INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)
Dundigal, Hyderabad - 500 043

COMPUTER SCIENCE AND ENGINEERING

TUTORIAL QUESTION BANK

Course Title	**OBJECT ORIENTED ANALYSIS AND DESIGN**				
Course Code	ACSB10				
Program	B.Tech				
Semester	V	CSE			
Course Type	Core				
Regulation	R-18				
Course Structure	Theory			Practical	
	Lecture	Tutorials	Credits	Laboratory	Credits
	3	-	3	-	-
Course Coordinator	Ms.N Shalini, Assistant Professor				

COURSE OBJECTIVES:

The students will try to learn:

I	Understand the issues in analysis and design of software systems.
II	Understand and use UML (2.0) notation and associated methodologies.
III	TUnderstand and use UML meta data – structural and behavioral diagrams, and their extensions.
IV	Forward engineering using UML

COURSE OUTCOMES:

After successful completion of the course, students should be able to:

CO 1	**List** the importance and use of basic principles in object oriented modeling for appropriate analysis and design of given scenarios.	Remember
CO 2	**Make use of** building blocks and different views for creating conceptual model architectural view of system in Unified Software Development Life cycle.	Apply
CO 3	**Demonstrate** static and dynamic aspects of the system through UML diagrams for specifying structure and interaction of objects during runtime.	Understand
CO 4	**Identify** basic building blocks for visualizing objects of an Object Oriented System.	Apply

CO 5	**Summarize** building blocks in structural and behavioral modeling of a software system visualizing the relationships.	Understand
CO 6	**Classify** structural modeling of system ffor representing framework with UML diagrams.	Analyze
CO 7	**Illustrate** behavioral modeling of system for conveying dynamic concepts of the system.	Understand
CO 8	**Categorize** behavioral modeling for visualizing flow control of objects and activities of specified case study like next gen POS system.	Analyze
CO 9	**Make use of** lcommon modeling techniques in UML for modeling of real time applications.	Apply
CO 10	**Develop** architectural model of a scenario for preparing outline of the entire system.	Apply
CO 11	**Model** software application like Unified Library with the help of UML diagrams for documenting static and dynamic aspects of a system.	Apply
CO 12	**Apply** knowledge of advanced computer science to formulate and analyze problems in computing and solve them.	Apply
CO 13	**Design** and conduct experiments as well as analyze and interpret data, alone or as a member of small group or team.	Apply

QUESTION BANK:

Q.No	QUESTION	Taxonomy	How does this subsume the level	CO's
MODULE I				
INTRODUCTION TO UML				
PART A-PROBLEM SOLVING AND CRITICAL THINKING QUESTIONS				
1	Analyze phase wise the activities to be done in software development life cycle (SDLC)? And explain which phase requires maximum efforts with suitable example.	Analyze	This would require learner to recall the concept of stages, phases and use in unified model. Then analyze about phase and explain among four phases which requires maximum effort.	CO 2
2	Build a class hierarchy to organize the following drink classes: Mineral water, alcoholic, nonalcoholic, grape juice and soda.	Apply	This would require learner to recall the concept of how UML started. Then describe about its evolution which define from starting to the state-of-the-art.	CO 1

3	Classify and describe four fundamental process activities which are common to all software processes.	Analyze	This would require learner to recall and analyze the concept of building blocks in UML. Then explaining about conceptual model by understanding common mechanisms from building blocks of UML.	CO 2
4	List four facts which indicate that the requirement capture and analysis process to be very difficult.	Analyze	This would require learner to recall the concept of stages and phases in unified model. Identify the issues and analyze suitable measures, then describe about phases involved in developing software using unified model.	CO 2
5	Analyze why object-oriented development methods are rapidly replacing older structured development methods. Has structured development failed? and why should object oriented development prove to be a better approach?	Analyze	This would require learner to recall the learned concepts of building blocks of UML. Then recall different diagrams, benefits and using UML. Then justify by giving its features.	CO 3
6	Suppose we wish to model an application for issuing business registration licenses. Identify: (a) Three classes for the model At least three attributes for each class	Apply	This would require learner to recall the learned concepts of building blocks of UML. Then recall different types of diagrams used in UML. Then answering diagrams used in designing for specific purpose.	CO 6
7	Suppose we wish to model an e- service application for a government agency. Model the relationship between the entities like User, Employee, Front-Office Employee, Back-Office Employee and Applicant.	Apply	This would require learner to recall the concept of software architecture. Then identify the symbols and describe architecture based on five views.	CO 2

8	Identify which of the following statements are true. For those that are false, and explain why. a) There is an association between Trainee and Course There is a composition between Course and Professor	Apply	This would require learner to recall the concept of relationships. Then recognize and answering true statements with proper justification.	CO 2
9	Consider a software process consisting of the following activities: Requirement gathering, object- oriented analysis, object design, implementation and deployment. (a) List the diagrams that are essential for each of these activities. Provide justifications for your choice of diagrams.	Apply	This would require learner to recall the learned concepts of building blocks of UML. Then recall different types of diagrams used in UML. Then describe diagrams used in designing for specific purpose.	CO 6
10	Distinguish between static and dynamic diagrams in UML and explain why it is necessary to have a variety of diagrams in a model of a system?	Analyze	This would require learner to recall the learned concepts of building blocks of UML. Then recall different types of diagrams used in UML. Then answering diagrams used in designing for specific purpose.	CO 5, CO 6
PART-B LONG ANSWER QUESTIONS				
1	Explain briefly the overview of UML..	Understand	This would require learner to understanding the Object oriented concepts and usage of UML in modeling. Then Explainingthe overview of UML in analysis and design	CO 2
2	Demonstrate the importance of the UML.	Understand	This would require learner to understanding the Object oriented concepts and usage of UML in modeling. Then Explainingthe importance of UML in analysis and design.	CO 1

