IT8076	SOFTWARE TESTING	LTPC 3003

UNIT I INTRODUCTION 9

Testing as an Engineering Activity – Testing as a Process – Testing Maturity Model- Testing axioms – Basic definitions – Software Testing Principles – The Tester‘s Role in a Software Development Organization – Origins of Defects – Cost of defects – Defect Classes – The Defect Repository and Test Design –Defect Examples- Developer/Tester Support of Developing a Defect Repository.

UNIT II TEST CASE DESIGN STRATEGIES 9

Test case Design Strategies – Using Black Box Approach to Test Case Design – Boundary Value Analysis – Equivalence Class Partitioning – State based testing – Cause-effect graphing – Compatibility testing – user documentation testing – domain testing – Random Testing – Requirements based testing – Using White Box Approach to Test design – Test Adequacy Criteria – static testing vs. structural testing – code functional testing – Coverage and Control Flow Graphs – Covering Code Logic – Paths – code complexity testing – Additional White box testing approaches- Evaluating Test Adequacy Criteria.

UNIT III LEVELS OF TESTING 9

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Subject Code: IT8076 Year/Semester :III/06

Subject Name : Software Testing Subject Handler: Ms.R.Revathi

UNIT I INTRODUCTION	
Testing as an Engineering Activity – Testing as a Process – Testing axioms – Basic definitions – Software Testing Principles – The Testers Role in a Software Development Organization – Origins of Defects – Cost of defects – Defect Classes – The Defect Repository and Test Design – Defect Examples – Developer/Tester Support of Developing a Defect Repository	
PART* A	
Q.NO	**QUESTIONS**
1.	**Define Software Engineering.**(BTL1) Software Engineering is a discipline that produces error free software with in a time and budget.
2.	**Define software Testing.(AU April/May 2016)**(BTL1) Testing can be described as a process used for revealing defects in software, and for establishing that the software has attained a specified degree of quality with respect to selected attributes.
3.	**List the elements of the engineering disciplines.**(BTL1) • Basic principles • Processes • Standards • Measurements • Tools • Methods • Best practices • Code of ethics • Body of knowledge
4.	**Define process in the context of software quality.**(BTL1) "Process" in the software engineering domain, is a set of methods, practices, Standards, documents, activities, polices, and procedures that software engineers use to develop and maintain a software system and its associated artifacts, such as project and test plans, design documents, code, and manuals
5.	**Define the term Testing**(BTL1) • Testing is generally described as a group of procedures carried out to evaluate some aspect of a piece of software. • Testing can be described as a process used for revealing defects in software, and for

	establishing that the software has attained a specified degree of quality with respect to selected attributes.
6.	**Interpret the term Debugging or fault localization.**(BTL1) Debugging or fault localization is the process of • Locating the fault or defect • Repairing the code, and • Retesting the code.
7.	**List the levels of TMM.(AU Nov/Dec2016)**(BTL1) The testing maturity model or TMM contains five levels. They are • Level1: Initial • Level2: Phase definition • Level3: Integration • Level4: Management and Measurement • Leval5: Optimization /Defect prevention and Quality Control.
8.	**List the members of the critical groups in a testing process.** (BTL1) • Manager • Developer/Tester • User/Client
9.	**Define Error.**(BTL1) An error is mistake or misconception or misunderstanding on the part of a software developer.
10.	**Define Faults (Defects).(AU Nov/Dec2016)**(BTL1) A fault is introduced into the software as the result of an error. It is an anomaly in the software that may cause nit to behave incorrectly, and not according to its specification.
11.	**Define failures.(AU NOV/DEC 2016)** (BTL5) A failure is the inability of a software or component to perform its required functions within specified performance requirements.
12	**What is the need of TMM?** Test maturity model gives the level at which an organization stands in meeting Testing criterias.
13	**Define Validation.**(BTL1) Validation is the process of evaluating a software system or component during, orat the end of, the development cycle in order to determine whether it satisfies specifiedrequirements.
14	**Explain in short about Verification.**(BTL1) Verification is the process of evaluating a software system or component to determine whether the product of a given development phase satisfy the conditions imposed at the start of that phase.
15	**Programmer A and Programmer B are working on a group of interfacing modules. Programmer A tends to be a poor communicator and does not get along well with Programmer B. Due to this situation, what types of defects are likely to surface in these interfacing modules?**(BTL3) • Communication defects.

16	**List the stages in Software Engineering** (BTL1) • Requirement Analysis • Design • Coding • Deployment • Delivery
17	**Define Test Cases.** (BTL1) A test case in a practical sense is a test related item which contains the following information. **A set of test inputs.** These are data items received from an external source by the code under test. The external source can be hardware, software, or human. **Execution conditions.** These are conditions required for running the test, for example, a certain state of a database, or a configuration of a hardware device. **Expected outputs.** These are the specified results to be produced by the code under test.
18.	**Define Test Oracle** (BTL1) Test Oracle is a document, or a piece of software that allows tester to determine whether a test has been passed or failed.
19.	**Define Test Bed.(AU Nov/Dec 2017)**(BTL1) A test bed is an environment that contains all the hardware and software needed to test a software component or a software system.
20.	**Define Software Quality.** (BTL1) Quality relates to the degree to which a system, system component, or process meets specified requirements. Quality relates to the degree to which a system, system component, or process meets Customer or user needs, or expectations.
21.	**List the Quality Attributes.**(BTL1) • Correctness • Reliability • Usability • Integrity • Portability • Maintainability • Interoperability
22.	**Define SQA group.**(BTL1) The software quality assurance (SQA) group is a team of people with the necessary training and skills to ensure that all necessary actions are taken during the development process so that the resulting software confirms to established technical requirements.
23.	**Explain the work of SQA group.**(BTL2) Testers to develop quality related policies and quality assurance plans for each project. The group is also involved in measurement collection and analysis, record keeping, and Reporting. The SQA team members participate in reviews and audits, record and track Problems, and verify that corrections have been made.
24.	**Define reviews.** (BTL1) A review is a group meeting whose purpose is to evaluate a software artifact or a set of Software artifacts. Review and audit is usually conducted by a SQA group.
25.	**List the sources of Defects or Origins of defects.** **(AU April/May 2017)**(BTL1) • Education • Communication

