Question Bank

23INMCA302 - Introduction to Software Engineering

Course Type	Course Nature	CA Conduct	System	L	T	P	Credits	CA Total	CA Pass	SEE Total	SEE Pass	Total Pass
Theory	1	End Semester	Mark	3	1	0	4	40	24	60	24	50

Question Bank Summary

Sect. Part A	Sect. Part B	Easy	Med.	Chall.	Th.	Appli.
14	24	3	23	12	13	25

Part A

#	Unit	Question	COS	Categorized
1	1.1	Explain the purpose of the Requirements Engineering process by describing how it transforms stakeholder needs into well-defined software requirements and why this transformation is critical to project success.	CO1	Medium - Understanding - T
2	1.1	Predict one long-term consequence of poor requirements management in a large, evolving software system, considering frequent requirement changes.	CO1	Medium - Analysing - T
3	1.1	The Software Requirements Specification (SRS) is often referred to as a "Legal Contract" between the developer and the customer. Justify this statement by explaining how a welldefined SRS prevents "Scope Creep" during the development phase.	CO1	Medium - Analysing - T
4	1.1	Explain the FURPS quality model and briefly describe how it is used to categorize non-functional requirements in software engineering.	CO1	Easy - Understanding - T
5	1.1	Explain how requirements can be effectively gathered using structured questioning techniques such as the 5Ws and 1H. Briefly describe any one approach used to convert stakeholder goals into software requirements.	CO1	Medium - Understanding - T
6	1.1	Explain the purpose of using formal methods to record software requirements and briefly mention any two commonly used requirement recording methods.	CO1	Easy - Understanding - T
7	1.1	A software development team has completed the Software Requirements Specification (SRS) for a new application. During review, some members focus on checking whether the requirements are written correctly and consistently, while others focus on confirming that the documented requirements truly reflect what users need.Based on this situation, distinguish between Verification and Validation in the Requirements Engineering process by explaining the distinct goal of each activity	CO1	Challenging - Analysing - A
8	1.1	Predict one possible consequence if integration testing is skipped while moving directly from unit testing to system testing.	CO1	Medium - Analysing - A
9	1.2	A project manager estimates a software system size as 400 KLOC. Analyze the effort and development time required for the project if it is developed as an Organic, Semi-detached, and Embedded system using the COCOMO cost estimation model.	CO1	Medium - Applying - A
10	1.2	A small software project is estimated to have a size of 10 KLOC. Using the Basic COCOMO model for an Organic project, state the formula used to estimate effort in person-months and specify the values of the constants a and b applicable to this project type	CO1	Medium - Applying - A
11	1.2	A Project Manager’s report indicates that 40% of the initial budget was consumed during the first 10% of the project timeline due to "unforeseen feature requests." Interpret this data in the context of the Planning Phase. What does this suggest about the original Software Scope Document?	CO1	Challenging - Analysing - A

12	1.2	Explain why empirical estimation techniques such as Expert Judgment, Delphi Technique, and COCOMO are widely used in software project estimation instead of relying only on intuition.	CO1	Easy - Understanding - T
13	2.2	Discuss and analyze the advantages and disadvantages of three different software process models commonly used in software development, such as Waterfall, Agile, and Spiral models, and explain how each model impacts the overall software development lifecycle.	CO2	Medium - Analysing - T
14	2.2	A project begins with stable requirements, while another project expects frequent changes. Briefly compare how predictive and agile models respond to such differences in requirement stability.	CO2	Challenging - Understanding - A

Part B

#	Unit	Question	COS	Categorized
1	1.1	Illustrate the Software Development Life Cycle (SDLC) via a detailed diagram. Describe the feedback loops between the "Testing" and "Development" phases. Why is it more cost-effective to identify an error in the "Requirements Gathering" phase than in the "Deployment" phase?	CO1	Medium - Analysing - T
2	1.1	Evaluate the effectiveness of different goal-to-requirement conversion approaches—Copy Existing Systems, Clairvoyance, and Brainstorming—in comparison with structured techniques like 5W and H. Discuss their strengths and limitations in real-world requirement engineering.	CO1	Challenging - Evaluating - A
3	1.1	A software organization experiences frequent misunderstandings between stakeholders and developers due to poorly documented requirements. Analyze the importance of systematic requirement recording methods and explain different techniques used to record requirements, highlighting how each method improves clarity and traceability.	CO1	Medium - Analysing - A
4	1.1	A company is designing a large-scale enterprise application.Analyze the key items that should be specified in the High-Level Design and explain how each contributes to system quality and maintainability.	CO1	Medium - Analysing - A
5	1.1	You are assigned to prepare a High-Level Design for a software system. Design an high level design outline that includes hardware requirements, security considerations, database design, reports, configuration data, training needs, and other system outputs, and justify how this design supports smooth development and deployment.	CO1	Challenging - Creating - A
6	1.1	A software product is developed in modules and integrated gradually. Analyze the four levels of testing—Unit, Integration, System, and Acceptance testing—by explaining the objective of each level and how they collectively ensure software reliability.	CO1	Medium - Applying - A
7	1.2	A software organization is planning projects of varying sizes and complexities. Using the COCOMO cost estimation model, estimate project effort and explain the different types of COCOMO models. Analyze how each model is suitable for different project complexities and discuss the factors that influence effort estimation in each case.	CO1	Medium - Applying - A
8	1.2	A software development team is planning a project with an estimated size of 10 KLOC. Using the Basic COCOMO model, estimate the effort in person-months for an organic project. Recalculate the effort if the project is classified as semi-detached. Analyze how project type influences effort estimation and justify the importance of selecting the correct COCOMO model.	CO1	Medium - Applying - A
9	1.2	A project manager wants to predict software development cost using an algorithmic estimation approach. Examine the algorithmic cost estimation technique used in software engineering, analyze its effectiveness in forecasting project expenses, and outline the stages involved in this estimation process.	CO1	Challenging - Analysing - A
10	1.2	An organization plans to skip formal requirements validation to accelerate development. Evaluate this decision by discussing the risks involved and explaining how validation activities contribute to requirement correctness and stakeholder satisfaction.	CO1	Medium - Applying - A
11	1.2	Evaluate the effectiveness of Expert Judgment, Delphi Technique, and COCOMO as empirical estimation techniques. Discuss their strengths and limitations and justify situations where each technique is most suitable.	CO1	Challenging - Evaluating - A
12	1.2	You are asked to design an **effort estimation strategy** for a software company. Design a combined approach using **Expert Judgment, Delphi Technique, and COCOMO**, and justify how this strategy improves estimation accuracy and decision-making.	CO1	Challenging - Creating - A