3	Demonstrate the various principles of modeling in UML.	Understand	This would require learner to understanding the concept of modeling. Then Explainingthe principles of modeling in UML.	CO 1
4	Explain briefly the importance of object-oriented modeling in UML.	Understand	This would require learner to understanding the concept of modeling. Then Explainingthe importance of object oriented concepts in modeling with UML.	CO 1
5	Explain briefly different kinds of things in UML with an illustration.	Understand	This would require learner to recall the concept of building blocks used in UML. Then Explainingdifferent types of things used with an example.	CO 2
6	Illustrate various relationships with UML notation.	Understand	This would require learner to recall the concept of building blocks used in UML. Then Explainingdifferent types of relationships used with an example.	CO 4
7	Explain briefly various structural diagrams in UML.	Understand	This would require learner to recall the concept of building blocks used in UML and in that diagrams used. Then Explainingdifferent types of structural diagrams from nine diagrams used in UML.	CO 6
8	List out the behavioral diagrams in UML with an example.	Remember	—	CO 7
9	Explain briefly software architecture in the UML.	Understand	This would require learner to recall the concept of software architecture. Then ExplainingUML architecture based on five views.	CO 2

10	What is software development life cycle? Explain in case of unified model in detail.	Remember	—	CO 2
11	Explain briefly about classes and its importance.	Understand	This would require learner to recall the concept of structural things. Then Explainingabout classes used in UML representation and its importance.	CO 4
12	Explain any two common modeling techniques of classes.	Understand	This would require learner to recall the concept of structural things. Then Explainingabout common modeling techniques of classes used in UML.	CO 9
13	List out the terms and concepts of relationships.	Remember	—	CO 4
14	What are stereotypes and tagged values? Explain them in detail.	Remember	—	CO 4
15	Explain briefly the conceptual model of the UMLand also common mechanisms used in UML.	Understand	This would require learner to recall the concept of building blocks in UML. Then Explainingabout conceptual model and common mechanisms from building blocks of UML.	CO 4
16	How we model a new building block? Explain with an illustration.	Remember	—	CO 2
17	Explain briefly about behavioral diagrams.	Understand	This would require learner to recall the concept of building blocks in UML. Then Explainingabout conceptual model and common mechanisms from building blocks of UML.	CO 7

18	Explain the advantages of object- oriented development.	Understand	This would require learner to recall the concept of building blocks in UML. Then Explainingabout conceptual model and common mechanisms from building blocks of UML.	CO 1
19	What is the necessity to have a variety of diagrams to model a system	Remember	—	CO 1
20	Summarize differences between use case and algorithm.	Understand	This would require learner to recall the concept of building blocks in UML. Then Explainingabout conceptual model and common mechanisms from building blocks of UML.	CO 2
PART-C SHORT ANSWER QUESTIONS				
1	Define Unified Modeling Language.	Remember	–	CO 1
2	Describe the importance of modeling.	Understand	This would require learner to recall the concept of modeling. Then explaining its importance.	CO 1
3	List out static and dynamic diagrams in UML.	Remember	–	CO 3
4	List out various goals of UML.	Remember	–	CO 1
5	Where can be the UML used?	Remember	–	CO 1
6	Define basic building blocks of the UML.	Remember	–	CO 2
7	What are the things in UML?	Remember	–	CO 2
8	Classify structural things in UML.	Understand	This would require learner to recall the concept of different types of things used in UML. Then classifying various structural things used in UML.	CO 2

9	Classify behavioral things in UML.	Understand	This would require learner to recall the concept of different types of behavioral things used in UML. Then classifying various behavioral things used in UML.	CO 2
10	Define different annotational things.	Remember	–	CO 2
11	List out various grouping things.	Remember	–	CO 2
12	List out the various rules of the UML.	Remember	–	CO 2
13	List out various extensibility mechanisms in UML.	Remember	–	CO 4
14	What is software architecture?	Remember	–	CO 2
15	List out the phases existing in SDLC.	Remember	–	CO 2
16	Write short notes on Class.	Remember	–	CO 4
17	Explain about attributes and operations used in a class.	Understand	This would require learner to recall the concept of different compartments used in representation of class. Then explaining about different attributes and operations performed in that particular class used in UML.	CO 4
18	Define the responsibility with an example.	Remember	–	CO 4
19	How we model the vocabulary of a system.	Remember	–	CO 4
20	How can we model non-software things?	Remember	–	CO 4
21	What is dependency and generalization?	Remember	–	CO 4

22	Explain the importance of association in UML.	Understand	This would require learner to recall the concept of different types of relationships used in UML diagrams representation. Then explaining about significance of association relationship used in UML.	CO 4
23	How can we model a structural relationship?	Remember	–	CO 4
24	What is note and its importance?	Remember	–	CO 2
25	What are adornments in UML?	Remember	–	CO 4
26	Illustrate the usage of stereotypes.	Understand	This would require learner to recall the concept of different types of common mechanisms used in UML. Then explaining usage of stereotypes with an example.	CO 4
27	Illustrate the usage of tagged values.	Understand	This would require learner to recall the concept of different types of common mechanisms used in UML. Then explaining usage of stereotypes with an example	CO 4
28	Classify the structural diagrams.	Understand	This would require learner to recall the concept of different diagrams used in studying static and dynamic aspects of the system in UML. Then classifying different types of structural diagrams used for the scenario.	CO 6

MODULE II				
ADVANCED BEHAVIORAL MODELING				
PART-A PROBLEM SOLVING AND CRITICAL THINKING QUESTIONS				
1	Construct an object diagram that contains a three-level hierarchy of objects.	Apply	This would require learner to recall the concept of different structural diagrams used in UML. Then the learner to find the importance for constructing object diagram using UML that contains three-level of hierarchy of objects with an example.	CO 6
2	In an ATM banking system, a use case is given as "Validate User". The steps involved in authenticating a user are described in scenarios. There will be a number of different scenarios for "Validate User", describe different situations that can arise. 1. Identify main (primary) flow of events for "Validate User". Identify Exception flow of events	Apply	This would require identify the requirements, recall the learned concepts of architecture of UML. Then answering to model static and dynamic views in UML.	CO 3
3	Build an object diagram showing at least 10 relationships among the following object classes. Include associations and qualified associations, aggregations, generalizations, and multiplicity. You may add additional objects. Also, show attributes and operations. School, playground, principal, school board, classroom, book, student, teacher, canteen, restroom, computer, desk, chair.	Apply	This would require learner to recall the learned basic concepts of UML. The learner finds the objects and suitable relations, then answering to model web of relations in UML.	CO 5

