13	K2	CO2

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create

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13. a) Explain and draw a use case diagram for a ticket distributor for a train system. The system includes two actors: a traveler who purchases different types of tickets and a central computer system that maintains a reference database for the tariff. Use cases should include Buy One Way Ticket, Buy Weekly Card, Buy Monthly Card, and Update Tariff. Also include the following exceptional cases: Time Out (i.e., traveler took too long to insert the right amount), Transaction Aborted (i.e., traveler selected the cancel button without completing the transaction), Distributor Out Of Change and Distributor Out Of Paper. 13 K3 CO3

**OR**

- b) Explain and Create an activity diagram to illustrate the process of booking a flight ticket online. Include the various steps involved such as selecting departure and arrival locations, choosing travel dates, entering passenger information, selecting a seat, making payment, and receiving a booking confirmation. 13 K3 CO3

14. a) Explain the UML notations can be used in a class diagram and provide suitable example to model a software application. 13 K2 CO4

**OR**

- b) Explain and draw the Sequence diagram for Library Management System. 13 K3 CO4

15. a) Illustrate the process of creating a Package Diagram. Provide a step-by-step explanation of how packages are defined, connected, and organized. Discuss the benefits of using Package Diagrams in designing complex software architectures. 13 K3 CO5

**OR**

- b) Describe the components and interactions involved in a deployment diagram. Discuss how these elements contribute to the deployment architecture of a software application. 13 K3 CO5

**PART - C (1 × 15 = 15 Marks)**

16. a) i) An online shopping system needs to be designed to facilitate the purchase of products by customers. The system maintains information about products, customers, orders, and payments. 8 K3 CO4

a) Customers can browse through the catalog of products, add items to their shopping cart, and proceed to checkout. b) Each customer can have multiple addresses, including a billing address and one or more shipping addresses. c) Products are categorized into different types such as clothing, electronics, and books. d) Customers can place orders, which consist of one or more products, quantities, and associated prices. e) Orders are processed for shipping, and customers can track the status of their orders. f) Payment for orders can be made using various methods, including credit/debit cards, online payment gateways, or cash on delivery.

Using UML class diagrams, illustrate the static structure of the online

shopping system, including the classes involved, their attributes, and the relationships between them. Incorporate associations, generalization (inheritance), aggregation, and dependencies as appropriate to model the relationships between classes.

ii) Draw the component diagram for online shopping system. 7 K3 CO5

**OR**

b) i) Discuss collaboration diagram and provide examples to support your explanation, highlighting the notations and usage 8 K2 CO4

ii) Draw the component diagram for Library Management System. 7 K3 CO5