	• Oversight • Transcription • Process.
	PART *B
1	**Discuss about the role of process in software quality (Testing). (13M)** BTL2 **Answer: page : 1 - Notes** **Process** – Creates an impact in the system.(2M) **Testing as a process:** Set of activities well planned in advance.(2M) **Figure** - Components of an engineered process.(2M) (Pg no: 2 in notes) **Explanation:** **Testing Maturity model TMM** (4M) • Level 1: Initial • Level 2: Phase Definition • Level 3: Integration • Level 4: Management and Measurement • Level 5: Optimization/Defect Prevention/Quality control **Verification and Validation Model**(3M) • **Diagram :** Pg no:2 in notes • **Verification:** Checks if software confirm to Functional and Non – Functional requirements • **Validation:** Confirms if Software meets user requirements.
2	**Draw the 5-level structure of the testing maturity model ,discuss about it.(13M)** BTL2 **Answer : page : 9 - Notes** **Test maturity model :** Gives an overview of the activities done in each level of testing. **Explanation: Testing Maturity model TMM** (4M) • Level 1: Initial • Level 2: Phase Definition • Level 3: Integration • Level 4: Management and Measurement • Level 5: Optimization/Defect Prevention/Quality control **Verification and Validation Model**(3M) • **Diagram :** Pg no:2 in notes (4M) • **Verification:** Checks if software confirm to Functional and Non – Functional requirements • **Validation:** Confirms if Software meets user requirements.
3	**Explain in detail about the software testing principles.(13M)** **April/may 2017**BTL2 **Answer : Page: 3-23 - Srinivasan & Ramaswamy** **Definition:** Principle is any rule that governs the system. **Explanation:** • Principle 1 :Revealing defects and evaluating quality (2M) • Principle 2 : Effectiveness of testing effort (1M) • Principle 3 : Test results should be inspected (1M) • Principle 4 : Test case must contain the expected output (1M) • Principle 5:Test case developed for both valid and invalid input conditions (1M)

	• Principle 6 :Defects ratio (1M) • Principle7 : Testing should be carried out by a group (1M) • Principle8 : Tests must be repeatable and reusable (1M) • Principle9 :Testing should be planned (1M) • Principle 10: Testing activities should be integrated into software lifecycle (1M) • Principle 11: Testing is a creative and challenging task (2)
4	**Give an example for defect classes and discuss them in detail.(13M)** (**Nov/Dec 2016)** BTL4 **Answer : page : 10 - Notes** **Definition:**Any abnormal condition that affects the execution of a program is called defect. **(2M)** **Figure:**Defect classes and a defect repository.(2M) **Explanation: (9M)** • **Requirements and specification defects** a. Functional Description defects b. Feature defects c. Feature interaction defects d. Interface description defects, • **Design defects** a. Algorithmic and processing defects b. Control ,logic, and sequence defects c. Data defects. d. Module interface description defects e. External Interface description defects. • **Coding defects** a. Algorithmic and processing defects. b. Control ,logic, and sequence defects c. Typographical defects d. Initialization defects. e. Dataflow defects f. Data defects g. Module interface defects, h. Code document defects. i. External hardware and software interface defects, j. Testing defects. k. Test harness defects l. Test case design and test procedure Defects.
5	**Explain in detail about Testing as a Process.** **(13M)**BTL2 **Anwer : Page :29 - 31 - Srinivasan & Ramaswamy book** **Process** – Creates an impact in the system.(2M) **Testing as a process:** Set of activities well planned in advance.(2M) **Figure** - Components of an engineered process.(2M) (Pg no: 2 in notes) **Explanation:** **Testing Maturity model TMM** (4M) • Level 1: Initial • Level 2: Phase Definition • Level 3: Integration • Level 4: Management and Measurement

	• Level 5: Optimization/Defect Prevention/Quality control **Verification and Validation Model**(3M) • **Diagram :** Pg no:2 in notes • **Verification:** Checks if software confirm to Functional and Non – Functional requirements **Validation:** Confirms if Software meets user requirements.
6	**Give a detailed account on the origins of defects. (13M)** (**Nov/Dec 2016)** BTL2 **Answer : page: 10 - Notes** **Definition:**Any abnormal condition that affects the execution of a program is called defect. (2M) **Figure:**Defect classes and a defect repository.(4M) **Explanation:** (3M) **Types of Defect:** • Variance from product specification • Variance from customer or user specification • Wrong requirement • Missing Requirement • Extra Requirement **Sources of Error:** • Education • Communication • Oversight • Transcription • Process **Hypothesis:** • Design Test **Fault Model:** Employed to prepare fault list. **Physical Defects:** • Manufacturing Errors • Component Wear out. • Environmental Effects **Figure :** Origins of defects.(4M)
7	**Discuss the Coin Problem along with the defect categories associated withit.(13M)** BTL6 **Answer : page : 17 - Notes** **Figure :** Sample specification with defects.(4M) **Figure :** a sample design specification with defects(4M) **Explanation**:(5M) • Algorithmic and processing defects. • Precondition • Post-condition • Control,logic, and sequence defects. • Typographical defects.

	• Initialization defects. • Dataflow defects.
8	**Analyse the role of tester in software development Organization.(13M)** BTL4 **(Nov/Dec 2017)** **Answer : page:9 - Notes** **Tester:** Objective of testing to get high quality software which should satisfy all requirements of software. Role of tester to ensure whether all requirements of software are satisfied. (2M) **Explanation:** **Tester's job**:(4M) • Reveal defects • Find weak points • Inconsistent behavior • Circumstances where the software does not work as expected. **Tester's Need:** • Communication Skills • Team working skills • Decision Making skills **Testers are said to be specialist:** • Provide plan • Do Execution • Recording result • Analysing the test result
	PART – C
1	**Given 6 different denominations of coins ,The program finds total dollars & cents values for a set of coins and outputs the number of dollars. Find the possible defects in the above scenario.(15M)** BTL6 **(April/May 2017)** **Answer : Appendix - Srinivasan,Ramaswamy** **Explanation:** • Requirements or functional Defects(4M) • Functional description defects • Interface description defects • Pre conditions(5M) • Post conditions • Control,Logic and sequence defects(3M) • Algorithmic and processing defects • Data flow defects(3M) • Data Defects • External
2	**If you were testing a feature of your software on Monday and finding a new bug every hour, at what rate would you expect to find bugs on Tuesday? (15M)** BTL4 **Answer : Appendix - Srinivasan,Ramaswamy** **Explanation:** • Number of bugs remaining is proportional to the number of bugs you have already found.(8M) • Pesticide paradox – Tells you that if you continue to run the same tests over and over that you eventually won't find new and different bugs until you add more tests.(7M)
3	**Visiting all the states that the program has assures that you have also traverses all the**

	transitions among them. The statement is true or false? Justify your answer.(15M) BTL4 **Answer : Appendix - Srinivasan Ramaswamy** **STATEMENT** :False(8M) **Explanation(7M)** • Think of visiting 50 different cities spread out across the entire United states. • You could plan a trip that would take you to each city. • But it would be impossible for you to travel all the roads that connects all the cities.

UNIT II TEST CASE DESIGN STRATEGIES

Test case Design Strategies – Using Black Box Approach to Test Case Design – Random Testing – Requirements based testing – Boundary Value Analysis – Equivalence Class Partitioning – State-based testing – Cause-effect graphing – Compatibility testing – user documentation testing – domain testing – Using White Box Approach to Test design – Test Adequacy Criteria – static testing vs. structural testing – code functional testing – Coverage and Control Flow Graphs – Covering Code Logic – Paths – code complexity testing – Evaluating Test Adequacy Criteria.

