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# B.M.S. College of Engineering, Bengaluru-560019

**Autonomous Institute Affiliated to VTU**

## January / February 2025 Semester End Main Examinations

**Programme: B.E.** **Semester: V**

**Branch: Computer Science and Engineering** **Duration: 3 hrs.**

**Course Code: 23CS5PCOOM** **Max Marks: 100**

**Course: Object Oriented Modelling**

**Instructions**: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.



**Important Note:** Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

| | | UNIT - I | *CO* | *PO* | Marks |
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| 1 | a) | Illustrate the restructuring technique used to deal the multiple inheritance issue with relevant examples. | *CO1* | *PO1* | **10** |
| | b) | A library lends books and magazines to members, who are registered in the system. Also it handles the purchase of new titles for the library. Popular titles are bought in multiple copies. Old books and magazines are removed when they are out of date or in poor condition. A member can reserve a book or magazine that is not currently available in the library, so that when it is returned or purchased by the library, the person is notified. The library can easily create, replace and delete informations about the titles, members loans and reservations in the system.<br>Create a Class Diagram for the above problem definition. Give the explanation for your design. | *CO 3* | *PO 3* | **10** |
| | | **OR** | | | |
| 2 | a) | I] Analyze and identify a list of models that you would expect each of the following system to handle:<br>i) A catalog store order enter system.<br>ii) A Speed fast courier system.<br>iii) A ticketing system in metro rail service.<br>iv) A voice mail system with delivery options, message forwarding and group lists.<br><br>II]Analyze the following relationships into generalization, aggregation, association and n-ary associations. Explain your answers.<br>i) A drawing object is text, a geometrical object, or a group.<br>ii) A person uses a computer language on a project.<br>iii) Modems and keyboards are input/output devices.<br>iv) A route connects two cities.<br>v) A file contains records.<br>vi) A polygon is composed of an ordered set of points. | *CO2* | *PO2* | **10** |

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| | | b) | Prepare a class diagram for each group of classes mentioned below. Add at least 10 relationships (association and generalizations) to the diagram. Use association names and association end names where needed. Also use qualified associations and show multiplicity. Write attributes and methods for the classes.<br>**file system, file, ASCII file, binary file, directory file, Disc, drive, track, sector** | *CO3* | *PO3* | **10** |
| | | | **UNIT - II** | | | |
| | 3 | a) | Illustrate with example the different types of events in state modeling. | *CO1* | *PO1* | **10** |
| | | b) | Design an advanced State diagram for Telephone line system with activities. | *CO3* | *PO3* | **10** |
| | | | **OR** | | | |
| | 4 | a) | Define Concurrency. Illustrate any two ways of handling concurrency in state modeling with an example for each. | *CO2* | *PO2* | **10** |
| | | b) | Design an advanced State diagram for Bank ATM system. | *CO 3* | *PO 3* | **10** |
| | | | **UNIT - III** | | | |
| | 5 | a) | Consider a physical bookstore, such as in a shopping mall.<br>a. List at least 3 actors that are involved in the design of checkout system. Explain the relevance of each actor.<br>b. Identify the use cases. Summarize the purpose of each use case with a sentence.<br>c. Prepare a use case diagram for a physical bookstore checkout system.<br>d. Prepare a normal and exception scenario for any two use cases that you have identified.<br>e. Prepare a sequence diagram corresponding to each scenario | *CO 3* | *PO 3* | **10** |
| | | b) | Differentiate between Passive objects and Transient Objects with the help of an example and neat diagram. | *CO 2* | *PO 2* | **10** |
| | | | **OR** | | | |
| | 6 | a) | A customer decides to upgrade her PC and purchase a DVD player. She begins by calling the sales department of the PC vender and they tell her to talk to customer support and they put her on hold while talking to engineering. Finally, customer support tells the customer about several supported DVD options. The customer chooses the DVD and is shipped by the mail department. The customer receives a DVD, installs it satisfactorily and then mails her payment to accounting.<br>Construct an activity diagram for this process. Use swim-lanes to show various interactions. | *CO 3* | *PO 3* | **10** |
| | | b) | Explain the Use Case Relationships with example for each**.** | *CO 1* | *PO 1* | **10** |

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| | | | **UNIT - IV** | | | |
| | 7 | a) | Consider the following Problem statement (given below) for ATM System:<br>**"**Design the software to support a computerized banking network including both human cashiers and automatic teller machines (ATMs) to be shared by a consortium of banks. Each bank provides its own computer to maintain its own accounts and process transactions against them. Cashier stations are owned by individual banks and communicate directly with their own bank's computers. Human cashiers enter account and transaction data.<br>Automatic teller machines communicate with a central computer that clears transactions with the appropriate banks. An automatic teller machine accepts a cash card, interacts with the user, communicates with the central system to carry out the transaction, dispenses cash, and prints receipts. The system requires appropriate recordkeeping and security provisions. The system must handle concurrent accesses to the same account correctly.<br>The banks will provide their own software for their own computers; you are to design the software for the ATMs and the network. The cost of the shared system will be apportioned to the banks according to the number of customers with cash cards.**"**<br>i) What criteria would you take into consideration to find relevant classes?<br>ii) Analyze with an example how to select the good classes from the set of ATM classes that are identified from the knowledge of problem domain. | *CO 3* | *PO 3* | **10** |
| | | b) | Discuss the steps involved in constructing Application Interaction Model for ATM System and illustrate with example for each. | *CO 1* | *PO 1* | **10** |
| | | | **OR** | | | |
| | 8 | a) | Discuss the steps involved in constructing Application State Model for ATM System and illustrate with example for each. | *CO 1* | *PO 1* | **10** |
| | | b) | Discuss the steps involved in constructing Domain State Model for ATM System and illustrate with example for each. | *CO 1* | *PO 1* | **10** |
| | | | **UNIT - V** | | | |
| | 9 | a) | Define a pattern and illustrate the properties of pattern. | *CO 1* | *PO 1* | **10** |
| | | b) | Most of today's software system runs on distributed systems. These distributed systems needs a means of communication. Explain how Forwarder-Receiver model addresses this issue. | *CO 2* | *PO 2* | **10** |
| | | | **OR** | | | |
| | 10 | a) | Explain in detail the different categories of patterns. Develop a pattern description template that helps in writing patterns. | *CO 1* | *PO 1* | **10** |
| | | b) | Explain Publisher-Subscriber pattern in detail. | *CO 2* | *PO2* | **10** |

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