4	Build a class and object diagram of Library Management System.	Apply	This would require learner to recall the structural building blocks of UML. Then identify required objects to model and describe model group of elements using packages in UML.	CO 5
5	Assume that you wise to buy a car. Identify all the attributes and methods of the car object. Write a short description of services that each will provide. Create a class hierarchy of the "car" class.	Analyze	This would require learner to recall the concept of different structural diagrams used in UML. Understand requirements of user. Apply the concepts of UML to develop class diagram using UML notations.	CO 6
6	Build basic class diagrams (of your choice) to identify and describe key concepts like classes, types in the system and their relationships.	Apply	This would require learner to recall the concept of advanced building blocks in UML. Then recall terms and concepts of advanced classes. Then Explaining about their common modeling techniques.	CO 5
7	Build an object diagram for a computer network consisting of three LANs. Each pair of LANs is connected through a router. LANs contain 02, 05 and 06 nodes respectively. Two LANs are CSMA/CD and one is FDDI based.	Apply	This would require learner to recall the concept of advanced building blocks in UML. Then recall terms and concepts of object diagram. Then build object diagram based on given requirements.	CO 5
8	Build a Class Diagram for Online purchasing System	Apply	This would require learner to recall the concept of different behavioral diagrams used in UML. Then recall diagrams used for representation of different activities involved in a system. Then applying principles involved in drawing activity diagram for a particular case study of Cellular Phone.	CO 5

9	Construct an object diagram Hospital Management System.	Apply	This would require learner to recall the concept of different behavioral diagrams used in UML. Then recall diagrams used for different activities carried out. Then explaining steps involved in drawing activity diagram for a particular case study of Credit card validation with swim lane concept.	CO12
10	Develop the activity diagram for the process sale and specify actor, use case and scenario with swim lanes.	Apply	This would require learner to recall the concept of different behavioral diagrams used in UML. Then recall diagrams used for representation of different activities involved in a system. Then applying principles involved in drawing activity diagram for a particular case study of POS system with swim lane concept.	CO12
PART-B LONG ANSWER QUESTIONS				
1	Explain briefly terms, concepts and common modeling techniques of Advanced Classes.	Understand	This would require learner to recall the concept of advanced building blocks in UML. Then recall terms and concepts of advanced classes. Then Explainingabout their common modeling techniques.	CO 9
2	What is advanced relationships? Explain its commonmodeling techniques with suitable examples.	Understand	This would require learner to recall the concept of advanced building blocks in UML. Then recall concepts of advanced relationships. Then Explainingabout their common modeling techniques.	CO 9

3	Demonstrate in detail about Interfaces. Explain briefly types and roles with suitable examples.	Understand	This would require learner to recall the concept of advanced building blocks in UML. Then Explainingabout types and roles with an example.	CO 5
4	Explain common modeling techniques of Packages.	Understand	This would require learner to recall the concept of advanced building blocks in UML. Then Explainingabout common modeling techniques of packages.	CO 9
5	Illustrate the importance of class diagram and explain its common modeling techniques of Class diagram.	Understand	This would require learner to recall the concept of different structural diagrams used in UML. Then Explaining about significance and common modeling techniques of class diagrams used in UML.	CO 9
6	Explain common modeling techniques of Object diagram.	Understand	This would require learner to recall the concept of different structural diagrams used in UML. Then Explainingabout steps involved in common modeling techniques of object diagrams used in UML.	CO 9
7	Name some of the roles that are played by the packages, modules and wrappers?	Remember	—	CO 4
8	Write differences between method and message in object.	Remember	—	CO 6
9	Why do we need to classify objects? Why is it a difficult process?	Remember	—	CO 6
10	What is the need of identifying the relationship between objects?	Remember	—	CO 6

11	What Interaction diagrams commonly contains?	Understand	This would require learner to recall the concept of different structural diagrams used in UML. Then Explainingabout steps involved in common modeling techniques of object diagrams used in UML.	CO 7
12	What Activity diagrams commonly contains?	Remember	—	CO 7
13	Write a short note on Transition in Activity diagram.	Remember	—	CO 7
14	Discuss about branching, forking and joining.	Understand	This would require learner to recall the concept of different structural diagrams used in UML. Then Explainingabout steps involved in common modeling techniques of object diagrams used in UML.	CO 8
15	Describe four defined properties that can be used in operations.	Understand	This would require learner to recall the concept of different structural diagrams used in UML. Then Explainingabout steps involved in common modeling techniques of object diagrams used in UML.	CO 8
16	What is Visibility? Discuss its importance in classes.	Remember	—	CO 6
17	Describe forward and reverse engineering.	Understand	This would require learner to recall the concept of different structural diagrams used in UML. Then Explainingabout steps involved in common modeling techniques of object diagrams used in UML.	CO 6

18	Discuss the common modeling techniques used in Activity diagram.	Remember	—	CO 7
19	Explain the common modeling techniques of class diagram.	Understand	This would require learner to recall the concept of different structural diagrams used in UML. Then Explainingabout common modeling techniques of class diagrams used in UML.	CO 6
20	What are the results of forward and reverse engineering object diagrams	. Remember	—	CO 5
PART-C SHORT ANSWER QUESTIONS				
1	What are classifiers?	Remember	—	CO 5
2	What are different types of classifiers that help you to model?	Remember	—	CO 5
3	What is visibility? Discuss its importance in classes.	Remember	—	CO 5
4	List four defined properties that can be used in operations.	Remember	—	CO 4
5	What are template classes?	Understand	This would require learner to recall the concept of advanced building blocks in UML. Then Explainingabout template classes used in UML.	CO 5
6	Explain four standard stereotypes that apply to classes.	Understand	This would require learner to recall the concept of advanced building blocks in UML. Then Explainingabout stereotypes applied in classes.	CO 4
7	Illustrate the advanced dependency relationship.	Understand	This would require learner to recall the concept of advanced building blocks in UML. Then Explainingabout different types of advanced relationships used in UML.	CO 5

8	Explain generalization concept with suitable example.	Understand	This would require learner to recall the concept of building blocks in UML. Then Explainingabout generalization relationship used in UML.	CO 4
9	What is association? Discuss its importance.	Remember	—	CO 2
10	Write a short note on interface with an illustration.	Remember	—	CO 4
11	What is package? Discuss its terms and concepts.	Remember	—	CO 2
12	Define the use of importing and exporting of a package.	Remember	—	CO 5
13	Illustrate how the generalization among the packages will be happened.	Understand	This would require learner to recall the concept of advanced building blocks in UML. Then Explainingabout generalization relationship with grouping things used in UML.	CO 5
14	Explain UML defined five standard stereotypes that apply to packages.	Understand	This would require learner to recall the concept of advanced building blocks in UML. Then recall different common mechanisms used. Then Explainingabout stereotypes with grouping things used in UML.	CO 4
15	What are the common properties of object diagram?	Remember	—	CO 6
16	Explain the common modeling techniques of object diagram.	Understand	This would require learner to recall the concept of different structural diagrams used in UML. Then Explainingabout common modeling techniques of object diagrams used in UML.	CO 6