PART *A

1	**Define Smart Tester.**(BTL1) Software must be tested before it is delivered to users. It is responsibility of the testers to Design tests that (i) reveal defects (ii) can be used to evaluate software performance, usability and reliability. To achieve these goals, tester must select a finite no. of test cases (i/p, o/p, & conditions).
2	**Define responsibility.(AU Nov/Dec 2016)**(BTL1) A straightforward definition for object-responsibility is this: An object must contain the data (attributes) and code (methods) necessary to perform any and all services that are required by the object.
3	**Write short notes on Random testing and Equivalence class portioning.**(BTL1) **(Nov/Dec 2015)** Each software module or system has an input domain from which test input data is selected. If a tester randomly selects inputs from the domain, this is called random testing. In equivalence class partitioning the input and output is divided in to equal classes or partitions.
4	**Define State.**(BTL1) A state is an internal configuration of a system or component. It is defined in terms of the values assumed at a particular time for the variables that characterize the system or component.
5	**Define Finite-State machine.** (BTL1) A finite-state machine is an abstract machine that can be represented by a state graph having a finite number of states and a finite number of transitions between states.
6	**Define Error Guessing.(**BTL1) The tester/developer is sometimes able to make an educated "guess' as to which type of defects may be present and design test cases to reveal them. Error Guessing is an ad-hoc approach to test design in most cases.
7	**Define COTS Components.**(BTL1) The reusable component may come from a code reuse library within their org or, as is most likely, from an outside vendor who specializes in the development of specific types of software components. Components produced by vendor org are known as commercial off-the shelf, or COTS, components.
8	**Express the benefits of low coupling**.(BTL2) **Maintainability** – changes are confined in a single module **Testability** – modules involved in unit testing can be limited to a minimum **Readability** – classes that need to be analysed are kept at a minimum.
9	**Define usage profiles and Certification.**(BTL1) Usage profiles are characterizations of the population of intended uses of the software in its intended environment. Certification refers to third party assurance that a product,process, or service meets a specific set of requirements.

10	**Write the application scope of adequacy criteria?**(BTL4**)** • Helping testers to select properties of a program to focus on during test. • Helping testers to select a test data set for a program based on the selected properties. • Supporting testers with the development of quantitative objectives for testing • Indicating to testers whether or not testing can be stopped for that program.
11	**Define path**.(BTL1) A path is a sequence of control flow nodes usually beginning from the entry node of a graph through to the exit node.
12	**Write the formula for cyclomatic complexity?(AU Nov/Dec 2016**)(BTL1) The complexity value is usually calculated from control flow graph(G) by the formula. V(G) = E-N+2 Where The value E is the number of edges in the control flow graph The value N is the number of nodes.
13	**List the various iterations of Loop testing.** ?(BTL1) • Zero iteration of the loop • One iteration of the loop • Two iterations of the loop • K iterations of the loop where k<n • n-1 iterations of the loop • n+1 iterations of the loop
15	**What are the errors uncovered by black box testing**?(BTL1) • Incorrect or missing functions • Interface errors • Errors in data structures • Performance errors • Initialization or termination error.
16	**Define Equivalence class partitioning?**(BTL1) If a tester is viewing the software-under-test as a black box with well definedinputs and outputs, a good approach to selecting test inputs is to use a method calledEquivalence class partitioning.
17	**Define Cause effect graphing**?(BTL1**)** Cause Effect Graph is a black box testing technique that graphically illustrates the relationship between a given outcome and all the factors that influence the outcome.
18	**What is Certification?**(BTL1) Certification refers to third-party assurance that a product, process, or servicemeets a specific set of requirements.
19	**What is the goal of smart tester**?(BTL1) The goal of the smart tester is to understand the functionality, input/outputdomain, and the environment of use for the code being tested.
20	**List the two major assumptions in Mutation testing.**(BTL1) • The component programmer hypothesis • The coupling effects
21	**List the two basic Testing strategies.**(BTL1) • Black box testing. • White box testing.
22	**What are the knowledge sources for Black box testing?**(BTL2) • Requirement • Document specification • Domain knowledge

	• Defect analysis data
23	**What are the knowledge sources for White box testing? (AU Nov/Dec 2015)**(BTL2) • High level design • Detailed design • Control flow graphs • Cyclomatic complexity
24	**List the methods of Black box testing?(AU Nov/Dec 2017)**(BTL1) • Equivalence class partitioning • Boundary value analysis • State transition testing • Cause and effect graphing • Error guessing
25	**List the methods of White box testing?(AU Nov/Dec 2017)**(BTL1) • Statement testing • Branch testing • Path testing • Data flow testing • Mutation testing • Loop testing
	PART* B
1	**Elaborate the qualities of a smart Tester.**BTL2**(13M)** **Answer : page : 18 - Notes** • Reveal defects(4M) 1. Find the bugs before the software becomes operational 2. Find errors at the early stage (Requirement Analysis) 3. Find the weak points 4. Situations at which error may occur • Evaluate quality(4M) 1. Ensures if software meets user requirements 2. Ensures if software meets requirement specification 3. Ensures if software meets performance criteria such as reliability,usability, portability • Finite no of test case(5M) 1. Number of test cases. 2. A test case that makes the tester to makesure that software meets all user requirements. 3. Test cases that are capable enough to make the system to crash.
2	**Discuss the test case design strategies.**BTL2 **(13M)** **Answer: page : 18 - Notes** • Two strategies • Whitebox (clear or glass box) (2M) • Testing the software with X – Ray glasses • Black box(Functional or specification)(2M) • Testing the software blind folded.

	• Table: The two basic testing strategies.(9M)Page 18 in notes
3	**List and explain the types of black box testing.AU April/May 2016**BTL2 **(13M)** **Answer:Page:73 - 105 - Srinivasan & Ramaswamy** • Random testing (1M) 1. Randomly select the input. 2. Three conditions. • Equivalence class partitioning(2M) 1. Adv of Equivalence class partitioning 2. List of conditions. 3. Figure: A specification of a square root function 4. Example of equivalence class reporting table • Boundary value analysis(1M) 1. List the conditions 2. Figure: Boundaries of on Equivalence partition 3. Example of Boundary value analysis. • State Transition Testing(1M) 1. Abstract Machine 2. State graph having a finite number of states and transitions between 3. Internal configuration of system or component • Error guessing(1M) 1. Tester/Developer's past experience • Cause and Effect Graphing(2M) 1. Nodes in the graph are causes and effects 2. Tester need to identify causes and effects 3. Graph must be annotated with constraints 4. Graph is then converted into decision table 5. Columns in the decision table are converted into test cases • Requirement Based Testing(1M) 1. Test Requirement Specification 2. Explicit Requirement 3. Implicit Requirement 4. Requirement traceability Matrix • Compatibility Testing(1M) 1.Confirms working of product with different infrastructure components 2.Forward Compatibility Testing 3.Backward Compatibility testing • User documentation Testing(2M) 2. Manuals, User guidelines 3. Installation guidelines 4. Setup guidelines, Readme files 5. Software Release notes,Online help • Domain Testing(1M) 1. Needs business domain knowledge than software knowledge 2. They get trained in software ,instead of training the software professional in business domain.

