# SRM VALLIAMMAI ENGINEERING COLLEGE

SRM Nagar, Kattankulathur – 603 203

## DEPARTMENT OF

## COMPUTER SCIENCE AND ENGINEERING

## QUESTION BANK



## ME CSE - II SEMESTER

## PCP101- SOFTWARE TESTING AND QUALITY ASSURANCE

## Regulation – 2023

## Academic Year 2024 – 2025 (Even Semester)

*Prepared by*

## Mrs. A.LALITHA, Assistant Professor (Sel. G) / CSE

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## QUESTION BANK

**SUBJECT     : PCP101-SOFTWARE TESTING AND QUALITY ASSURANCE**

**YEAR/ SEM  :ME CSE - I / II SEM**

| UNIT I - I N T R O D U C T I O N |
|---|
| Introduction to Software Quality - Challenges - Objectives - Quality Factors - Components of SQA - Contract Review - Development and Quality Plans - SQA Components in Project Life Cycle - SQA Defect Removal Policies - Reviews. |

| PART – A | | | |
|---|---|---|---|
| Q. No | Questions | BT Level | Competence |
| 1 | Show, how you will measure software quality. | Apply | BTL 3 |
| 2 | Quote Quality Audit. | Remember | BTL1 |
| 3 | Arrange the various quality factors of Software. | Analyze | BTL 4 |
| 4 | Create the Quality Framework. | Create | BTL 6 |
| 5 | Assess Verification. | Evaluate | BTL 5 |
| 6 | Differentiate quality control and quality assurance. | Analyze | BTL 4 |
| 7 | Analyze the differences between Verification and Validation. | Analyze | BTL4 |
| 8 | Demonstrate four topics addressed by ISO 9001:2000. | Apply | BTL 3 |
| 9 | Discuss open bug. | Understand | BTL2 |
| 10 | Estimate, what are the Risk levels in Bug Fixing?. | Understand | BTL2 |
| 11 | Tell the methods to measure defects and manage it. | Remember | BTL 1 |
| 12 | Generalize the measurement techniques available in defect management. | Create | BTL 6 |
| 13 | Label any two IEEE standards of quality. | Remember | BTL 1 |
| 14 | Define Quality Assurance and tell its uses. | Remember | BTL 1 |
| 15 | What are techniques available for Quality process? | Understand | BTL 2 |
| 16 | What is a quality metric? Give any two examples of quality metrics. | Understand | BTL 2 |
| 17 | List the origins of defects. | Remember | BTL 1 |

| 18 | Define the term 'cost of Quality'. | Remember | BTL 1 |
|---|---|---|---|
| 19 | Classify the elements of Quality assurance. | Apply | BTL 3 |
| 20 | Recall basic principles of testing. | Evaluate | BTL 5 |
| 21 | What is Software Quality? | Remember | BTL1 |
| 22 | List Factors of Software Quality | Remember | BTL1 |
| 23 | List common challenges of Software Quality | Remember | BTL1 |
| 24 | Analyses SQA component | Analyze | BTL 4 |

**PART-B**

| 1 | (i)**Analyze** Quality cost of software engineering process in detail? <br> (ii) Describe the Quality Framework with suitable diagram? | Analyze | BTL 4 |
|---|---|---|---|
| 2 | **Illustrate** about: - <br> (i)Verification techniques with an example. <br> (ii)Validation Strategies available in testing process. | Apply | BTL 3 |
| 3 | i)**Discuss** with examples the validation checks and verification checks in software process. <br> ii) What are the main objectives of quality control? Discuss | Understand | BTL 2 |
| 4 | **Describe** in detail about: - <br> (i)Defect taxonomy. <br> (ii)defect management. | Remember | BTL 1 |
| 5 | **Discriminate** the measurements available in defect management process. | Evaluate | BTL 5 |
| 6 | **Explain** in detail about the statistics of defects in testing process. | Understand | BTL2 |
| 7 | **Explain** the various Quality Assurance methods in detail. | Remember | BTL 1 |
| 8 | **Discuss** about the various IEEE standards for Software Quality in detail. | Understand | BTL 2 |
| 9 | **Describe** various Quality control processes in detail with suitable example. | Remember | BTL 1 |
| 10 | **Examine** how software quality assurance is ensured in a software development system. | Remember | BTL 1 |
| 11 | **Compose** the importance of Quality assurance in Testing process with the help of suitable examples. | Create | BTL 6 |
| 12 | (i) Discriminate how the defect leads to failure in project development. <br> (ii) **Recommend** the check lists to prevent the projects from defects. | Evaluate | BTL 5 |
| 13 | i) **Explain** about the different software quality models. <br> ii) Explain in detail about View of Quality. | Analyze | BTL 4 |
| 14 | **Illustrate** briefly about the software quality attributes with respect to <br> i) product operation and product transition. <br> ii) product revision. | Apply | BTL 3 |
| 15 | **Develop** software quality policies for a college automation software process. | Create | BTL 6 |