17	What is class diagram? When to use class diagrams?	Remember	—	CO 6
18	What is the importance of object diagram?	Remember	—	CO 6
19	What is package diagram?	Remember	—	CO 5
20	List out the relationships used in class diagram.	Understand	This would require learner to recall the concept of different structural diagrams used in UML. Then Explainingabout different types of relationships used in representation of Class diagrams used in UML.	CO 4
MODULE III				
ARCHITECTURAL MODELING				
PART A-PROBLEM SOLVING AND CRITICAL THINKING QUESTIONS				
1	Draw sequence diagrams OR communication diagrams with advanced notation for your system to show objects and their message exchanges.	Apply	This would require learner to recall the concept of different behavioral diagrams used in UML. Then recall different types of interaction diagrams. Then explaining about interaction diagrams for a particular case study of Hotel management system with an example.	CO 12
2	What are the similarities/dissimilarities between a sequence diagram and a collaboration diagram? Build the Interaction diagram for an ATM – used for a card-based banking system.	Apply	This would require learner to recall the concept of different behavioral diagrams used in UML. Then recall different types of interaction diagrams. Then explaining about sequence diagram and the explaining for a particular case study of Library management system.	CO 11

3	Model System Sequence Diagram for the Make Phone Calls of a Telephone System	Apply	This would require learner to Understand different types of interaction diagrams used in UML. Recall about sequence diagram and apply principles of modeling to draw sequence diagram for particular case study of ATM system.	CO 12
4	Analyze and draw a Sequence diagram that specifies the flow of control involved in initiating a simple, two-party phone call.	Analyze	This would require learner to Understand different types of interaction diagrams used in UML. Recall about sequence diagram and apply principles of modeling to draw sequence diagram for particular case study of two-party phone call system.	CO 12
5	Build and show the sequence of actions involved in an ATM transaction by using Sequence diagram.	Understand	This would require learner to recall the concept of different behavioral diagrams used in UML. Then recall different types of interaction diagrams. Then explaining about sequence of actions involved and then explaining for a particular case study of ATM with sequence diagram.	CO 12

6	Consider “buy tickets” function in a railway reservation system. Build a sequence diagram. Explain them briefly.	Apply	This would require learner to recall the concept of different behavioral diagrams used in UML. Then recall different types of interaction diagrams. Then explaining about sequence of actions involved in buy ticket function of railway reservation system and then explaining for a particular case study of Railway reservation system with sequence diagram.	CO 12
7	Construct a use-case diagram for Hotel Information System. There are two types of customers: Tour- group customers and Individual customers. Both can book, cancel, check-in and check-out of a room by Phone or via the Internet. There are booking process clerk and reception staff who manages it. A customer can pay his bill by credit card or pay utility bills.	Apply	This would require learner to recall the concept of different behavioral diagrams used in UML. Then recall diagrams used for overall behavior of system. Then applying principles involved in drawing use case diagram for a particular case study of Cellular Phone.	CO12
8	With reference to use case relationship, when would you use the followings and why? (a) ¡¡extends¿¿ (b) ¡¡uses¿¿ (b) Draw the use-case diagram for Online Admission Process for Engineering Students in Telangana	Apply	This would require learner to recall the concept of different behavioral diagrams used in UML. Then recall diagrams used for overall behavior of system. Then applying principles involved in drawing use case diagram for a particular case study of POS system.	CO12

9	Make use the following given library system to answer questions. Assume that a member of the library is allowed to borrow up to six items (e.g. a copy of a book, a journals, etc). The system supports to carry out the tasks of borrowing a copy of a book, extending a loan, and checking for reservation. (a) Identify the use cases that represent these tasks, (b) Draw a use-case diagram to represent relationships among these uses cases.	Apply	This would require learner to recall the concept of different behavioral diagrams used in UML. Then recall diagrams used for overall behavior of system. Then explaining about use case diagram for a particular case study of Library management system.	CO12
10	Construct a Use case scenario of ATM system. Model the following use cases a) System Startup Use Case b) System Shutdown Use Case c) Session Use Case d)Transaction Use Case	Apply	This would require learner to recall the concept of different behavioral diagrams used in UML. Then recall diagrams used for representation of different activities involved in a system. Then applying principles involved in drawing activity diagram for a particular case study of Cellular Phone.	CO11
11	Draw and model the activity diagrams to display either business flows or like flow charts. (Example: ATM system)	Apply	This would require learner to recall the concept of different behavioral diagrams used in UML. Then recall diagrams used for representation of different activities involved in a system. Then applying principles involved in drawing activity diagram for a particular case study of Cellular Phone.	CO12

PART-B LONG ANSWER QUESTIONS				
1	Explain terms, concepts and common modelingtechniques of interactions.	Understand	This would require learner to recall the concept of different behavioral diagrams used in UML. Then Explaining about concepts and common modeling techniques of interaction concept.	CO 9
2	Explain in detail about Interaction diagrams and also its notations with neat sketch.	Understand	This would require learner to recall the concept of different behavioral diagrams used in UML. Then recall different types of interaction diagrams used and Explaining interaction diagrams with their notations with an example.	CO 7
3	Explain about links, messages and sequencing in interactions.	Understand	This would require learner to recall the concept of different behavioral diagrams used in UML. Then recall different types of interaction diagrams and their concepts. Then Explaining about links, messages and sequencing aspects in interactions concept.	CO 7
4	Explain the use sequence diagram? Illustrate it with an example of invalid pin for ATM.	Understand	This would require learner to recall the concept of different behavioral diagrams used in UML. Then recall different types of interaction diagrams. Then Explaining about sequence diagram for a particular case study of ATM function of invalid PIN with an example.	CO 12

