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: Machine Learning   **Duration: 3 hrs.**

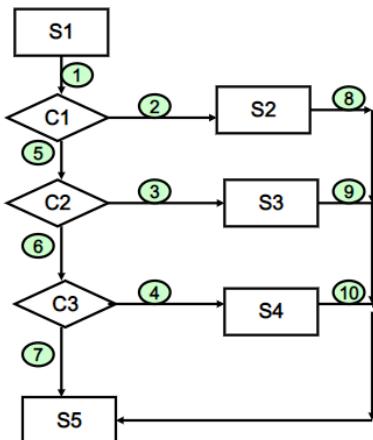**Course Code: 22AM5PCSED**   **Max Marks: 100**

Course: Software Engineering and Design Patterns

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

				CO	PO	Marks
			UNIT - I	*CO*	*PO*	**Marks**
1	a)		Illustrate any 5 Principles of software engineering practice	*CO1*	*PO1*	**10**
	b)		Justify why V-model is best when compared to waterfall model with neat diagram.	*CO1*	*PO2*	**10**
			(OR)			
2.	a)		Compare and Contrast Spiral Model and Agile Model.	*CO1*	*PO2*	**10**
	b)		Differentiate Halsted metrics vs Cyclomatic Complexity. Analyze the following code and calculate the cyclomatic complexity using all the three methods. 1. begin int x, y, power; 2. float z; 3. input(x, y); 4. if(y<0) 5. power = -y; 6. else power = y; 7. z=1; 8. while(power!=0) 9. { z=z*x; 10. power=power-1; 11. } if(y<0) 12. z=1/z; 13. output(z); 14. end	*CO1*	*PO2*	**10**
			UNIT - II			
3	a)		Differentiate functional and non-functional requirements with examples each.	*CO1*	*PO2*	**06**
	b)		Desing a use case for depicting the Online Shopping website for the following requirements The top-level uses are as follows; View Items, Make Purchase, Checkout, Client Register. The **View Items** use case is utilized by	*CO1*	*PO2*	**08**

			the customer who searches and view products. The **Client Register** use case allows the customer to register itself with the website for availing gift vouchers, coupons, or getting a private sale invitation. It is to be noted that the **Checkout** is an included use case, which is part of **Making Purchase,** and it is not available by itself.			
		c)	Define Coupling and Cohesion. Also justify which is the best design aspect.	*CO1*	*PO2*	**06**
			(OR)			
	4	a)	Define Function and non-functional requirements. Also analyze the following statements and identify whether they fall under functional requirements or non-functional requirement. Summarize your justification.	*CO1*	*PO2*	**06**
		b)	Desing an activity diagram that showcases interaction between swimlanes for withdraw of money from an ATM Account - The three involved classes (people, etc.) of the activity are Customer, ATM, and Bank.	*CO1*	*PO2*	**08**
		c)	Illustrate with a neat diagram the process of translating requirements model to design model.	*CO1*	*PO2*	**06**
			UNIT - III			
	5	a)	Differentiate Verification and Validation.	*CO2*	*PO1*	**06**
		b)	Illustrate in detail on Control Flow Testing and provide boundary value analysis and also equivalence classes for the following requirement. 1. Accept the Employee Number of Max 5 Digits. 2. Accept Age field of length between 04 to 100.	*CO2*	*PO2*	**10**
		c)	Explain key principles of Six-Sigma quality assurance standard.	*CO2*	*PO1*	**04**
			(OR)			
	6	a)	Signify the importance of ISO software quality standard.	*CO2*	*PO2*	**06**
		b)	XYZ company plans to launch its website as a part of its business. The product is given to a development company. Provide solutions and strategies to test the web application.	*CO2*	*PO2*	**10**
		c)	Analyze the following control graph and find out the predicate nodes and independent paths. Also determine the cyclomatic complexity considering independent path method.	*CO2*	*PO2*	**04**

		UNIT - IV			
7	a)	Signify the importance of CRC representation. Depict the same for an MVC architecture	*CO3*	*PO1*	**10**
	b)	Design a sequence diagram for the pipe and filter pattern where in the Data Source is an active with multiple active Filters and sink will be passive.	*CO3*	*PO2*	**10**
		(OR)			
8	a)	Write about various pattern categories and explain each of them briefly with one example pattern.	*CO3*	*PO1*	**10**

	b)	Analyze the following requirements which employees layer pattern. Map the corresponding requirements to the best suitable layer accordingly.
		   i. How the system behaves on the business rules.
		   ii. Main Programs and other components.
		   iii. tables, Index's and Search Engine usage.
		   iv. Business Process is written as business rules
		   v. System behavior for the defined business rules.
			CO3	*PO2*	**10**

		UNIT - V			
9	a)	Illustrate publisher-subscriber pattern.	*CO3*	*PO1*	**10**
	b)	Differentiate proxy patterns and observer pattern with a neat architectural representation.	*CO3*	*PO2*	**10**
		(OR)			
10	a)	Illustrate master-slave design pattern in detail.	*CO3*	*PO1*	**10**
	b)	What is an idiom? Describe various styles of idioms that can be used.	*CO3*	*PO1*	**10**

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