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

Autonomous Institute Affiliated to VTU

October 2024 Supplementary Examinations

Programme: B.E.
Branch: Computer Science and Engineering
Course Code: 23CS4PCSED
Course: Software Engineering

Semester: IV
Duration: 3 hrs.
Max Marks: 100

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

			UNIT - I	CO	PO	Marks
	1	a)	Differentiate between the following: i) Waterfall model and Spiral model ii) User requirements and system requirements iii) Software Engineering and Computer Science	CO2	PO2	**8**
		b)	The ACM and the IEEE have cooperated to produce a joint code of ethics and professional practice. Discuss the principles that software engineers must adhere to protect the welfare of the society.	CO1	PO1	**6**
		c)	Illustrate the two approaches used in evolutionary development. Analyze the advantages and disadvantages of evolutionary approach.	CO2	PO2	**6**
			OR			
	2	a)	Given below are three situations faced by a software engineer. Identify the challenge the scenario poses to the software engineer and justify your answer. i) The application supports payment option which uses a payment Gateway offered by a third party and accessed through web services. ii) The software being developed by the software engineer has to be installed on machines running different OS and a different hardware setup. iii) The project is being developed using a software process that is consuming a lot of time, which is extending the project period.	CO2	PO2	**6**
		b)	Consider an insulin pump system which includes a component for computing insulin dosage based on the sugar levels of the patient. Design a system requirements specification for this component using structured natural language.	CO3	PO3	**8**
		c)	Given below are some requirements. Identify whether they are functional requirements or non-functional requirements. Justify i) The website's home page should load in 30 seconds	CO2	PO2	**6**

			and have well defined frames.			
		ii)	The users must be able to send messages from their accounts.			
		iii)	Every user must be authenticated through their username and password.			
		iv)	Users should be given with virtual keyboard during password entry.			

UNIT – II

3	a)	Differentiate between enduring and volatile requirements. Identify any two enduring and volatile requirements for a student information management system, responsible for student registration and result generation.	CO2	PO2	6
	b)	Consider an e-Commerce application that sells laptops and mobile phones, and has both online and offline payment modes. Design a set of use cases for the above application and represent them using a use case diagram.	CO3	PO3	6
	c)	Assume that a microwave oven has the following operation states: Waiting, full power, half power, operation, enabled, disabled. Identify the different events that could occur during the oven's operation and design a state machine model for the same. Also, discuss the advantages and disadvantages of state machine models.	CO3	PO3	8

UNIT - III

4	a)	For the below given applications, identify the most appropriate control models that could be used to design them. Justify your answer and explain the same. i) A remote control system used to control the music system. ii) A weather monitoring system that gathers data from various sensors deployed around such as rain gauge, temperature sensors and moisture sensors.	CO2	PO2	6
	b)	(i) Illustrate the different methods used for identifying objects for a given system. (ii)Identify the different objects, attributes and operations for the below given system description: A weather mapping system is required to generate weather maps on a regular basis using data collected from remote, unattended weather stations and other data sources such as weather observers, balloons and satellites. Weather stations transmit their data to the area computer in response to a request from that machine. The data is collected using various instruments such as ground thermometer, anemometer, barometer and rain gauge. These instruments must be calibrated appropriately for their correct functioning. Represent these objects using UML notations.	CO3	PO3	10

		c)	Discuss the advantages of a shared repository model used for sharing project data among different sub-systems.	*CO1*	*PO1*	**4**
			UNIT - IV			
5	a)		Analyze the series of questions that need to be answered in order to develop the key project characteristics and an appropriate project plan.	*CO4*	*PO4*	**6**
	b)		Discuss the two project scheduling methods used for software development. For the below given tasks of a project design a project timeline chart. Also show the milestones.	*CO4*	*PO4*	**8**
	c)		An organization has a burdened labour rate of Rs.8000 per month and the estimated effort of 36.9 pm(person-months). Given the total FP count of 340 and $\sum(Fi) = 55$, calculate the following: i) The average productivity of the organization. ii) Function point estimate. iii) Cost per function point.	*CO1*	*PO1*	**6**
			UNIT – V			
6	a)		An organization has accepted to rapidly develop and deliver the software application to their clients. All requirements are expressed as scenarios. The clients want the design to be simple and the software development to be planned and released in smaller portions. Identify the most suitable software development method to be adopted for the above requirements. Discuss the various practices involved in this method.	*CO2*	*PO2*	**8**
	b)		Discuss the advantages of software inspections over software testing. Identify the different roles and responsibilities in the inspection process.	*CO2*	*PO2*	**6**
	c)		Path testing is a structural testing strategy whose objective is to exercise every independent execution path through a component or program. For a binary search program, design a path flow graph, where each node represents a line of code. Identify the number of independent paths to be tested using cyclomatic complexity and justify.	*CO2*	*PO2*	**6**
			OR			
7	a)		Differentiate between structural testing and functional testing.	*CO2*	*PO2*	**6**
	b)		Discuss the set of laws proposed by Lehman with respect to program evolution.	*CO1*	*PO1*	**8**

Within question 5 b), the following table appears:

Tasks	Task duration
Project planning	1 Months
Requirements Analysis	2 Months
Design	2 Months (M1)
Development (Part 1)	3 Months
Development (Part 2)	2 Months (M2)
Testing and Integration	1 Month (M3)
Deployment	15 days (M4)

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		c)	Assume that an organization has 10 legacy systems. The organization is planning the budget for the upcoming financial quarter and wants to discard some of the legacy systems so that new systems can be incorporated. Discuss the different clusters that need to be analyzed by the organization for discarding the legacy systems.	*CO4*	*PO4*	**6**

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