5	Explain in detail about the notations of a sequence diagram with neat sketch.	Understand	This would require learner to recall the concept of different behavioral diagrams used in UML. Then recall different types of interaction diagrams. Then Explaining about different notations used in sequence diagram with an example.	CO 7
6	Explain in detail about the notations of a collaboration diagram with neat sketch.	Understand	This would require learner to recall the concept of different behavioral diagrams used in UML. Then recall different types of interaction diagrams. Then Explaining about different notations used in collaboration diagram with an example.	CO 7
7	What are the steps for creating collaboration diagrams?	Remember	—	CO 7
8	Explain in detail the steps needed to create sequence diagrams.	Understand	This would require learner to recall the concept of different behavioral diagrams used in UML. Then recall different types of interaction diagrams. Then Explaining about different steps involved in sequence diagram with an example.	CO 7
9	Compare the differences between sequence and collaboration diagram.	Understand	This would require learner to recall the concept of different behavioral diagrams used in UML. Then recall different types of interaction diagrams. Then Explaining about differences of sequence and collaboration diagram.	CO 7

10	Explain in detail about use case diagrams with neat sketch.	Understand	This would require learner to recall the concept of different behavioral diagrams used in UML. Then recall diagrams used for overall behavior of system. Then explaining use case diagram with an example.	CO 6
11	Classify three kinds of actors in use case. Examine the purpose of using use cases to describe requirements.	Understand	This would require learner to recall the concept of different behavioral diagrams used in UML. Then recall diagrams used for overall behavior of system. Then explaining different kinds of actors in use case based on requirements with an example.	CO 6
12	What is activity diagram? Mention the elements of an activity diagram.	Remember	–	CO 7
13	Compare the differences between a system use case and a business use case.	Understand	This would require learner to recall the concept of different behavioral diagrams used in UML. Then recall diagrams used for overall behavior of system. Then explaining differences between system use case and business use case with an example.	CO 6
14	What is the use of use case diagrams? Differentiate between the roles of actors and use cases?	Remember	–	CO 6
15	What are the steps to model a behavior of system in use cases?	Remember	–	CO 6
16	What are the preconditions and post conditions of scenarios?	Remember	–	CO 6

17	Explain in detail about the components, symbols and notations of use case diagram.	Understand	This would require learner to recall the concept of different behavioral diagrams used in UML. Then recall diagrams used for overall behavior of system. Then explaining notations used in drawing use case diagram with an example.	CO 6
18	Explain in detail about the steps to draw activity diagram with suitable examples.	Understand	This would require learner to recall the concept of different behavioral diagrams used in UML. Then recall diagrams used for different activities carried out. Then explaining steps involved in drawing activity diagram with an example.	CO 7
19	Classify three kinds of actors in use case. Examine the purpose of using use cases to describe requirements.	Understand	This would require learner to recall the concept of different behavioral diagrams used in UML. Then recall diagrams used for overall behavior of system. Then explaining different kinds of actors in use case based on requirements with an example.	CO 6
20	What is activity diagram? Mention the elements of an activity diagram.	Remember	–	CO 7
21	Explain its terms, concepts and common modeling techniques of use cases.	Understand	This would require learner to recall the concept of different behavioral diagrams used in UML. Then recall concepts used for overall behavior of system. Then explaining about concepts and common modeling techniques of use cases.	CO 9

PART-C SHORT ANSWER QUESTIONS				
1	Explain terms, concepts and common modelingtechniques of interactions.	Remember	—	CO 7
2	Explain in detail about Interaction diagrams and also its notations with neat sketch.	Remember	—	CO 7
3	Explain about links, messages and sequencing in interactions.	Understand	This would require learner to recall the concept of different behavioral diagrams used in UML. Then Explaining about common uses of different types of interaction diagrams.	CO 7
4	Explain the use sequence diagram? Illustrate it with an example of invalid pin for ATM.	Remember	—	CO 7
5	Explain in detail about the notations of a sequence diagram with neat sketch.	Remember	—	CO 7
6	Explain in detail about the notations of a collaboration diagram with neat sketch.	Understand	This would require learner to recall the concept of different behavioral diagrams used in UML. Then recall different types of interaction diagrams used and Explaining relationship between interaction diagrams with an example.	CO 6
7	What are the steps for creating collaboration diagrams?	Remember	—	CO 7
8	Explain in detail the steps needed to create sequence diagrams.	Remember	—	CO 7

9	Compare the differences between sequence and collaboration diagram.	Understand	This would require learner to recall the concept of different behavioral diagrams used in UML. Then recall different types of interaction diagrams used and Explaining similarity and differences between interaction diagrams.	CO 7
10	What is the purpose of sequencendiagram?	Remember	—	CO 7
11	What is use case diagram?	Remember	—	CO 6
12	What are the uses of use cases?	Remember	—	CO 6
13	What use case diagrams commonly contain?	Remember	—	CO 6
14	What are the common modeling techniques of use cases?	Remember	—	CO 9
15	What is transition in activity diagram?	Remember	—	CO 7
16	Define about branching, forking and joining.	Remember	—	CO 7
17	Explain the common modeling techniques of activity diagram.	Understand	This would require learner to recall the concept of different behavioral diagrams used in UML. Then Explaining about concepts and common modeling techniques of activity diagram.	CO 9
18	What activity diagrams commonly contains?	Remember	—	CO 7
19	Define actors, scenarios and use cases.	Remember	—	CO 6
20	List out the kinds of actors in use case.	Remember	—	CO 6
21	What is the use of activity diagram?	Remember	—	CO 7
22	What is an activity diagram? Mention the elements of an activity diagram.	Remember	—	CO 7

23	List out the steps to find use cases.	Remember	—	CO 6
24	When to apply case diagrams.	Remember	—	CO 6
MODULE IV				
ARCHITECTURAL MODELING				
PART A- PROBLEM SOLVING AND CRITICAL THINKING QUESTIONS				
1	Model a state machine for the controller of a home security system, which is responsible for monitoring various sensors around the perimeter of the house.	Apply	This would require learner to recall the concepts of advanced behavioral modeling used in UML. Understand requirements of user. Apply the concepts of UML to develop state machine for home automation using UML notations.	CO 9
2	Develop a state chart diagram of an ATM system.	Analyze	This would require learner to recall diagrams used for advanced behavioral modeling used in UML. Understand requirements of user. Apply the concepts of UML to develop state chart diagram for particular case study of ATM system.	CO 10