4	**Discuss the various approaches in White Box test design.(13M)** **AU Nov/Dec 2016**BTL2 **Answer:Page :29 - 31 - Srinivasan & Ramaswamy** • Coverage and control flow graph(3M) 1. Three basic primes 2. Sequential 3. Condition 4. Iteration • Coverage code logic(3M) 1. Figure: Code sample with branch and loop. 2. Figure: A control flow graph representation for the code. 3. Table: A test case for the code ,that satisfies the decision • coverage criterion.(3M) 1. Table: Test cases for simple decision coverage 2. Table: Test cases for condition coverage 3. Table: Test cases for decision condition coverage. • Path Testing (4M) 1. Path 2. Cyclomatic complexity formula.
5	**Evaluate test adequacy Criteria with necessary properties.(13M)**BTL3 **Answer: page:27 - Srinivasa & Ramamurty** • Axioms –Set of assumptions(1M) • Applicability Property(1M) • Non exhaustive applicability property(1M) • Monotonicity Property(2M) • Inadequate Empty set(1M) • General multiple change Property(1M) • Anti decomposition Property(2M) • Renaming Property(1M) • Complexity Property(1M) • Statement Coverage Property(2M)
6	**Demonstrate the various black box testing approaches using Equivalence partitioning and boundary value Analysis.(13M)** **Nov/Dec 2016**BTL5 **AnswerPage : 84,90 - Srinivasan & Ramaswamy** **Equivalence Partition:** (8M) Software testing technique – divides input data of software unit into partitions of equivalent data – test cases can be derived – main principal of test cases are deigned to coverpartition at least once. **Boundary value analysis:** (5M) Test case design technique to test boundary value between partitions-boundary value is an input or output value on the border of an equivalence partition.
7	**Compare static testing with that of dynamic testing and list the major difference between both.(13M)** BTL4

	STATIC TESTING	**DYNAMIC TESTING**
	Prevention.	Cure.
	More cost-effective.	Less cost – effective.
	Greater marginal benefits.	Lesser marginal benefits.
	Comprehensive diagnostics for code.	More diagnostics for code.
	Finds more bugs.	Finds fewer bugs.
	Takes lesser time.	Takes longer time.
	Testing covers more areas.	Testing covers less areas.
	Done in verification stage.	done in validation stage.

PART *C

1	**Explain What a tester should worry about with this line from a spec. The software will allow up to 100 million simultaneous connections, although no more than 1 million will normally be used.**BTL4**(15 M)** **Answer : Appendix - Srinivasan Ramaswamy** • Testability(4M) • It doesn't matter that typical usage is only 1 million connections.(4M) • If the specification states that 100 million are possible(4M) • The 100 million must be tested.(3M)
2	**Assume that you are assigned to test the windows calculator,** **Is it possible to test all the test cases. How do you test it systematically and explain the principle involved.**BTL6**(15M)** **Answer: Appendix - Srinivasan Ramaswamy** • Equivalence Partitioning(5M) • Grouping similar input(4M) • Grouping similar Output(4M) • Grouping similar operations of software(2M)
3	**Visiting all the states that the program has assures that you have also traverses all the transitions among them. The statement is true or false? Justify your answer.**BTL4**(15M)** **Answer : Appendix - Srinivasan Ramaswamy** False(8M) **Explanation**(7M) • Think of visiting 50 different cities spread out across the entire United States. • You could plan a trip that would take you to each city. • But it would be impossible for you to travel all the roads that connect all the cities.

UNIT III LEVELS OF TESTING	
The need for Levels of Testing – Unit Test – Unit Test Planning – Designing the Unit Tests – The Test Harness – Running the Unit tests and Recording results – Integration tests – Designing Integration Tests – Integration Test Planning – Scenario testing – Defect bash elimination System Testing – Acceptance testing – Performance testing – Regression Testing – Internationalization testing – Ad-hoc testing – Alpha, Beta Tests – Testing OO systems – Usability and Accessibility testing – Configuration testing – Compatibility testing – Testing the documentation – Website testing.	
PART A	
1	**Define Unit Testing (Nov/Dec 2017)**BTL1 A unit is the smallest possible testable software component that can be characterized in several ways.
2	**Write the different levels of testing.**BTL1 • Unit test • Integration test • System test • Acceptance test.
3	**List the components suitable for unit test.**BTL1 • Procedures and functions • Classes/objects and methods Procedure-sized reusable components.
4	**List the phases in the unit test planning.** (**April/May 2015)**BTL1 • Phase 1: Describe unit test approach and risks. • Phase 2: Identify unit features to be tested. • Phase 3: Add levels of detailed to the plan.
5	**Write the issues in the unit test**.BTL1 • Issue 1: Adequately testing classes. • Issue 2: Observation of objects states and state changes. • Issue 3: The retesting of classes-I • Issue 4: The retesting of classes-II
6	**What is Test harness?**(**Nov/Dec 2016)**BTL1 The auxiliary code developed to support to testing of units and components is called a test harness. The harness consists of drivers that call the target code and stubs that represent modules it calls.
7	**List the major goals of Integration test.**BTL1 • To detect defects that occurs on the interfaces of units. • To assemble the individual units into working subsystems and the finally a complete system that is ready for system test
8	**What is the advantage of Bottom up integration?**BTL1 Bottom-up integration has the advantage that the lower-level modules are usually well tested early in the integration process. This is important if these modules are candidates for reuse.
9	**What is a cluster?**BTL1 A cluster consists of classes that are related, for example, they may work together to support a required functionality for the complete system.

10	**List the several types of system tests.(Nov/Dec 2016)**BTL1 • Functional testing • Performance testing • Stress testing • Configuration testing • Security testing • Recovery testing
11	**Define Load.**BTL1 A load is a series of inputs that simulates a group of transactions.
12	**List the two major requirements of Performance testing.**BTL1 • Functional requirements • Quality requirements.
13	**What is meant by Stress testing?**BTL1 When a system is tested with a load that causes it to allocate its resources in maximum amounts, this is called stress testing.
14	**Define Recovery testing.**BTL1 Recovery testing subjects a system to losses of resources in order to determine if it can recover properly from these losses.
15	**Define Use case.**BTL1 A use case is a pattern, scenario, or exemplar of usage. It describes a typical interaction between the software system under development and a user.
16	**Define Regression testing** .BTL1 Regression testing is not a level of testing, but it is the retesting of the software that occurs when the changes are made to ensure that the new version of the software has retained the capabilities of the old version and that has no defect have been introduced due to the changes.
17	**Write the objectives of configuration testing**.BTL1 • Show that all the configuration changing commands and menus work properly • Show that all interchangeable devices are really interchangeable, and that they each enter • The proper states for the specified conditions • Show that the system's performance level is maintained when devices are interchanged,or when they fail.
18	**List the effect of security breaches**.BTL1 • Loss of information • Corruption of information • Misinformation • Privacy violations • Denial of service
19	**Define functional Testing**. BTLl Functional tests at the system level are used ensure that the behavior of the system adheres to the requirement specifications.
20	**What is load generator and Load?**BTLl An important tool for implementing system tests is a load generator. A load generator is essential for testing quality requirements such as performance and stress. A load is a series of inputs that simulates a group of transactions.
21	**What are the approaches used to develop the software?**BTLl There are two major approaches to software development

	• Bottom-Up • Top-Down
22	**List the objectives of configuration testing**. BTLl • Show that all the configuration changing commands and menus work properly • Show that all interchangeable devices are really interchangeable, and that they each enterthe proper states for the specified conditions • Show that the system's performance level is maintained when devices are interchanged,or when they fail.
23	**List the effect of security breaches.**BTLl • Loss of information • Corruption of information • Misinformation • Privacy violations • Denial of service.
24	**Give the examples of security testing.**BTL2 • Password checking. • Legal and illegal entry with password. • Password Expiration. • Encryption. • Browsing. • Trap doors. • Viruses.
25	**List the areas covered during recovery testing.**BTLl • Restart. • Switchover.

