U.S.N.										

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

Autonomous Institute Affiliated to VTU

October 2024 Supplementary Examinations

Programme: B.E. **Semester: VI**
Branch: Computer Science and Engineering **Duration: 3 hrs.**
Course Code: 22CS6PCSEO **Max Marks: 100**
Course: Software Engineering and 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
1	a)	Discuss the responsibilities that the software engineers should have towards profession and society. State ACM/IEEE code of Ethics and professional practice that software engineers should adhere.	CO1	PO1	6
	b)	Giving reasons for your answers based on the type of system being developed, suggest the most appropriate generic software process model that might be used as a basis for managing the development of the following systems: i) An interactive system that allows flight passengers to find flight times from terminals installed in airports. ii) A banking accounting system that replaces an existing system. iii) A system to control anti-lock braking in a bike.	CO2	PO2	6
	c)	Consider the vaccination drive service where the citizens of a country whose age are between 15 to 60 years should be given vaccination to fight against a deadly virus. The registration process can be done online or get the vaccination done directly at various health centers setup by the government. Capture the requirement specification with respect to the age group and doses to be given using structured natural language template.	CO2	PO2	8
		UNIT - II			
2	a)	Explain enduring and volatile requirements with an example.	CO1	PO1	6
	b)	(i) Giving reasons for your answer based on the type of system being developed, suggest the most appropriate structural model that might be used as a basis for managing the development of the following systems: 1. Passport Authentication system. 2. An automated robot floor cleaner.	CO2	PO2	6

			(ii) Suggest the most appropriate control model that might be used for the following systems. Provide proper justification for your answers. 1. A set of software tools that are produced by different vendors, but which must work together. 2. A television controller that responds to signals from a remote control unit.			
		c)	Consider the "Online Fresh Food Store" application where users can place order for the item required using this app. Design the context diagram for this application by showing the various entities that interact with the system and explain.	***CO3***	***PO3***	**8**
			OR			
	3	a)	Explain any two organizational styles used to structure a system.	***CO1***	***PO1***	**6**
		b)	The Online book website displays only the available e-books, research papers, articles etc. General public can register on the website by providing necessary credentials, once registered they can purchase the available materials (There is no restriction on the purchase, that is a single buyer can purchase several study materials). The payment for the purchased materials can be made through net banking, credit cards and debit cards. After realization of payments, the purchased materials are dispatched to courier agency to deliver to the purchaser. Identify the principal viewpoints which might be taken into account in the specification of this system and organize these using a view point hierarchy diagram and explain.	***CO2***	***PO2***	**6**
		c)	Design the data flow diagram for Equipment procurement process and explain.	***CO3***	***PO3***	**8**
			UNIT - III			
	4	a)	Define Constraint. Discuss the different types of constraint with example for each.	***CO1***	***PO1***	**6**
		b)	Categorize the following relationships into generalization, aggregation, association and n-ary associations. Explain your answers. 1. A drawing object is text, a geometrical object, or a group. 2. A person uses a computer language on a project. 3. Modems and keyboards are input/output devices. 4. Classes may have several attributes. 5. A person plays for a team in a certain year. 6. A route connects two cities.	***CO2***	***PO2***	**6**
		c)	Prepare a class diagram for **Managing Credit Card Accounts** with the group of classes as given below: **Credit Card Account, Institution, Mailing Address, Customer, Statement, Transaction, Cash Advance, Interest, Purchase, Fee, Adjustment, Merchant**. Add relationships (association & generalization) to diagram. Use association names, association end names where needed.	***CO3***	***PO3***	**8**