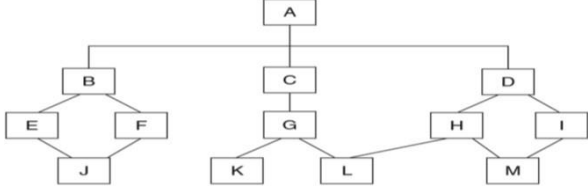| 16 | **Assess** the purpose of process and product quality assurance? Why quality assurance for process is important? Discuss with examples. | Evaluate | BTL 5 |
|---|---|---|---|
| 17 | **Create** a Verification and validation process for an automobile software process to check the product quality. | Create | BTL 6 |

| UNIT II - TESTING METHODOLOGIES |
|---|
| Basics of Software Testing - Test Generation from Requirements - Finite State Models - Combinatorial Designs - Test Selection, Minimization and Prioritization for Regression Testing - Test Adequacy, Assessment and Enhancement. |

| PART – A | | | |
|---|---|---|---|
| Q. No | Questions | BT Level | Competence |
| 1 | Describe the difference between black-box and white-box testing techniques? | Remember | BTL 1 |
| 2 | If a program passes all the black-box tests, it means that the program should work properly. Then, in addition to black-box testing, why do you need to perform white-box testing? | Create | BTL 6 |
| 3 | Discuss the advantages and disadvantages of top-down and bottom-up testing. | Understand | BTL2 |
| 4 | What is software quality? | Remember | BTL 1 |
| 5 | Explain five views of quality. | Analyze | BTL 4 |
| 6 | Develop Check-in Request Form | Create | BTL 6 |
| 7 | What are the four key concepts in functional testing? | Create | BTL 1 |
| 8 | Define boundary value analysis. | Remember | BTL 1 |
| 9 | Explain data integrity and data conversion. | Evaluate | BTL 5 |
| 10 | Describe acceptance test execution. | Understand | BTL2 |
| 11 | Examine the outline of useful framework for preparing an SIT plan. | Apply | BTL 3 |
| 12 | Can an incorrect, that is, faulty, software system be considered to be reliable? Justify your answer. | Evaluate | BTL 5 |
| 13 | Why are acceptance test cases executed in two phases? | Understand | BTL2 |
| 14 | Who should define the acceptance quality attribute criteria of a test project. Justify your answer? | Remember | BTL 1 |
| 15 | Discuss the advantages and disadvantages of customer involvement in testing | Understand | BTL2 |
| 16 | What are the objectives of system testing? | Remember | BTL 1 |
| 17 | Explain criteria must the system meet in order to be acceptable? | Analyze | BTL 4 |
| 18 | Analyse what is meant by DoS attack? | Analyze | BTL 4 |
| 19 | Show the differences between UAT and BAT? | Apply | BTL 3 |
| 20 | Examine how the idea of software reliability can uncover missing requirements. | Apply | BTL 3 |
| 21 | What is Software Testing? | Remember | BTL 1 |
| 22 | Examine Benefits of Software Testing | Apply | BTL 3 |
| 23 | Discuss Finite-state machines | Understand | BTL 2 |
| 24 | Explain Regression Testing in Software Engineering | Analyze | BTL 4 |