	PART B

1	**How would you define a software unit? In terms of your definition, what constitutes a unit for procedural code; for object-oriented code?(13M)**BTL4
	Answer : Page : 38,261-264 - Srinivasan & Ramaswamy
	Explanation:
	• Functions, procedures, classes and methods as units
	• **Fig:** Some components suitable for unit test(1M)
	• Unit Test: Need for preparation
	  • Planning
	  • Both black box and White box
	  • Reviewe
	  • Several Tasks
	1. Unit Test Planning(4M)
	Phase I: Describe unit test approach and Risks
	Phase II: Identify unit features to be tested
	Phase III: Add levels of detail to the planning
	2. Designing the Unit Test(3M)
	  • Test Cases
	  • Test Proceedure
	3. Running and recording the results(3M)

	• Perform the unit test in all the units of system • Record the results. 4. Test Harness(2M) • Additional code included to perform testing.
2	**Why is it so important to design a test harness for reusability?(13M)**BTL2 **Answer: Page : 35 - Notes** **Explanation:** • Auxiliary code developed • Support testing of units , components (3M) • Harness consists of drivers that call the target code • Stubs that represent modules it calls.(3M) **Fig:** The test Harness(4M) Driver(2M) Stub(1M)
3	**What are the key differences in integrating procedural-oriented systems as compared to object-oriented systems?(13M)**BTL3 **Answer: Page : 35 - Notes** • Goals(2M) • Integration Strategies: i. Top – Down ii. Bottom – Up iii. Bi – Directional • Designing Integration Test: i.Black Box Approach ii.White Box Approach • Integration test strategy for procedures(5M) • Integration test strategy for classes(6M) • Critical Module characteristics
4	**Describe the activities/Tasks and responsibilities for developer/testers in support of multilevel testing.(13M)**BTL2 **Answer : Page :261 - Srinivasan & Ramaswmy** • **Fig:** Levels of testing **Explanation:** • Levels of Testing(4M) i. Unit Test ii. Integration test iii. System Test iv. Acceptance Test • Two Approaches(4M) Bottom_Up Top_Down • Two types of Language(5M) Procedure Oriented Object Oriented
5	**Explain Integration Test with example.(13M) (Nov/dec 2016)**BTL3 **Answer:Page : 107 - Srinivasan & Ramaswamy**

	Explanation: • Goals(2M) • Integration Strategies: i. Top – Down ii. Bottom – Up iii. Bi – Directional • Designing Integration Test: 1.Black Box Approach • White Box Approach • Integration test strategy for procedures(5M) • Integration test strategy for classes(6M) • Critical Module characteristics • Example : Sandwich Testing
6	**Explain the different types of system testing with example.(13M)**BTL2 **Answer:Page : 130 - Srinivasan & Ramaswamy** **Explanation:** • Functional testing(1M) • Performance testing(1M) • Stress testing(1M) • Configuration testing(1M) • Security testing(1M) • Recovery testing(1M) • **Fig**: Types of System Test(4M) • **Fig:** Example of special resources needed for a performance test(3M)
7	**Explain in detail about scenario Testing.(13M)**BTL2 **Answer:Page : 130 - Srinivasan & Ramaswamy** • Two Methods(4M) i. System Scenarios ii. Use Case Scenarios • Why Scenario test?(4M) i. Learn product ii. Connect Testing to documented requirement iii. Expose failure to deliver described benefits iv. Expose expert use of program v. Bring requirement related issues • Twelve ways to create good scenarios(5M)
7	**How would you identify hardware and software for configuration testing and how would you apply website testing?(13M)(Nov/dec 2016)**BTL5 **Answer:Page : 195,198,369 - Srinivasan & Ramaswamy** **Explanation:** • Configuration testing - testingapplication with multiple combinations (7M) • To find out the optimal **configurations** • Web testing - focuses on web applications.(6M) • Complete testing of web-based system before going live • Help address issues before system revealed to the public.

8	**i) Explain about Defect Bash Elimination.(7M)**BTL2 **Answer : Page : 39 – Notes** • Ad-hoc Testing(2M) • Not based on written test cases(2M) • Brings together plenty of good practices(1M) • Steps in defect bash(2M) **ii) Explain about Ad-hoc Testing in detail.(6M)**BTL2 **Answer : Page : 39 – Notes** • Discovers unfound errors in software(2M) • Impacted due to(2M) i. Intuition ii. Previous Experience iii. Expert knowledge of the platform iv. Experience in Testing • Drawback • Figure : Ad - hoc Testing(2M)
9	**i) Explain about usability and accessibility Testing.(7M)**BTL2 **Answer : Page : 49 - Notes** **Usability testing:(4M)** • Characteristics • Quality Factors • Approach to usability • Aesthetic testing **Accessibility Testing:(3M)** • Basic accessibility • Product accesibility **ii) Explain Testing OO Model in detail.(6M)**(BTL2) • Unit Testing • Integration testing • Validate and system testing • Regression testing

10	**i) Differentiate Alpha and Beta Testing and discuss the phases in which alpha and beta testing are done?(7M)** **ii) Explain about documentation testing in detail.(6M)(Nov/Dec 2017)**BTL3 **Answer:Page : 137-140 - Srinivasan & Ramaswamy** **Alpha Testing: (4M)** • Type of acceptance testing • Performed to identify all possible **issues/bugs** • Before releasing the product to everyday users or public. • Aim to carry out the tasks that a typical user might perform. **Beta Testing:(3M)** • Second phase of **Software Testing** • Sampling of the intended audience tries the product out. • Beta Testing of a product is performed by **real users** of the software application in a **real environment**. **ii)Explanation:** • Importance of documentation testing • Main things to look for in reviewing the document • Packaging and text graphics • Marketing materials,ads and other inserts • Warranty/Registration • EULA • Label and stickers • Installation setup & Instructions • Users Manual • Online help
	PART – C
1	**If you are assigned to test compatibility of your product's data file formats, How would you approach the task**?(15M)BTL6 **Answer:Appendix - Srinivasan Ramaswamy** **Explanation:** • Research whether your program follows existing standards for its files.(6M) • If so, test that it meets its standards.(1M) • Equivalence partition the possible programs that would read and write your program's files.(6M) • Design test documents with representative sample of the types of data.(2M)
2	**Explain the significance of control flow graph and cyclomatic complexity with the pseudo code for the sum of n numbers(13M).(Nov/Dec 2017)**BTL6 **Answer : Appendix - Srinivasan Ramaswamy** **Explanation:** • Cyclomatic complexity is a software metric used to measure the complexity of a program.(5M)

