|  |  |
| --- | --- |
| LOGO.jpg | **GEETHANJALI INSTITUTE OF SCIENCE & TECHNOLOGY**  (**AN AUTONOMOUS INSTITUTION**)  **(Approved by AICTE, New Delhi & Affiliated to JNTUA, Ananthapuramu)**  **(Accredited by NAAC with “A” Grade, NBA (EEE,ECE &ME)&ISO9001:2008CertifiedInstitution)** |
| **QUESTIONBANK(DESCRIPTIVE)**  **Subject Name with Code:** OBJECT ORIENTED ANALYSIS AND DESIGN &23A0520a  **Course & Branch: B.TECH & DS**  **Year& Semester: III-I Regulation: RG23** | |

**UNIT - I**

|  |  |  |
| --- | --- | --- |
| **S.No.** | **Question** | **[BT Level] [CO][ Marks]** |
| **2 Marks Questions (Short)** | | |
|  | Define a complex system with an example from software engineering. | **L1 CO1 2M** |
|  | What is meant by the inherent complexity of software systems? | **L2 CO1 2M** |
|  | List any two key attributes of a complex system. | **L1 CO1 2M** |
|  | Differentiate between organized and disorganized complexity. | **L4 CO1 2M** |
|  | Explain the term “Bringing Order to Chaos” in the context of software design. | **L2 CO1 2M** |
|  | What challenges arise when designing complex systems? | **L2 CO1 2M** |
|  | Give two examples of real-world systems that exhibit characteristics of complex systems. | **L1 CO1 2M** |
|  | Why is modularity important in the design of complex systems? | **L2 CO1 2M** |
|  | What is meant by the "Structure of Complex Systems"? | **L2 CO1 2M** |
|  | In the context of the case study, mention two components involved in the architecture of a satellite-based navigation system. | **L1 CO1 2M** |
| **Descriptive Questions (Long)** | | |
|  | Explain the structure of complex systems with suitable examples. How do components, interconnections, and system behavior contribute to system complexity? | **L2 CO1 10M**  **L3** |
|  | Discuss the inherent complexity of software systems. What makes software more complex compared to other engineered systems? | **L2 CO1 10M**  **L4** |
|  | Describe the key attributes of a complex system. How do these attributes influence software design and maintenance? | **L2 CO1 10M**  **L4** |
|  | Differentiate between organized and disorganized complexity. Give real-world examples of each and explain their relevance in software engineering. | **L4 CO1 10M** |
|  | What is meant by "Bringing Order to Chaos" in the context of complex systems? Discuss strategies or design principles used to manage software complexity. | **L2 CO1 10M**  **L4** |
|  | Outline the main challenges in designing complex systems. How can abstraction, modularity, and hierarchy be used to reduce these challenges? | **L2 CO1 10M**  **L3**  **L4** |
|  | With the help of diagrams, explain how the design of a complex system differs from the design of a simple system. Include the role of feedback loops, concurrency, and emergent behavior. | **L4 CO1 10M** |
|  | Describe the architecture of a satellite-based navigation system. Identify the major components and explain how they interact to deliver location-based services. | **L2 CO1 10M**  **L3** |
|  | Discuss how the principles of complex system design are applied in the development of a satellite-based navigation system. What challenges are faced in ensuring accuracy, availability, and reliability? | **L4 CO1 10M** |
|  | Using the case study of satellite-based navigation, explain how system complexity can be managed through layered architecture and subsystem decomposition. | **L4 CO1 10M** |

**UNIT - II**

|  |  |  |
| --- | --- | --- |
| **S.No.** | **Question** | **[BT Level] [CO][ Marks]** |
| **2 Marks Questions (Short)** | | |
|  | What is the importance of modeling in software development? | **L2 CO2 2M** |
|  | List any two principles of modeling. | **L1 CO1 2M** |
|  | Define object-oriented modeling. How does it differ from traditional modeling? | **L1 CO1 2M**  **L4** |
|  | What are the key elements of the conceptual model of UML? | **L1 CO1 2M** |
|  | Briefly describe the role of UML in the Software Development Life Cycle (SDLC). | **L2 CO1 2M** |
| **6** | What is a class in UML? Give an example. | **L1 CO1 2M**  **L3** |
| **7** | Define association and generalization relationships in UML with diagrams. | **L1 CO2 2M**  **L3** |
| **8.** | Name any two common mechanisms used in UML. | **L1 CO2 2M** |
| **9** | What is the purpose of class diagrams in structural modeling? | **L2 CO2 2M** |
| **10** | Identify two UML diagrams that would be useful in modeling a traffic management control system and justify your choice briefly. | **L3 CO2 2M** |
| Descriptive Questions (Long) | | |
| **11** | Explain the importance of modeling in software engineering. How does UML facilitate better communication and understanding among stakeholders? | **L2 CO2 10M** |
| **12** | Describe the fundamental principles of modeling. How do these principles guide the construction of effective UML diagrams? | **L2 CO2 10M**  **L3** |
| **13** | What is object-oriented modeling? Explain its advantages over traditional structured modeling approaches with suitable examples. | **L2 CO2 10M**  **L4** |
| **14** | Describe the conceptual model of UML. Explain its key elements and how they support object-oriented analysis and design. | **L2 CO2 10M** |
| **15** | Discuss the architecture of UML. Explain how different UML views (use case view, design view, implementation view, process view, deployment view) support the Software Development Life Cycle (SDLC). | **L2 CO2 10M**  **L4** |
| **16** | Define a class in UML. Explain the syntax of a class diagram with an example that includes attributes, operations, and visibility indicators. | **L3 CO2 10M**  **L1** |
| **17** | Describe different types of relationships in UML (association, generalization, dependency, aggregation, composition). Illustrate each with a real-world example. | **L3 CO2 10M**  **L2** |
| **18** | What are the common mechanisms in UML? Explain the role of stereotypes, tagged values, and constraints in enhancing UML diagrams. | **L2 CO2 10M**  **L3** |
| **19** | Draw and explain a class diagram for a Library Management System, clearly showing relationships, multiplicity, and key components. | **L3 CO2 10M** |
| **20** | Design a UML class diagram for a Traffic Management Control System. Explain how classes and relationships model real-world components such as vehicles, signals, sensors, and traffic controllers. | **L4 CO2 10M** |