## PART-B

| | | | |
|---|---|---|---|
| 1. | Discuss top-down and bottom-up approaches to integration testing. | Understand | BTL2 |
| 2. | Describe the circumstances under which you would apply white-box testing, back-box testing, or both techniques. | Remember | BTL 1 |
| 3. | Develop an integration test plan for your current test project. | Create | BTL 6 |
| 4. | Explain about<br>  i.    Functional testing.<br>  ii.   Testing a function in context. | Analyze | BTL 4 |
| 5. | Explain<br>  i.    Framework for Entry Criteria to Start System Integration<br>  ii.   Framework for System Integration Exit Criteria | Evaluate | BTL 5 |
| 6. | Describe<br>  i.    Built in testing<br>  ii.   Functional testing | Remember | BTL 1 |
| 7. | Explain briefly about test plan for system integration. | Analyze | BTL 4 |
| 8. | Describe in brief notes<br>  i.    Hardware Design Verification Tests,<br>  ii.   Hardware and Software Compatibility Matrix | Understand | BTL2 |
| 9. | What is functional testing and discuss about testing a function in context. | Remember | BTL 1 |
| 10 | Analyze<br>i.     Guidelines for BVA<br>ii.    Steps in developing test cases using the decision table technique | Analyze | BTL 4 |
| 11 | For the current software project, you are working on, answer the following questions:<br> i. List the quality attributes most important to your project. In order to focus on the business functional tests, select no more than six quality attributes from this list as the most functional critical for your system.<br>ii. Why are the selected functional criteria the most critical ones for your system? | Remember | BTL 1 |
| 12 | Examine how the parameters of the basic model and the logarithmic model can be determined. | Apply | BTL 3 |
| 13 | Discuss the relationship between the correctness and the reliability quality attributes of a software system. | Understand | BTL2 |
| 14 | Examine why it may not be possible to satisfy some of the assumptions used in the two models of software reliability. | Apply | BTL 3 |
| 15 | Discuss the similarity between the decision table – based and category partition – based testing methodology. | Create | BTL 6 |
| 16 | Access for your current test project, develop a taxonomy of system tests that you plan to execute against the implementation | Evaluate | BTL 5 |

| 17 | Using the module hierarchy given in Figure, show the orders of module integration for the top-down and bottom-up integration approaches. Estimate the number of stubs and drivers needed for each approach. Specify the integration testing activities that can be done in parallel, assuming you have three SIT engineers. Based on the resource needs and the ability to carry out concurrent SIT activities, which approach would you select for this system and why?  | Create | BTL 6 |
|---|---|---|---|

## UNIT III - TEST STRATEGIES

Testing Strategies - White Box and Black Box Approach - Integration Testing - System and Acceptance Testing - Performance Testing - Regression Testing - Internationalization Testing - Ad-hoc Testing - Website Testing - Usability Testing - Accessibility Testing.

### PART – A

| Q. No | Questions | BT Level | Competence |
|---|---|---|---|
| 1 | Discuss the differences between configuration, compatibility, and interoperability testing? | Understand | BTL2 |
| 2 | Brief the differences between performance, stress, and scalability testing? | Analyze | BTL 4 |
| 3 | What are the differences between load testing and stress testing? | Remember | BTL 1 |
| 4 | What is the difference between performance and speed? | Create | BTL 6 |
| 5 | Describe security testing. | Understand | BTL2 |
| 6 | What are the similarities and differences between quality assurance (QA) and safety assurance (SA)? | Remember | BTL 1 |
| 7 | Explain state-oriented model. | Evaluate | BTL 5 |
| 8 | List the types of test architectures. | Remember | BTL 1 |
| 9 | What is meant by Testing with State Verification? | Create | BTL 6 |
| 10 | Discuss the importance of regression testing. | Understand | BTL2 |
| 11 | Define finite-state model. | Remember | BTL 1 |
| 12 | Analyse the Methodology for Testing with State Verification. | Analyze | BTL 4 |
| 13 | Examine requirement identification. | Apply | BTL 3 |
| 14 | What are the factors considered during test design? | Remember | BTL 1 |
| 15 | Discuss briefly about coverage metrics. | Understand | BTL2 |
| 16 | Define test case design effectiveness. | Remember | BTL 1 |
| 17 | Summarize the differences between software testability and reliability? What is more important in a software: high testability or | Evaluate | BTL 5 |
| 18 | Explain the difference between coverage metrics and traceability matrix. | Analyze | BTL 4 |
| 19 | Why is it important to assign both severity and priority levels to a defect? | Apply | BTL 3 |
| 20 | Examine the difference between causal analysis and statistical analysis. | Apply | BTL 3 |