	• This metric measures independent paths through the program's source code. An independent path is defined as a path that has at least one edge which has not been traversed before in any other paths.(6M) • Cyclomatic complexity can be calculated with respect to functions, modules, methods or classes within a program.(4M)
3	**What basic elements of a web page can easily be tested with black box Approach?(15M)**BTL6 **Answer : Appendix - Srinivasan Ramaswamy** **Explanation:** • The elements that are similar to what is multimedia CD – ROM software – text graphics ,and hyperlinks.(3M) • Web testing - focuses on web applications.(6M) • Complete testing of web-based system before going live (3M) • Help address issues before system revealed to the public.(3M)

UNIT IV TEST MANAGEMENT	
People and organizational issues in testing – Organization structures for testing teams – testing services – Test Planning – Test Plan Components – Test Plan Attachments – Locating Test Items – test management – test process – Reporting Test Results – The role of three groups in Test Planning and Policy Development – Introducing the test specialist – Skills needed by a test specialist – Building a Testing Group.	
PART* A	
1	**Define Goal in testing.**BTL1 A Goal can be described as a statement of intent or a statement of a accomplishment of an individual test person.
2	**What are the three types of goals in testing?**BTL1 • Business Goal • Technical Goal • Political Goal
3	**Define the term policy.(Nov/Dec2016)**BTL1 A policy can be defined as a high-level statement of principle or course of action that is used to govern a set of activities in an organization.
4	**Define Test Plan**.(**Nov/Dec 2015)**BTL1 A Plan is a document that provides a frame work or approach for achieving a set of goals.
5	**List the various Test Plan components.(Nov/Dec2016)**BTL1 • Test Plan identifier • Introduction • Items to be tested • Features to be tested • Pass/Fail criteria • Suspension & Resumption criteria • Testing tasks Test environment • Risks & Contingencies • Testing costs • Approvals
6	**Define Features**.BTL1 Features may be described as distinguishing characteristics of a software component or system.
8	**What is the meaning of the term Pass / Fail Criteria**?BTL1 Given a test item and a test case, the tester must have a set of criteria to decide on whether the test has been passed or failed upon execution.
9	**What is Suspension & Resumption criteria?**BTL1 The criteria to suspend and resume testing are described in the simplest of cases testing is suspended at the end of a working day and resumed the following morning.
10	**Define Work Breakdown Structure (WBS)**.BTL1 A Work Break Down structure is a hierarchical or tree like representation of all the tasks that are required to complete a project.
11	**Define Risks & Contingencies.**BTL1 Every testing effort has risks associated with it. Testing software with a high degree of critically, complexity, or a tight delivery deadline all impose risks that may have negative impacts on project goals.
12	**What is Cost Drive?**BTL1

	A Cost Driver can be described as a process or product factor that has an impact on overall project costs.
13	**What are the various components of the test plan**.**AU Nov/Dec2016**BTL1 • Test Design Specification • Test Case Specification • Test Procedures specifications
14	**Define Test Summary Report**.BTL1 This report is prepared when testing is complete. It is summary of the results of the testing efforts. It also becomes a part of the projects historical database and provides a basis for lessons learned as applied to future projects.
15	**List the skills needed by a Test specialist**.BTL1 • Organizational and planning skills • The ability to keep track of and pay attention to details • The determination to discover and solve problems • The ability to mentor and train others • The ability to work with users and clients • The ability to think creatively
16	**What is the use of V-model in testing**?BTL1 The V-model is model that illustrates how testing activities can be integrated in to each phase of the standard software life cycle.
17	**Write the WBS elements for testing.** BTL1 • Project start-up • Management coordination • Tool selection • Test planning • Test design • Test development • Test execution • Test measurement, and monitoring • Test analysis and reporting • 10. Test process improvement
18	**What is the function of Test Item Transmittal Report or Locating Test Items?**BTL2 Suppose a tester is ready to run tests on the data described in the test plan. We needs to be able to locate the item and have knowledge of its current status. This is the function of the Test Item Transmittal Report. Each Test Item Transmittal Report has a unique identifier.
19	**Define Test Log.**BTL1 The Test log should be prepared by the person executing the tests. It is a diary of the events that take place during the test. It supports the concept of a test as a repeatable experiment.
20	**What are the Three critical groups in testing planning and test plan policy?(April/May 2015)**BTL1 • Managers: • Developers/Testers • Users/Clients
21	**What is scenario Testing?** The process of giving the usage scenario of the system in the clien's point of view and checking how the system reacts to it is called as scenario Testing.

22	**What are the information present in the Test Item Transmittal Report or Locating Test Items?**BTL1 • Version/revision number of the item • Location of the item • Person responsible for the item (the developer) • References tyo item documentation and test plan it is related to. • Status of the item • Approvals – space for signatures of staff who approve the transmittal.
23	**What are the skills needed by a test specialist?**BTL1 • Personal and managerial Skills • Organizational, and planning skills, work with others, resolve conflicts, mentor and train others, written /oral communication skills, think creatively. • Technical Skills • General software engineering principles and practices, understanding of testing principles and practices, ability to plan, design, and execute test cases, knowledge of networks, database, and operating System.
24	**Write the test term hierarchy?**BTL2 • Test Manager • Test leader • Test Engineer • Junior Test Engineer
25	**Write the approaches to test cost Estimation?**BTL2 • The COCOMO model and heuristics • Use of test cost drivers • Test tasks • Tester/developer ratios • Expert judgment
26	**Define Mutation Testing. BTL1** Mutation testing is a method of software testing in which program or source code is deliberately manipulated. The mutations introduced to source code are designed to imitate common programming errors.
27	**Discuss role of manager in testing group. BTL2** • Task forces,policies,standards • Planning • Resource allocation • Support for education and training • Interact with users
	PART* B

1	**Explain the role of the 3 critical groups in software testing. (13M)**BTL2 **Answer:Page: 321 - Srinivasan & Ramaswamy** **2. Managers**(4M) • Task forces,policies,standards • Planning • Resource allocation • Support for education and training • Interact with users **3. Developers/ testers**(5M) • Apply black and white box methods • Assist with test planning • Test at all levels • Train and mentor • Participate in task forces • Interact with users **4. Users/clients**(4M) • Specify requirements clearly • Participate in usability test
2	**Explain the various documents involved in reporting Test Results**. **(13M)**BTL2 **Answer: Page : 59 - Notes** **Explanation:** • Test log(1M) • Test log identifier(2M) • Description(1M) • Activity and event entities(1M) • Test incident report(3M) • Test incident report identifier(1M) • Summary(1M) • Impact(1M) • Test summary report(2M)
3	**Explain the various Test Plan attachments? (13M)**BTL2 **Answer:Page : 381 - Srinivasan & Ramaswamy** **Explanation:** • Test design specifications(4M) • Test case specifications(5M) • Test procedure specifications(4M)