**UNIT - III**

|  |  |  |
| --- | --- | --- |
| **S.No.** | **Question** | **[BT Level] [CO][ Marks]** |
| **2 Marks Questions (Short)** | | |
|  | Define a class and an object in UML. | **L1 CO3 2M** |
|  | What is the purpose of a class diagram in software modeling? | **L2 CO3 2M** |
|  | Mention any two differences between class diagrams and object diagrams. | **L4 CO3 2M** |
|  | List any two key elements of a class diagram. | **L1 CO3 2M** |
|  | What is multiplicity in class relationships? Provide an example. | **L2 CO3 2M**  **L3** |
|  | What is an interface in UML and how is it represented? | **L2 CO3 2M** |
|  | Define the term "package" in UML. Why are packages used? | **L2 CO3 2M**  **L1** |
|  | Differentiate between aggregation and composition with UML notation. | **L4 CO3 2M** |
|  | What is meant by “type” and “role” in advanced class modeling? | **L2 CO3 2M** |
|  | Name two advanced relationships in UML and briefly describe them. | **L2 CO3 2M**  **L1** |
| **Descriptive Questions (Long)** | | |
|  | Explain the key terms and concepts used in class diagrams. How do classes, objects, attributes, operations, and relationships interact in UML? | **L2 CO3 10M** |
|  | Describe the modeling techniques used to create class diagrams. Illustrate your answer with an example involving inheritance, aggregation, and association. | **L3 CO3 10M**  **L2** |
|  | Differentiate between class diagrams and object diagrams. How does each support different stages of the software development process? | **L4 CO3 10M** |
|  | Draw both a class diagram and a corresponding object diagram for a simple online shopping cart system. Clearly explain how the object diagram is an instance of the class diagram. | **L3 CO3 10M**  **L4** |
|  | Explain the role of multiplicity, association classes, and visibility in enhancing the expressiveness of class diagrams. Support your answer with suitable examples. | **L3 CO3 10M**  **L2** |
|  | Discuss the concept of advanced classes in UML. How do abstract classes, nested classes, and active classes enhance object-oriented modeling? | **L2 CO3 10M**  **L4** |
|  | Explain advanced relationships in UML, including qualified associations, n-ary associations, and dependency relationships. Provide appropriate examples for each. | **L3 CO3 10M**  **L2** |
|  | Define interfaces, types, and roles in UML. How do they promote reusability and flexibility in system design? | **L2 CO3 10M**  **L1** |
|  | What are packages in UML? Discuss their importance in organizing complex models. Illustrate your answer with a package diagram for a university management system. | **L3 CO3 10M**  **L2** |
|  | Using the case study of AI-based Cryptanalysis, design a class diagram showing the relationship between cryptographic algorithms, encryption keys, AI modules, and pattern recognition units. Explain how UML helps in understanding and developing such complex AI systems. | **L4 CO3 10M** |