| 21 | Define Software Testing Strategies | Remember | BTL 1 |
|---|---|---|---|
| 22 | Describe black-box testing | Understand | BTL 2 |
| 23 | Describe white-box testing | Understand | BTL 2 |
| 24 | Examine the comparison of black box and White Box testing | Apply | BTL 3 |

## PART - B

| | | | |
|---|---|---|---|
| 1 | (i) What are zero-day attacks?<br>(ii) Discuss its significance with respect to security testing. | Understand | BTL 2 |
| 2 | Discuss briefly about various system test categories. | Understand | BTL2 |
| 3 | (i) What are the differences between safety and reliability?<br>(ii) What are the differences between safety testing and security | Remember | BTL 1 |
| 4 | (i) Discuss the importance of regression testing when developing a new software release.<br>(ii) What test cases from the test suite would be more useful in software testing | Understand | BTL2 |
| 5 | (i) Examine the differences between performance, stress, and scalability testing?<br>(ii) Examine the differences between load testing and stress testing? | Apply | BTL 3 |
| 6 | Examine<br>(i) State-Oriented Model.<br>(ii) Finite-State Machine | Apply | BTL 3 |
| 7 | Describe briefly about test generation from FSM models. | Remember | BTL 1 |
| 8 | Develop state transition model for any two examples. | Create | BTL 6 |
| 9 | Explain in detail about test architectures.<br>(i) Local architecture.<br>(ii) Distributed architecture | Evaluate | BTL 5 |
| 10 | Describe<br>(i) Transition Tour Method,<br>(ii) Testing with State Verification. | Remember | BTL 1 |
| 11 | Explain about the following test architectures.<br>(i) Coordinated architecture.<br>(ii) Remote architecture. | Analyze | BTL 4 |
| 12 | Explain in detail about modelling a Test Design Process, Test Design Preparedness metric and test case design effectiveness. | Analyze | BTL 4 |
| 13 | Explain about the following<br>(i) Defect Causal Analysis,<br>(ii) Beta testing | Analyze | BTL 4 |
| 14 | Describe briefly about<br>(i) system test execution- Modelling Defects,<br>(ii) Metrics for Monitoring Test Execution. | Remember | BTL 1 |
| 15 | For your current test project, develop a taxonomy of system tests that you plan to execute against the implementation. | Create | BTL 6 |
| 16 | Explain all categories of system test architectures with neat diagrams. | Evaluate | BTL 5 |
| 17 | Develop a set of beta release criteria for your current test project. | Create | BTL 6 |

## UNIT IV - TEST AUTOMATION AND MANAGEMENT

Test plan - Management - Execution and Reporting - Software Test Automation - Automated Testing tools - Hierarchical Models of Software Quality - Configuration Management - Documentation Control.