3	Construct a state chart diagram of a Hotel Management System. Requirements are, The system should supports chain of hotels. A hotel contains two categories of rooms: executive and normal, both AC and non-AC. The customers of executive rooms can avail extra facilities like games, swimming, food service in rooms, etc. The booking is possible by internet or by phone. If the booking is through phone, process is done by receptionist, and if booking is done through internet the process is carried out by customer through hotel website. Depending on the number of days customer stays, appropriate bill is generated. The bill also contains amount for transport, food and other facilities enjoyed by the customer along with necessary taxes. The manager should be able to generate reports like list of customers staying in the hotel, list of rooms empty, monthly/yearly income, etc.	Apply	This would require learner to recall diagrams used for advanced behavioral modeling used in UML. Understand requirements of user. Apply the concepts of UML to develop state chart diagram for particular case study of Library Management system.	CO 8

4	A simple digital watch has a display and two buttons to set it, the A button and B button. The watch has two modes of operation, display time and set time. In the display time mode, the watch displays hours and minutes, separated by a flashing colon. The set time mode has two sub modes, set hours and set minutes. The A button selects modes. Each time it is pressed the mode advances in the sequence: display, set hours, set minutes, display, etc Within the sub modes, the capital B button advances the hours or minutes once each time it is pressed. Buttons must be released before they can generate another event. Construct a state chart diagram of the watch. Also show the activity effects and do activities in the state diagram.	Analyze	This would require learner to recall diagrams used for advanced behavioral modeling used in UML. Understand requirements of user. Apply the concepts of UML to develop state chart diagram for particular case study of Online Railway Reservation system.	CO 8
5	Develop a state chart diagram for the case study on the Next Gen POS system with suitable examples.	Analyze	This would require learner to recall diagrams used for advanced behavioral modeling used in UML. Understand requirements of user. Apply the concepts of UML to develop state chart diagram for particular case study of Next Gen POS system.	CO 8

6	Consider the following system for Online Theatre Booking (for multiplex). Following are the minimum requirement of the system from the perspective of a user who is going to use this online system. • User should be a registered member. • User can book any number of tickets on availability. • User should be able to search for the availability of tickets on selecting a particular movie. • Once user books the ticket a token number will be generated so that on providing this token he will be able to collect tickets before show from theatre premises. • User can cancel all or some seats of the ticket by providing token number before 1 Hr of scheduled time for that movie. (I) Describe the system boundary for this application in a few sentences. (II) Identify the actors for the application and draw the use case diagram.	Apply	This would require learner to recall the concept of behavioral diagrams used in UML. Then recall diagrams used for representation of different actors and use cases involved in a system. Then applying principles involved in drawing use case diagram for a particular case study of online theater booking.	CO 11

7	Consider "buy tickets" function in a railway reservation system. Build a sequence diagram. Explain them briefly.	Apply	This would require learner to recall the concept of different behavioral diagrams used in UML. Then recall different types of interaction diagrams. Then explaining about sequence of actions involved in buy ticket function of railway reservation system and then explaining for a particular case study of Railway reservation system with sequence diagram.	CO 12
8	Construct an activity diagram the shows flow of control from activity to another by modeling a credit card validation system with swim lanes.	Apply	This would require learner to recall the concept of different behavioral diagrams used in UML. Then recall diagrams used for different activities carried out. Then explaining steps involved in drawing activity diagram for a particular case study of Credit card validation with swim lane concept.	CO12
9	Develop an activity diagram that shows the process of passport automation with swim lanes.	Apply	This would require learner to recall the concept of different behavioral diagrams used in UML. Then recall diagrams used for representation of different activities involved in a system. Then applying principles involved in drawing activity diagram for a particular case study of Passport Automation system.	CO12

10	A soft drink vending machine accepts coins for a variety of products. When the amount of money deposited into the machine is equal to or greater than the price of any of its available products, the respective product selection buttons will be enabled for the user to make the selection. After the user has made a valid selection, the machine will dispense the soft drink, together with the change (if applicable). Model and draw the Activity Diagram for this vending machine.	Apply	This would require learner to recall the concept of behavioral diagrams used in UML. Then recall diagrams used for representation of different activities involved in a system. Then applying principles involved in drawing activity diagram for a particular case study of vending machine.	CO 11
PART-B LONG ANSWER QUESTIONS				
1	Explain briefly about signals, call events, time, change and sending / receiving events with an illustration.	Understand	This would require learner to recall the concept of advanced behavioral modeling used in UML. Then explaining about the mentioned concepts with an example.	CO 8
2	Explain briefly about modeling a family of signals and modeling exceptions.	Understand	This would require learner to recall the concept of advanced behavioral modeling used in UML. Then recall different common modeling techniques in advanced behavioral modeling. Then explaining about steps involved in mentioned common modeling techniques.	CO 9

3	Explain in detail about states, initial and final states of state machine with an example.	Understand	This would require learner to recall the concept of advanced behavioral modeling used in UML. Then explaining about mentioned advanced behavioral modeling concepts with an example.	CO 8
4	Explain transitions and advanced states and transitions.	Understand	This would require learner to recall the concept of advanced behavioral modeling used in UML. Then explaining about mentioned advanced behavioral modeling concepts.	CO 8
5	Explain modeling the lifetime of an object.	Understand	This would require learner to recall the concept of advanced behavioral modeling used in UML. Then recall different common modeling techniques in advanced behavioral modeling. Then explaining about steps involved in mentioned common modeling technique.	CO 9
6	Define process and threads. Explain flow of control, classes and events.	Remember	–	CO 8
7	Explain standard elements, communication and Synchronization.	Understand	This would require learner to recall the concept of advanced behavioral modeling used in UML. Then Explaining about mentioned advanced behavioral modeling concepts.	CO 8

8	Explain the common modeling techniques of processes and threads.	Understand	This would require learner to recall the concept of advanced behavioral modeling used in UML. Then recall different common modeling techniques in advanced behavioral modeling. Then Explaining about steps involved in mentioned common modeling technique.	CO 9
9	Explain the terms and concepts of time and space with suitable examples.	Understand	This would require learner to recall the concept of advanced behavioral modeling used in UML. Then explaining about mentioned advanced behavioral modeling concepts with an example.	CO 8
10	Explain the steps to model timing constraints and distribution of objects.	Understand	This would require learner to recall the concept of advanced behavioral modeling used in UML. Then recall different common modeling techniques in advanced behavioral modeling. Then explaining about steps involved in mentioned common modeling technique.	CO 9
11	Explain briefly the usage of state chart diagram, its contents and common uses with an example.	Understand	This would require learner to recall the concept of advanced behavioral modeling used in UML. Then explaining about mentioned advanced behavioral modeling concepts with an example.	CO 8