13	2.1	Critically evaluate the statement that the Incremental Model is more suitable than the Waterfall Model for most business, e-commerce, and personal systems, providing appropriate justification with examples	CO2	Medium - Evaluating - T
14	2.1	A development team must choose between Agile and Spiral models for a complex project. Compare and contrast these two models in terms of process flow, flexibility, and risk handling. Illustrate your explanation using well-labeled diagrams	CO2	Medium - Analysing - T
15	2.1	A team working on a documentation heavy project is evaluating different Waterfall model variations. Explain the various Waterfall model variants with examples, highlighting their design, workflow, advantages, and limitations. Support your explanation with a labeled diagram	CO2	Medium - Understanding - T
16	2.1	A government project requires a highly structured development approach. Using a labeled diagram, explain the structure and process flow of suitable Waterfall model variants, and outline their key advantages and limitations for such projects.	CO2	Medium - Applying - A
17	2.1	Explain in detail the four phases of the Spiral Model and analyze how each phase contributes to managing risks throughout the software development lifecycle. Discuss how the Spiral Model is suitable for large, high-risk projects, and provide an example scenario where this model would be the most effective choice	CO2	Medium - Analysing - T
18	2.1	You are managing a software project where requirements are expected to change frequently due to evolving customer needs. Which Software Engineering model would you choose for this project, and justify your choice with appropriate reasoning.	CO2	Medium - Analysing - A
19	2.1	A healthcare technology company is tasked with developing an AI powered patient monitoring system for hospitals. The project involves frequent changes in requirements because doctors, nurses, and technical staff continue to refine what the system should monitor and how alerts should be generated. The system also includes significant risks related to patient safety, real-time data processing, and regulatory compliance. Describe how the four phases of the Spiral Model will guide the development process. Analyze the role of each phase in managing uncertainties and mitigating risks associated with the project. Finally, justify why the Spiral Model is an ideal fit for this evolving, high-risk system, referencing elements from the scenario. (6) ---	CO2	Challenging - Evaluating - A
20	2.1	A healthcare technology company is tasked with developing an AI powered patient monitoring system for hospitals. The project involves frequent changes in requirements because doctors, nurses, and technical staff continue to refine what the system should monitor and how alerts should be generated. The system also includes significant risks related to patient safety, real-time data processing, and regulatory compliance. Describe how the four phases of the Spiral Model will guide the development process. Analyze the role of each phase in managing uncertainties and mitigating risks associated with the project. Finally, justify why the Spiral Model is an ideal fit for this evolving, high-risk system, referencing elements from the scenario. (6) ---	CO2	Challenging - Evaluating - A
21	2.1	Identify the appropriate software engineering models for each of the following characteristics and briefly describe each model: (i) Overlapping development phases. (ii) One-to-one correspondence between development and testing activities. (iii) A model that emphasizes risk identification and management	CO2	Challenging - Analysing - A
22	2.1	You are tasked with designing a software development approach for a mission-critical application. Design an SDLC-based workflow by mapping software engineering principles to each SDLC phase and justify how this design avoids software crisis situations.	CO2	Medium - Applying - A
23	2.1	A government organization plans to develop a payroll system with clearly defined requirements and minimal expected changes. Analyze how the Waterfall model would be applied to this project by explaining each phase of the model. Also analyze the advantages and limitations of using Waterfall in this scenario.	CO2	Medium - Applying - A
24	2.2	You are assigned to select an appropriate development approach for multiple projects with varying requirement stability and delivery expectations. Propose a decision framework that maps predictive, iterative, incremental, and agile models to suitable project scenarios, and justify your choices.	CO2	Challenging - Creating - A