### PART – A

| Q. No | Questions | BT Level | Competence |
|-------|-----------|----------|------------|
| 1 | Discuss the five different views of software quality. | Understand | BTL2 |
| 2 | Show how one can measure the user's view of software quality. | Apply | BTL 3 |
| 3 | Define manufacturer's view of software quality. | Remember | BTL 1 |
| 4 | Explain how one can measure the manufacturer's view of software Quality. | Analyze | BTL 4 |
| 5 | Examine McCall's quality factors. | Apply | BTL 3 |
| 6 | Explain briefly about McCall's quality criteria. | Evaluate | BTL 5 |
| 7 | How do measure software quality? | Remember | BTL 1 |
| 8 | What is mean by Quality? | Remember | BTL 1 |
| 9 | Develop the people's quality expectations for software systems. | Create | BTL 6 |
| 10 | What is the relationship between quality, correctness, defects, and quality attributes? | Create | BTL 6 |
| 11 | List the various software quality models. | Remember | BTL 1 |
| 12 | What is the relationship between quality, quality assurance, and quality engineering? | Remember | BTL 1 |
| 13 | Discuss the difference between testing and quality? | Understand | BTL2 |
| 14 | Define software quality. | Remember | BTL 1 |
| 15 | Give the quality factors based on McCall's quality model. | Understand | BTL2 |
| 16 | Explain people's quality expectations. | Analyze | BTL 4 |
| 17 | Discuss functionality and reliability. | Understand | BTL2 |
| 18 | Assess Error, fault, failure, and defect. | Evaluate | BTL 5 |
| 19 | Examine the quality factors of McCall'c model. | Apply | BTL 3 |
| 20 | Explain the factors involved in ISO 9126 model. | Analyze | BTL 4 |
| 21 | How To Create a Test Plan | Understand | BTL 2 |
| 22 | List Automated tools for testing | Remember | BTL 1 |
| 23 | Explain Boehm's Software Quality Model | Remember | BTL 1 |
| 24 | Summarise Documentation control | Create | BTL 6 |

### PART-B

| | | | |
|---|---|---|---|
| 1 | Compare McCall's quality model with the ISO 9126 quality model. | Analyze | BTL 4 |
| 2 | Describe briefly about<br>  i.   McCall's categorization of quality factors<br>  ii.  McCall's quality criteria. | Remember | BTL 1 |
| 3 | Explain the ISO 9126 quality characteristics. | Evaluate | BTL 5 |
| 4 | Discuss ISO 9000:2000 Fundamental document for quality assurance. | Understand | BTL2 |

| 5 | Give any two software quality models and explain with neat diagram. | Understand | BTL2 |
|---|---|---|---|
| 6 | Describe how one can measure the user's view of software quality. | Understand | BTL2 |
| 7 | State some difficulties in applying the McCall and ISO 9126 quality models. | Remember | BTL 1 |
| 8 | Define the following terms and give some concrete examples:<br>   i.   Defect, error, fault failure, accident.<br>   ii.   What is the relationship among them and What about (software) bugs? | Remember | BTL 1 |
| 9 | Briefly explain McCall's categorization of quality factors and quality criteria. | Analyze | BTL 4 |
| 10 | Develop ISO 9126 quality model. | Create | BTL 6 |
| 11 | Examine<br>   i.   measure the manufacturer's view of software quality.<br>   ii.   five different views of software quality | Apply | BTL 3 |
| 12 | Briefly explain the ISO 9001:2000 Requirements document for quality assurance. | Analyze | BTL4 |
| 13 | Describe<br>   i.   ISO 9126 quality model<br>   ii.   ISO 9001:2000 | Remember | BTL 1 |
| 14 | Examine McCall's quality factors model with a neat diagram | Apply | BTL 3 |
| 15 | What is your view of software quality? What is your company's definition of quality? | Create | BTL 6 |
| 16 | Explain McCall's categorization of quality factors into three quality criteria. | Evaluate | BTL 5 |
| 17 | Develop the ISO 9001:2000 (Requirements) document for quality assurance. | Create | BTL 6 |

## UNIT V - SOFTWARE QUALITY ASSURANCE

Project progress control - costs - quality management standards - project process standards - management and its role in SQA - SQA unit.