12	Explain the common modeling techniques of state chart diagram.	Understand	This would require learner to recall the concept of advanced behavioral modeling used in UML. Then recall different common modeling techniques in advanced behavioral modeling. Then explaining about different common modeling technique of state chart diag	CO 9
13	Explain about state machines with suitable examples.	Understand	This would require learner to recall the concept of advanced behavioral modeling used in UML. Then explaining about mentioned concept with an example.	CO 8
14	What is time and space? Discuss in detail about time and space with suitable examples.	Remember	–	CO 8
15	Classify the usage of process and threads in advanced behavioural modeling? Explain them in detail.	Understand	This would require learner to recall the concept of advanced behavioral modeling used in UML. Then explaining about mentioned concepts with an example.	CO 8
16	What are the elements which are utilized in the state chart diagram?	Remember	–	CO 8
17	What are the steps to model inter process communication	Remember	–	CO 8
18	What is the UML approach to process synchronization	Remember	–	CO 10
19	Explain the following advanced features of states and transitions. a) Entry and exit actions b) Internal transitions c) Activities d) Deferred events	Understand	This would require learner to recall the concept of advanced behavioral modeling used in UML. Then explaining about mentioned concept with an example.	CO 9

20	Explain the following advanced features of states and transitions. a) Sub states, nested states, composite states b) concurrent substates c) Sequential substates d) History substates	Understand	This would require learner to recall the concept of advanced behavioral modeling used in UML. Then explaining about mentioned concept with an example.	CO 11
PART-C SHORT ANSWER QUESTIONS				
1	Define call Events.	Remember	–	CO 8
2	Define event and signal.	Remember	–	CO 8
3	What are time and change event?	Remember	–	CO 8
4	How to model a family of signals?	Remember	–	CO 8
5	Explain about sending / receiving events.	Understand	This would require learner to recall the concept of advanced behavioral modeling used in UML. Then recall concept of events. Then explaining about sending and receiving events with an example.	CO 8
6	How many kinds of events can be modeled?	Remember	–	CO 8
7	Explain any three parts of transitions.	Understand	This would require learner to recall the concept of advanced behavioral modeling used in UML. Then recall concept of transition. Then explaining about its parts with an example.	CO 8
8	What is guard condition?	Remember	–	CO 8
9	Define state Machine.	Remember	–	CO 8
10	Write about transitions and transition elements.	Remember	–	CO 8
11	Define process and threads.	Remember	–	CO 8
12	Define time and location.	Remember	–	CO 8
13	Define time and space.	Remember	–	CO 8
14	What is the common use of state chart diagram?	Remember	–	CO 8

15	Define the common properties of state chart diagram.	Remember	–	CO 8
16	Explain to model reactive objects by using state chart diagram.	Understand	This would require learner to recall the concept of advanced behavioral modeling used in UML. Then recall different common modeling techniques in advanced behavioral modeling. Then explaining about steps involved in mentioned common modeling techniques.	CO 9
17	Explain about forward and reverse engineering in case of State Chart diagrams.	Understand	This would require learner to recall the concept of advanced behavioral modeling used in UML. Then recall different diagrams used in advanced behavioral modeling and in that concept of forward and reverse engineering applied in state chart diagram. Then Explaining about the concept with state chart diagram with an example.	CO 8
18	What are the standard elements in process and threads	Remember	–	CO 8
19	Define Synchronization.	Remember	–	CO 8
20	Define and initial and final states	Remember	–	CO 8

MODULE V				
ARCHITECTURAL MODELING				
PART A-PROBLEM SOLVING AND CRITICAL THINKING QUESTIONS)				
1	Construct UML deployment and component diagrams for ATM system.	q	This would require learner to recall the concept of different architectural diagrams used in UML. Then recall diagrams used in representing physical aspects. Then explaining steps involved in drawing component diagram for a particular case study of ATM system	CO 12
2	With suitable example model and draw a component diagram of airport check-in and boarding of passengers.	Apply	This would require learner to recall the concept of different architectural diagrams used in UML. Then recall diagrams used in representing physical aspects. Then explaining steps involved in drawing component diagram for airport check-in and boarding of passengers.	CO 12
3	Construct a component diagram to show the run-time dependency between a java class file, the java.exe run-time program and the java classes in a zip file.	Analyze	This would require learner to recall diagrams used for architectural modeling used in UML. Understand requirements of user. Apply the concepts of UML to develop component diagram for particular case study of Java application.	CO 12
4	Construct a deployment diagram to show how a web browser and a web server are located on different machines and the communication protocol they use.	Apply	This would require learner to recall diagrams used for architectural modeling used in UML. Understand requirements of user. Apply the concepts of UML to develop deployment diagram for particular case study of Web application.	CO 12

5	Consider the Hospital Management System application with the following requirements i. System should handle the in- patient, out-patient information through receptionist. ii. Doctors are allowed to view the patient history and give their prescription iii. There should be a information system to provide the required information Construct the component and deployment diagram	Apply	This would require learner to find the concepts of architectural diagrams used in UML. Then recall diagrams used during runtime environment. Then explaining elements involved in drawing deployment diagram with an example.	CO 10
6	Construct a component diagram for Inventory Management System.	Apply	This would require learner to recall diagrams used for architectural modeling used in UML. Understand requirements of user. Apply the concepts of UML to develop deployment diagram for particular case study of Web application.	CO 12
7	Construct a component diagram for Point of Sale System.	Apply	This would require learner to recall diagrams used for architectural modeling used in UML. Understand requirements of user. Apply the concepts of UML to develop deployment diagram for particular case study of Web application.	CO 12
8	Construct a component and deployment diagram for working company.	Apply	This would require learner to recall diagrams used for architectural modeling used in UML. Understand requirements of user. Apply the concepts of UML to develop deployment diagram for particular case study of Web application.	CO 11

