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

Autonomous Institute Affiliated to VTU

June / July 2025 Semester End Main 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)	A software system is to be developed to manage the records of the candidates who register for the Online Course. The record includes the records of all candidates (Course name, duration, start and end dates assignment submission and so on) after the completion of the course the candidate has to take up an exam and qualify the exam with certain minimum percentage for certification. Classify and explain the Non-functional requirements hierarchy diagram for the above software system.	CO2	PO2	6
	c)	Illustrate the problems of using natural language for defining user and system requirements. Design a template using structured natural language for insulin pump control software.	CO2	PO2	8
		OR			
2	a)	Illustrate the structure of software requirement document.	CO1	PO1	6
	b)	Identify which model is most suitable in situations where the project requirements are well-defined and the project goals are clear. It is often used for large-scale projects with long timelines, where there is little room for error and the project stakeholders need to have a high level of confidence in the outcome. Explain the same with a neat diagram with its drawbacks.	CO 2	PO 2	8
	c)	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.	CO 2	PO2	6

			UNIT - II			
	3	a)	Explain the requirement engineering process with a neat diagram.	***CO1***	***PO1***	**6**
		b)	Write the different scenarios for downloading articles in Library Management System (LIBSYS).	***CO2***	***PO2***	**6**
		c)	Design the data flow diagram for Equipment procurement process.	***CO3***	***PO3***	**8**
			OR			
	4	a)	Differentiate between enduring requirements and volatile requirements. Give examples for each with respect to Hospital management.	***CO2***	***PO2***	**6**
		b)	Analyze the system and suggest an appropriate structural model for the following. Give reasons for your answers i) A computer-controlled video conferencing system that allows video, audio and computer data to be visible to several participants at the same time. ii) A robotic floor cleaner that is intended to clean relatively clear spaces such as corridors. The cleaner must be able to sense walls and other obstructions. Analyze the system and suggest an appropriate control model for the following. Give reasons for your answers i) A batch processing system that takes information about hours worked and pay rates and also prints salary slips, bank credit transfer information. ii) A set of software tools that are produced by different vendors, but which must work together.	***CO2***	***PO2***	**6**
		c)	A software system is to be developed to manage the records of Library. 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***	**8**
			UNIT - III			
	5	a)	Discuss any two methods of work arounds for multiple inheritance.	***CO1***	***PO1***	**6**
		b)	Prepare & explain a class diagram for a graphical document editor that supports grouping. Assume that a document consists of several sheets. Each sheet contains drawing objects, including text, geometrical objects, and groups. A group is simply a set of drawing objects, possibly including other groups. A group must contain at least two drawing objects. A drawing object can be a direct member of at most one group. Geometrical objects include circles, ellipses, rectangles, lines, and squares.	***CO3***	***PO3***	**8**
		c)	Analyze the following relationships into generalization, aggregation, association and n-ary associations. Explain your answers. i) A drawing object is text, a geometrical object, or a group. ii) A dining philosopher uses a fork iii) A file is an ordinary file or directory file iv) File contains records.	***CO2***	***PO2***	**6**

			v) A polygon is composed of ordered set of points vi) A person plays for a team in a certain year			
			OR			
	6	a)	Explain the concept of Ordering, Bags and Sequences of Class model with an example for each.	***CO 1***	***PO 1***	**6**
		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 information about the titles, members loans and reservations in the system. Create a Class Diagram for the above problem definition. Give the explanation for your design.	***CO 3***	***PO 3***	**8**
		c)	Differentiate with an example for each. 1. Aggregation and Association 2. Aggregation and Composition	***CO 2***	***PO 2***	**6**
			UNIT - IV			
	7	a)	Define Concurrency. Discuss the different ways of handling concurrency in state modeling with an example for each.	***CO1***	***PO1***	**10**
		b)	Consider a physical bookstore, such as in a shopping mall. a. List at least 3 actors that are involved in the design of checkout system. Explain the relevance of each actor. b. Identify the use cases. Summarize the purpose of each use case with a sentence. c. Prepare a use case diagram for a physical bookstore checkout system. d. Prepare a normal and exception scenario for any two use cases that you have identified. e. Prepare a sequence diagram corresponding to each scenario	***CO3***	***PO3***	**10**
			OR			
	8	a)	Consider the scenario for online course enrollment system where the student enrolls for the specific course. Instances of course can be in the Proposed, Scheduled, Open for Enrollment, Full, and Closed to Enrollment states. An object starts in an initial state and can end up in a final state. After the completion of the course the student has to appear for exams, for getting certified. Analyze and prepare the state diagram for the above scenario. Explain your diagram.	***CO3***	***PO3***	**10**
		b)	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.	***CO3***	***PO3***	**10**

			The customer receives a DVD, installs it satisfactorily and then mails her payment to accounting. Construct an activity diagram for this process. Use swimlanes to show various interactions. Explain your diagram.			
			UNIT - V			
	9	a)	Differentiate between Black box and White box testing with suitable examples.	***CO2***	***PO2***	**6**
		b)	Explain the principles of agile methods.	***CO1***	***PO1***	**6**
		c)	Consider the "Binary Search routine" Write the specification of a search routine. Analyze the equivalence partitions for search routine with suitable test cases. Draw the corresponding flow graph for a binary search routine find the number of independent paths to be tested.	***CO3***	***PO3***	**8**
			OR			
	10	a)	Differentiate between System testing and Component testing	***CO 1***	***PO 1***	**6**
		b)	As a project manager of a company what are the basic principles you adopt when you develop a complete schedule for the project.	***CO 1***	***PO 1***	**8**
		c)	Analyze and explain the strategies that helps to manage risks.	***CO 2***	***PO 2***	**6**

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