4	**Discuss in detail about the test plan components.(13M)(Nov/Dec 2016,Nov/Dec 2017)** BTL2**Answer: Page : 59 – Notes** **Test Plan Components(13M)** • Test plan identifier(5M) • Introduction • Items to be tested • Features to be tested • Approach • Pass/fail criteria(4M) • Suspension and resumption criteria • Test deliverables • Testing tasks • Test environment • Responsibilities(4M) • Staffing and training needs • Scheduling • Risks and contingencies • Testing costs • Approvals
5	**Evaluate the testing and debugging goals and policies in detail.(13M)(April/May 2017)**BTL5 **Answer:Page :62 - Notes** **Explanation:** • Debugging goal (4M) • Debugging policy(4M) • Testing Policy: Organization X(3M) • Debugging policy: Organization X(2M)
6	**Describe Test planning in detail. (13M)** BTL2 **Answer:Page : 352 - Srinivasan & Ramaswamy**
	Explanation: • Planning(1M) • Milestone (1M) • Overall test objectives(2M) • What to test (Scope of the tests) (1M) • Who will test? (2M) • How to test? (2M) • When to test? (2M) • When to stop Testing? (2M)
7	**Explain in detail about Mutation testing**. **(13M) (April/May 2017)** BTL2 **Answer: Page : 58 - Notes** **Explanation:** • Mutation testing is a method of software testing in which program or source code is deliberately manipulated(4M) • Followed by suite of testing against the mutated code(5M) • The mutations introduced to source code are designed to imitate common programming errors.(4M)

8	**Discuss in detail about the various skills needed by test specialist.(13M) (Nov/dec2017)**BTL2 **Answer:Page : 352 - Srinivasan & Ramaswamy** • **Personal and managerial Skills**(7M) ➢ Organizational, and planning skills, work with others, resolve conflicts, mentor and train others, written /oral communication skills, think creatively. • **Technical Skills**(6M) • General software engineering principles and practices, understanding of testing principles and practices, ability to plan, design, and execute test cases, knowledge of networks, database, and operating System.
9	**Explain the organizational structure for testing in single product companies.(13M)** BTL2 **(April/May 2017)** **Answer:Page :321 - Srinivasan & Ramaswamy** **Explanation:** • Exploits the rear loading nature of testing activities.(2M) • Enables Engineers to gain experience in all aspects of life cycle(4M) • Is amenable to the fact that the organization mostly has informal processes.(2M) • Some defects may be detected earlier.(3M) • Accountability for testing quality reduces.(1M) • Schedule pressures normally compromise testing.(1M)
	PART* C
1	**Describe pesticide paradox and how bring in new people to look at the software helps solve it.(15M)**BTL5 **Answer:Page : Appendix - Srinivasan Ramaswamy** This is the situation that occurs if you continue to test (3M) • Software with the same tests or same people.(4M) • Eventually, the software seems to build up immunity to the test because no new bugs are found.(3M)
	• If you change the tests or bring in new testers ,you will find new bugs.(2M) • The bugs are already there,it's the new technique which made the bugs visible.(3M)
2	**Why is the process of creating the test plan matters ,not the plan itself?(15M)**BTL5 **Answer:Page: Appendix - Srinivasan Ramaswamy** • Because all the issues and the questions defined in the test plan either impact or influenced by other project functional groups or team members.(4M) • Getting everyone to understand and agree to the contents of the plan is what matters.(4M) • Privately creating a paper document and putting it on a shelf is not just a waste of time, but also jeopardizes the project.(7M)

3	**Justify the statement " A schedule should be made to meet absolute dates ,so that there s no question when a testing task or phase is to start and when it is to end".(15M)**BTL6 **Answer:Page : Appendix - Srinivasan Ramaswamy** • The statement is false (3M) • Because testing depends so much on other aspects of the project(5M) • For example ,you can't test something until its coded), a test schedule is best made relative to the delivery status.(7M)
4	**Name a few typical testing resources that should be considered when test planning.(15M)**BTL6 **Answer:Page : Appendix - Srinivasan Ramaswamy** • People, Equipment, Offices, Labs , Software ,Outsourcing Companies and miscellaneous supplies.(3M) • What are the entrance and exit criteria?(4M) • The requirements must be met to move from one testing place to another.(3M) • A Phase can't be left until its exit criteria are met.(3M) • A new phase can't be entered until its entrance criteria are met.(2M)

UNIT V TEST AUTOMATION	
Software test automation – skill needed for automation – scope of automation – design and architecture for automation – requirements for a test tool – challenges in automation – Test metrics and measurements – project, progress and productivity metrics.	
PART * A	
1	**Define the term Project monitoring.**BTL1 • Project Monitoring refers to activities and tasks managers engage in to periodically check the status of each project. • Reports are prepared that compare the actual work done to the work that was planned.
2	**Define the term Project controlling.**BTL1 Project Controlling consists of developing and applying a set of corrective actions to get a project on track when monitoring shows a deviation from what was planned.
3	**Define Milestones. (Nov/Dec2016)** BTL1 Milestones are tangible events that are expected to occur at a certain time in the project's lifetime. Managers use them to determine project status.
4	**Differentiate version control and change control.**BTL2 • Version Control combines procedures and tools to manage different versions of configuration objects that are created during software process. • Change control is a set of procedures to evaluate the need of change and apply the changes requested by the user in a controlled manner.
5	**What are the goals of Reviewers?**BTL1 • Identify problem components or components in the software artifact that need improvement. • Identify components of the software artifact that donot need improvement. • Identify specific errors or defects in the software artifact. • Ensure that the artifact confirms to organizational standards.
6	**What are the benefits of a Review program?**BTL1 • Higher quality software • Increased productivity • Increased awareness of quality issues • Reduced maintenance costs • Higher customer satisfaction
7	**What are the Various types of Reviews?**BTL1 • Inspections • Walk Throughs
8	**Conclude on the need of Integration testing.(AU Nov/Dec2016)** BTL2 • Component integration testing that checks the interconnections between various parts (components) in a product. • System integration testing that tests the connections between the product and external systems.
9	**What is Inspections?**BTL1 It is a type of review that is formal in nature and requires prereview preparation on the

	part of the review team.The Inspection leader prepares is the checklist of items that serves as the agenda for the review.
10	**What is Walkthrough?**(**Nov/Dec 2017)** BTL1 It is a type of technical review where the producer of the reviewed material serves as the review leader and actually guides the progression of the review .It have traditionally been applied to design and code.
11	**List out the members present in the Review Team.**BTL1 • SQA(Software Quality Assurance) staff • Testers • Developers • Users /Clients. • Specialists.
12	**List the components of review plans.**(**AU April/May 2015)**BTL1 • Review Goals • Items being reviewed • Preconditions for the review. • Rolls, Team size, participants • Training requirements. • Review steps. • Time requirement
13	**What are the advantages of review approach.**BTL1 There are two pass approach for detect detection. • Pass 1 has individuals first reading reviewed item • Pass 2 has the item read by the group as a whole.
14	**What are the various roles in review program?**BTL1 • Review Leader • Review Recorder • Reader Reviewer
15	**List the various review team membership constituencyReview Team Members**.BTL1 • SQA Staff • Testers • Developers • Users / Clients • Specialists
16	**What are the various different types of software artifacts.**BTL1 • Requirement Reviews • Design Reviews • Code Reviews • Test Plan reviews
17	**Define Change Control Board (CCB**).BTL1 • There are 2 aspects of change control – one is tool based, the other term based. • The team involved is called CCB.
18	**Define Project monitoring**.BTL1 Project monitoring refers to the activities and tasks managers engage into periodically check the status of each project.Reports are prepared that compare the actual work done to the work that was plannedor tracking**.**