### PART – A

| Q. No | Questions | BT Level | Competence |
|---|---|---|---|
| 1 | What is quality assurance? | Remember | BTL 1 |
| 2 | What are the different types of QA activities? | Remember | BTL 1 |
| 3 | Define QA strategy. | Remember | BTL 1 |
| 4 | Define process maturity levels and discuss their relationship to the quality. | Remember | BTL 1 |
| 5 | Discuss the purpose of root cause analysis | Understand | BTL2 |
| 6 | What is the difference between reliability and safety? | Create | BTL 6 |
| 7 | Define the terms and concepts: accident, hazard. | Remember | BTL 1 |
| 8 | Explain hazard analysis. | Evaluate | BTL 5 |
| 9 | What is the impact of fault tolerance on reliability and safety | Create | BTL 6 |

| 10 | Differentiate decision trees and fault trees. | Analyze | BTL 4 |
|---|---|---|---|
| 11 | Define recovery blocks. | Remember | BTL 1 |
| 12 | Explain what is meant by FSM.. | Evaluate | BTL 5 |
| 13 | Discuss fault tolerance. | Understand | BTL2 |
| 14 | Explain fault containment. | Analyze | BTL 4 |
| 15 | Apply the areas that we can focus to ensure version independence? | Apply | BTL 3 |
| 16 | Show What is the primary motivation for risk identification? | Apply | BTL 3 |
| 17 | Examine eisks related to software projects from both the internal | Apply | BTL 3 |
| 18 | Differentiate decision trees and tree-based models? | Understand | BTL2 |
| 19 | Explain are the modelling techniques to perform multi-analysis? | Analyze | BTL 4 |
| 20 | Give the relative advantages and disadvantages between tree-based modelling. | Understand | BTL2 |
| 21 | Write components of project progress control | Remember | BTL 1 |
| 22 | Give software quality models | Remember | BTL 1 |
| 23 | Write Advantage of root cause analysis | Remember | BTL 1 |
| 24 | Develop the relative advantages and disadvantages of tree-based | Create | BTL 6 |

**PART-B**

| 1. | How would the applicability of different QA alternatives be different when other software processes are used? | Analyze | BTL 4 |
|---|---|---|---|
| 2. | Compare both the entry and exit levels of quality for individual QA alternatives. That is, what is the defect level before and after applying these specific QA alternatives. | Evaluate | BTL 5 |
| 3. | Explain briefly about<br>  i. Fault tolerance<br>  ii. Fault containment | Analyze | BTL 4 |
| 4. | Describe briefly about<br>  i. Measurement of direct quality<br>  ii. Measurement of indirect quality | Remember | BTL 1 |
| 5. | Develop the Algorithm for tree-based model construction. | Create | BTL 6 |
| 6. | Discuss in detail about fault tolerance with<br>  i. Recovery blocks<br>  ii. N-version programming | Understand | BTL2 |
| 7. | Discuss the algorithm<br>  i. Optimal set reduction<br>  ii. Pattern recognition | Understand | BTL2 |
| 8. | Describe in detail about NVP basic technique and implementation. | Understand | BTL2 |
| 9. | Describe the advantage and disadvantages of the following<br>  i. Tree-based modelling<br>  ii. Optimal set reduction. | Remember | BTL 1 |
| 10. | Describe in detail about defect management based on fault tolerance. | Remember | BTL 1 |
| 11. | Apply Tree-based defect model for a commercial product. | Apply | BTL 3 |

| 12. | Explain risk identification for classified defect data. | Analyze | BTL 4 |
|---|---|---|---|
| 13. | i.    What are the characteristics of web problems?<br>ii.   Describe briefly about FSMs for web testing. | Remember | BTL 1 |
| 14 | Examine in detail about the case study: FSM-based testing of web-based applications. | Apply | BTL 3 |
| 15 | Explain the purpose of root cause analysis? Does it have a strong impact on  your software quality? | Evaluate | BTL 5 |
| 16 | Explain in detail with neat diagrams<br>i.    Fault tolerance<br>ii.   Fault containment | Evaluate | BTL 5 |
| 17 | Consider the specific application environment in your organization, how would different QA alternatives compare? In addition, is cost a critical factor in your market segment? How would it affect the choice of different QA alternatives for your products? | Create | BTL 6 |