**UNIT - IV**

|  |  |  |
| --- | --- | --- |
| **S.No.** | **Questions** | **[BT Level] [CO][ Marks]** |
| **2 Marks Questions (Short)** | | |
|  | What is an interaction in UML? | **L1 CO4 2M** |
|  | Name any two types of interaction diagrams used in UML. | **L1 CO4 2M** |
|  | Define a use case with an example. | **L2 CO4 2M**  **L1** |
|  | What are the main elements of a use case diagram? | **L1 CO4 2M** |
|  | Differentiate between a use case and a user story. | **L4 CO4 2M** |
|  | What is the purpose of an activity diagram in UML? | **L2 CO4 2M** |
|  | Name any two notations used in an activity diagram. | **L1 CO4 2M** |
|  | How does an interaction diagram help in modeling system behavior? | **L2 CO4 2M** |
|  | List two use cases that could be part of a Vacation Tracking System. | **L1 CO4 2M** |
|  | Mention any two actors involved in a Vacation Tracking System use case diagram. | **L1 CO4 2M** |
| **Descriptive Questions (Long)** | | |
|  | Define interactions in UML. Explain how interactions are used to model the dynamic behavior of a system with a suitable example. | **L2 CO4 10M**  **L1** |
|  | What are interaction diagrams in UML? Differentiate between sequence diagrams and collaboration diagrams with examples. | **L2 CO4 10M**  **L4** |
|  | Explain the concept of use cases. How do they help in capturing system requirements from a user’s perspective? | **L2 CO4 10M** |
|  | Draw a use case diagram for an online hotel booking system and explain the roles of actors, use cases, and relationships (include, extend, generalization). | **L3 CO4 10M** |
|  | Discuss the components and notations used in an activity diagram. How is control flow represented in activity diagrams? | **L2 CO4 10M** |
|  | Draw and explain an activity diagram for a user registration process in an e-commerce system, including decisions, parallel actions, and final nodes. | **L3 CO4 10M**  **L4** |
|  | Identify the major actors and use cases in a Vacation Tracking System. Create a use case diagram for the system and explain your modeling choices. | **L3 CO4 10M**  **L4** |
|  | Draw a sequence diagram for applying and approving a vacation request in the Vacation Tracking System. Describe the interaction between user, system, and manager. | **L3 CO4 10M**  **L4** |
|  | Draw an activity diagram for the vacation approval workflow, including states like "Requested", "Pending Approval", "Approved", and "Rejected". | **L3 CO4 10M** |
|  | Explain how behavioural modeling helps in understanding the requirements and design of a Vacation Tracking System. Support your explanation with appropriate diagrams. | **L2 CO4 10M**  **L4** |

**UNIT - V**

|  |  |  |
| --- | --- | --- |
| **S.No.** | **Question** | **[BT Level] [CO][ Marks]** |
| **2 Marks Questions (Short)** | | |
|  | What is the difference between an event and a signal in UML? | **L4 CO5 2M** |
|  | Define a state machine and mention its primary purpose. | **L1 CO5 2M** |
|  | What is the role of a transition in a state machine diagram? | **L2 CO5 2M** |
|  | Distinguish between a process and a thread in software modeling. | **L4 CO5 2M** |
|  | How is time represented in UML behavioral models? | **L2 CO5 2M** |
|  | What is a component in UML architecture modeling? | **L1 CO6 2M** |
|  | List any two elements typically shown in a component diagram. | **L1 CO6 2M** |
|  | What does a deployment diagram represent in system architecture? | **L2 CO6 2M** |
|  | Differentiate between a component diagram and a deployment diagram. | **L4 CO6 2M** |
|  | Name two components you would include in a weather forecasting system’s component diagram. | **L1 CO6 2M** |
| **Descriptive Questions (Long)** | | |
|  | Define events and signals in UML. How do they differ, and what is their significance in modeling reactive systems? | **L1 CO5 10M**  **L2**  **L4** |
|  | Explain the concept of state machines in UML. Design a state machine diagram for a thermostat system and describe each state and transition. | **L3 CO5 10M**  **L2**  **L4** |
|  | Differentiate between processes and threads in the context of behavioral modeling. How are concurrent processes represented in UML? | **L4 CO5 10M** |
|  | Discuss the role of time and space in advanced behavioral modeling. How can timing constraints and spatial relationships be modeled in UML diagrams? | **L2 CO5 10M**  **L4** |
|  | Draw a state chart diagram for a weather alert system and explain how it handles transitions between different weather conditions (e.g., Clear → Cloudy → Rainy → Stormy). | **L3 CO5 10M** |
|  | What is a component in UML? Draw a component diagram for a modular weather forecasting application and explain the interactions between components. | **L3 CO5 10M**  **L1** |
|  | Describe the purpose of deployment diagrams. Draw and explain a deployment diagram for a cloud-based weather forecasting system. | **L3 CO6 10M**  **L2** |
|  | Compare and contrast component diagrams and deployment diagrams. When would you use each, and how do they complement one another? | **L4 CO6 10M** |
|  | Draw both component and deployment diagrams for a weather data collection and analysis system. Justify your design choices and assumptions. | **L3 CO6 10M** |
|  | Using the case study of a Weather Forecasting System, describe how advanced behavioral and architectural modeling techniques help in representing system behavior and structure. Use appropriate UML diagrams to support your explanation. | **L3 CO6 10M**  **L2**  **L4** |

**Signature of the Staff:**

**Signature of Department Academic Committee Member 1:**

**Signature of Department Academic Committee Member 2:**

**Signature of Department Academic Committee Member 3:**