			Show necessary attributes and operations. Also use qualified association and show multiplicity. Explain the designed model.			
			UNIT - IV			
	5	a)	Explain Procedural Sequence models with suitable examples.	***CO1***	***PO1***	**6**
		b)	A product is to be installed to control elevators in a building with m floors. The problem concerns the logic required to move elevators between floors according to the following constraints: • Each elevator has a set of m buttons, one for each floor. These illuminate when pressed and cause the elevator to visit the corresponding floor. The illumination is canceled when the elevator visits the corresponding floor. • Each floor, except the first floor and top floor has two buttons, one to request and up-elevator and one to request a down-elevator. These buttons illuminate when pressed. The illumination is canceled when an elevator visits the floor and then moves in the desired direction. • When an elevator has no requests, it remains at its current floor with its doors closed. Draw the sequence diagram for the above scenario.	***CO3***	***PO3***	**6**
		c)	Prepare a State diagram for the following scenario. Consider the class for telephone line with following activities and states: At the start of a call, the telephone line is idle. When the phone receiver is picked from hook, it gives a dial tone and can accept the dialing of digits. If after getting dial tone, if the user doesn't dial number within time interval then time out occurs and phone line gets idle. After dialing a number, if the number is invalid then some recorded message is played. Upon entry of a valid number, the phone system tries to connect a call and routes it to proper destination. If the called person answers the phone, the conversation can occur. When called person hangs up, the phone disconnects and goes to idle state. Draw the state transition diagram for above description of telephone line.	***CO3***	***PO3***	**8**
			OR			
	6	a)	Discuss any two ways of concurrency handling in state modeling with an example.	***CO1***	***PO1***	**6**
		b)	A Company is manufacturing a new product and must coordinate several departments. The product starts out as a raw marketing idea that goes to engineering. Engineering simulates the function of the product and prepares a design. Manufacturing reviews the design and adjusts it to confirm to existing machinery. Engineering approves the revisions and customer service then looks at the design – a good design must enable ready repair. Engineering approves the customer service proposals and ensures that the resulting design meets the target functionality. Construct an activity diagram for this process. Use swim lanes to show the various interactions.	***CO3***	***PO3***	**6**

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<tr><td></td><td></td><td>c)</td><td>Consider a computer email system.
a. List three actors. Explain the relevance of each actor.
b. List four use cases at the comparable level of abstraction and prepare a use case diagram for computer email system. Summarize the purpose of each use case with a sentence.
c. Prepare the Normal and Exception scenario for any two use case for which you have identified.
d. Design the sequence diagram for computer email system.</td><td>CO3</td><td>PO3</td><td>8</td></tr>
<tr><td></td><td></td><td></td><td>UNIT - V</td><td></td><td></td><td></td></tr>
<tr><td></td><td>7</td><td>a)</td><td>Describe the principles of Agile method.</td><td>CO1</td><td>PO1</td><td>6</td></tr>
<tr><td></td><td></td><td>b)</td><td>Differentiate between White-box and Black-box testing with suitable examples.</td><td>CO2</td><td>PO2</td><td>6</td></tr>
<tr><td></td><td></td><td>c)</td><td>Draw time line chart for the following project schedule:
<table><tr><th>Task</th><th>Duration (Days)</th><th>Dependencies</th></tr><tr><td>T1</td><td>10</td><td>--</td></tr><tr><td>T2</td><td>15</td><td>--</td></tr><tr><td>T3</td><td>15</td><td>T1(M1)</td></tr><tr><td>T4</td><td>10</td><td>--</td></tr><tr><td>T5</td><td>10</td><td>T2,T4(M3)</td></tr><tr><td>T6</td><td>5</td><td>T1,T2(M4)</td></tr><tr><td>T7</td><td>20</td><td>T1(M1)</td></tr><tr><td>T8</td><td>25</td><td>T4(M2)</td></tr><tr><td>T9</td><td>15</td><td>T3,T6(M5)</td></tr><tr><td>T10</td><td>15</td><td>T7,T8(M6)</td></tr><tr><td>T11</td><td>10</td><td>T9(M7)</td></tr><tr><td>T12</td><td>10</td><td>T10,T11(M8)</td></tr></table></td><td>CO3</td><td>PO3</td><td>8</td></tr>
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