19	**Define Project Controlling.**BTL1 It is the process of developing and applying a set of corrective actions to get a project on track when monitoring shows a deviation from what was planned.
20	**Define Defect Removal Leverage (DRL).**BTL1 This is a ratio of the defect detection rates from two review or test phases and can be expressed as $\text{DRL} = \frac{\text{Defects / hour (review or test phase X)}}{\text{Defects / hour (review or test phase Y)}}$
21	**What are the various steps in the inspection process**?BTL1 • Entry Criteria • Initiation • Preparation • Inspection Meeting • Reporting results • Rework & follow up
22	**What is the Role of process in Software quality?**BTL1 • Capability Maturity Model. • Testing Maturity model (TMM)
23	**List the measurements and milestones for monitoring and controlling**.BTL1 • Measurements for monitoring testing status • Coverage measures • Test case development • Test execution • Test harness development • Measurements to monitor tester productivity • Measurements for monitoring testing costs • Measurements for monitoring errors, faults, and failures • Monitoring test effectiveness
24	**Overview of the Testing Maturity Model(TMM)& the test related activities that should be done for V-model architecture.**BTL1 • Test related issues • Benefits of test process improvement • Introduction to TMM • TMM levels
25	**List the criteria for test completion**.BTL1 • All the planned tests that were developed have been executed and passed • All specified coverage goals have been met • The detection of a specific number of defects has been accomplished • The rates of defect detection for a certain time period have fallen below a specified level , Fault seeding ratios are favorable

26	**What are the benefits of testing tools and automation? (Nov/Dec – 2016)** Speed, Efficiency, Accuracy and Precision, Relentlessness.
27	**What is the difference between manual and automated testing?** In manual testing (as the name suggests), test cases are executed manually (by a human, that is) without any support from tools or scripts. But with automated testing, test cases are executed with the assistance of tools, scripts, and software.Testing is an integral part of any successful software project
28	**List the the challenges in automation?** 1) Testing the complete application: ... 2) Misunderstanding of company processes: ... 3) Relationship with developers: ... 4) Regression testing: ... 5) Lack of skilled testers: ... Testing always under time constraint:
29	**What skills are needed to be a good test automation tester?** Following are the technical skills a manual tester should master to become a brilliant automation testing engineer: Test architecture. Test design. Performance testing. Configuration management. Manual testing agility & interaction. Communication between teams. Troubleshooting. Agile, DevOps, and continuous delivery
30	**What is the scope of automation?(May/Jun 2016,Nov/Dec 2013,2014)** • Finding testing types which are amendable to automation. • Automating areas less prone to change • Automate tests that are less prone to change • Management aspects • Return on investments.
31	**Differentiate inspection from walkthroughs.** Inspection is monitoring the process of working. Walkthrough is a meeting in which the details of the product are discussed
32	**Differentiate milestone and deliverables (Nov / Dec 16)** Test Deliverables are the artifacts which are given to the stakeholders of software project during the software development lifecycle. There are different test deliverables at every phase of the software development lifecycle. Milestones are often new Releases of said software. Each new Release may have many new features (ie. deliverables) within it.

PART * B

1	**Illustrate with a sketch describe the design and architecture for test automation. (13M)(Nov /Dec ,2016)**BTL1 **Answer:Page : 396 - Srinivasan & Ramaswamy** **Explanation:** • External modules.(3M) • Scenario and configuration file modules.(3M) • Test cases and test framework mdules.(3M) • Tools and results modules.(2M) • Report generator and report metrics modules.(2M)
2	**Explain the various generations of automations and the skills for each.(13M)(Nov/Dec,2017)** BTL1 **Answer:Page :392 - Srinivasan & Ramaswamy** **Explanation:** • First Generation – Record and playback(4M) • Second Generation – Data Driven(5M) • Third Generation - Action Driven(4M)
3	**Explain the design and architecture of test automation and list the challenges.(13M)(April /May ,2017).**BTL2 **Answer:Page :396 - Srinivasan & Ramaswamy** **Explanation:** • External modules.(2M) • Scenario and configuration file modules.(2M) • Test cases and test framework modules.(2M) • Tools and results modules.(2M) • Report generator and report metrics modules.(2M) • Challenges(3M) • Certain types of testing cannot be executed without automation. • Automation means end to end not test execution alone.
4	**Discuss in detail about the controlling and monitoring: three critical views. (13M)**BTL2 **Answer:Page : 71 – Notes** **Explanation:** • Measurements for monitoring testing status(1M) • Coverage measures(1M) • Test case development(2M) • Test execution(1M)

	• Test harness development(2M) • Measurements to monitor tester productivity(2M) • Measurements for monitoring testing costs(1M) • Measurements for monitoring errors, faults, and failures(1M) • Monitoring test effectiveness(2M)
5	**Explain in detail about the role of reviews in testing software deliverables.(13M)** BTL2 **Answer:Page : 68 - Notes** **Planning the Review** (5M**)** • The role and responsibilities of the review leader • Identifying the deliverable to review and its review criteria • Developing review checklists for the reviewers based on requirements • Selecting the review team and assign review duties **Conducting the Review** (4M) • The role and responsibilities of the review leader • Inform the reviewers of their review duties, tasks, and schedule • Collect the reviews in a review meeting • Dealing with interpersonal issues • Common review pitfalls and how to avoid them **Report and Follow-up on the Review**(4M) • The role and responsibilities of the review leader • Compile the review findings into a single review report • Track review findings or issues • Follow-up on review findings or issues
6	**Describe the various metrics and measurements in software testing and explain the various areas of metrics. (13M) (Nov/Dec 2016)** BTL2 **Answer:Page: 420 - Srinivasan & Ramaswamy** **Explanation:** • Project metrics(2M) • Effort variance(3M) • Schedule Variance(3M) • Effort Distribution across phase(5M)
	PART * C
1	**How will you differentiate tools and automation? Name the few benefits and drawbacks of using software test tools and automation. (15M)**BTL6 **Answer:Page : Appendix - Srinivasan Ramaswamy** • A testing tool will help you test .making it easier for you to perform a manual testing task.(3M) • Automation is also a tool but it will run without your intervention.(3M) • Think power saw and hammer building a house while the carpenter sleeps.(3M) **Benefits**:(3M) • Speed up the amount of time it takes to run your test process. • Precise and relentless. **Drawbacks**:(3M)

	• Because software can change during the product's development, your test tools will be need to change. • It is easy to rely on automation much.
2	**If you were using metrics from the bug – tracking database to measure your progress or success at testing, why would just counting the number of bugs you find per day or computing your average find rate be an insufficient measure? (15M)**BTL6 **Answer:Page : Appendix - Srinivasan Ramaswamy** • It does not tell the entire story. You could be testing the complex area of the software.(4M) • Your area could have been written by the most experienced programmer.(4M) • It could have been written by the least experienced programmer.(4M) • The code that you are testing may already have been tested or may be brand new.(3M)
3	**"The test team is responsible for the quality of the product" Does the statement make sense, Justify your answer with necessary explanation. (15M)**BTL6 **Answer:Page : Appendix - Srinivasan Ramaswamy** • False! Testing looks for bugs .(7M) • Testers didn't put the bugs in the product and can't guarantee when they are done testing that no more bugs exist.(8M)