9	Construct a deployment diagram for ATM Trasaction System	Apply	This would require learner to recall diagrams used for architectural modeling used in UML. Understand requirements of user. Apply the concepts of UML to develop deployment diagram for particular case study of Web application.	CO 10
10	Construct a component diagramfor student marks Analysis System.	Apply	This would require learner to recall diagrams used for architectural modeling used in UML. Understand requirements of user. Apply the concepts of UML to develop deployment diagram for particular case study of Web application.	CO 11
PART-B LONG ANSWER QUESTIONS				
1	Define Components. Explain terms and concepts of components with examples.	Remember	–	CO 10
2	Explain different kinds of components with suitable examples.	Understand	This would require learner to recall the concept of architectural model used in UML. Then explaining different kinds of components with an example.	CO 10
3	Explain the common modeling techniques used in component diagrams with suitable example.	Understand	This would require learner to recall the concept of architectural modeling used in UML. Then recall different common modeling techniques in architectural modeling. Then explaining about steps involved in common modeling techniques of component diagram with an example.	CO 9
4	Define component diagrams. Explain common properties, contents and its common uses.	Remember	–	CO 10

5	Explain modeling source code and modeling an executable release.	Understand	This would require learner to recall the concept of architectural modeling used in UML. Then recall different common modeling techniques in architectural modeling. Then explaining about steps involved in mentioned common modeling techniques.	CO 9
6	Explain the steps to model a physical database and modeling adaptable systems.	Understand	This would require learner to recall the concept of architectural modeling used in UML. Then recall different common modeling techniques in architectural modeling. Then explaining about steps involved in mentioned common modeling techniques.	CO 9
7	Explain its common modeling techniques of deployment diagram with neat sketch.	Understand	This would require learner to recall the concept of architectural modeling used in UML. Then recall different common modeling techniques in architectural modeling. Then explaining about steps involved in common modeling techniques of deployment diagram with an example.	CO 9
8	Explain in detail about the terms and concepts of deployment diagrams with an example.	Understand	This would require learner to recall the concepts of architectural modeling used in UML. Then recall different diagrams used in architectural modeling. Then explaining about terms and concepts involved in deployment diagram with an example.	CO 10

9	Compare the differences between components in a component diagram and components in a deployment diagram.	Understand	This would require learner to recall the concepts of architectural modeling used in UML. Then recall different diagrams used in architectural modeling. Then explaining differences in usage of components in architectural diagrams.	CO 10
10	Explain in detail about the deployment diagram notations with suitable sketches.	Understand	This would require learner to recall the concepts of architectural modeling used in UML. Then recall different diagrams used in architectural modeling. Then explaining different notations used in drawing deployment diagram.	CO 10
11	Discuss in detail about NextGen POS system.	Remember	–	CO 10
12	Explain problem Statement and function requirements of a college library management system	Understand	This would require learner to recall the concepts of architectural modeling used in UML. Then recall different diagrams used in architectural modeling. Then explaining different notations used in drawing deployment diagram.	CO 12
13	Explain the concept of tuning / refinement of the existing model.	Understand	This would require learner to recall the concepts of architectural modeling used in UML. Then recall different diagrams used in architectural modeling. Then explaining different notations used in drawing deployment diagram.	CO 12

14	Draw a component diagram for unified library Application and explain.	Understand	This would require learner to recall the concepts of architectural modeling used in UML. Then recall different diagrams used in architectural modeling. Then explaining different notations used in drawing deployment diagram.	CO 10
15	Explain business process model.	Understand	This would require learner to recall the concepts of architectural modeling used in UML. Then recall different diagrams used in architectural modeling. Then explaining different notations used in drawing deployment diagram.	CO 10
16	Discuss in detail about Automated operations without user interface.	Remember	–	CO 10
17	List out the steps to reverse engineer a deployment diagram.	Remember	–	CO 10
18	Explain modeling process and devices.	Understand	This would require learner to recall the concepts of architectural modeling used in UML. Then recall different diagrams used in architectural modeling. Then explaining different notations used in drawing deployment diagram.	CO 11
19	Discuss in detail about modeling distribution of components.	Remember	–	CO 10
20	Explain about adaptable System and physical database.	Understand	This would require learner to recall the concepts of architectural modeling used in UML. Then recall different diagrams used in architectural modeling. Then explaining different notations used in drawing deployment diagram.	CO 11

PART-C SHORT ANSWER QUESTIONS				
1	Define component diagram.	Remember	–	CO 10
2	Define deployment diagram.	Remember	–	CO 10
3	What are the main purposes of using component diagrams?	Remember	–	CO 10
4	What are the main purposes of using deployment diagrams?	Remember	–	CO 10
5	When to draw a deployment diagram?	Remember	–	CO 10
6	List out the common properties of component diagram.	Remember	–	CO 10
7	What are the common uses of component diagram?	Remember	–	CO 10
8	Explain the steps to model a source code and executable release.	Understand	This would require learner to recall the concept of architectural modeling used in UML. Then recall different common modeling techniques in architectural modeling. Then explaining about steps involved in mentioned common modeling techniques.	CO 9
9	Write a short note on deployment diagram.	Remember	–	CO 10
10	List out the common properties of deployment diagram.	Remember	–	CO 10
11	Explain the steps to model an embedded system by using deployment diagrams.	Understand	This would require learner to recall the concept of architectural modeling used in UML. Then recall different common modeling techniques in architectural modeling. Then Explaining about steps involved in common modeling techniques of deployment diagram.	CO 9

12	List the steps to produce a component diagram with an example.	Understand	This would require learner to recall the concept of architectural model used in UML. Then recall diagrams used architectural model. Then explaining steps involved in drawing component diagram for a particular System as an example.	CO 10
13	List the steps to produce a deployment diagram with an example.	Understand	This would require learner to recall the concept of architectural model used in UML. Then recall diagrams used architectural model. Then explaining steps involved in drawing deployment diagram for a particular system as an example.	CO 10
14	How to draw a deployment diagram?	Remember	–	CO 10
15	List out various applications of a deployment diagram.	Remember	–	CO 10
16	Distinguish between method and message in object.	Remember	–	CO 10
17	Describe the Primary goals in the Design of UML.	Understand	This would require learner to recall the concept of architectural model used in UML. Then recall diagrams used architectural model. Then explaining steps involved in drawing deployment diagram for a particular system as an example.	CO 9
18	Define the term package vs subsystem	Remember	–	CO 10
19	What is adaptable system.	Remember	–	CO 11
20	Define physical database.	Remember	–	CO 11

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