

ISTQB[®] Foundation Level Certified Model-Based Tester

Sample Exam Answers and Justifications

Version 2015 – v1.0

International Software Testing Qualifications Board



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0. Introduction

0.1 Purpose of this document

This document contains a full sample exam following the rules described in the ISTQB® Foundation Level Exam Structure and Rules document.

The sample questions, answer sets and associated justifications in this document have been created by a team of subject matter experts and experienced question writers with the aim of assisting ISTQB® Member Boards and Exam Boards in their question writing activities as well as people planning to take the ISTQB® Foundation Level Certified Model-Based Tester examination.

These questions cannot be used as-is in any official examination, but they should serve as guidance for question writers. Given the wide variety of formats and subjects, these sample questions should offer many ideas for the individual Member Boards on how to create good questions and appropriate answer sets for their examinations. Furthermore training providers can use these questions as part of their training to prepare participants for the examination.

0.2 Instructions

The question and answer sets are organized in the following way:

- Learning Objective and K-level
- Question - including when appropriate any scenario followed by the question stem
- Answer Set
- Correct answer – including justification of the answers

1. Model-Based Tester Sample Questions

Question 1 K1

Chapter 1 - Term (K1) – Recall the definition of model-based testing according to the ISTQB glossary

Answer and justification:

- A. Incorrect. Model-based testing is used to generate manual or automated tests.
- B. Incorrect. Model-based testing supports and automates a large variety of test design techniques, not only state transition testing.
- C. Incorrect. Model-based testing may use a large variety of modeling languages, not only business process modeling.
- D. Correct (see ISTQB glossary).

Point Value: 1

Question 2 K2

FM-1.1.1 (K2) - Describe expected benefits of MBT

Answer and justification:

- A. Incorrect. MBT is not equivalent to test automation. It is also possible (and beneficial) to generate test cases for manual test execution.
- B. Correct. A benefit of MBT is to facilitate a shared understanding of requirements between testers and other stakeholders using MBT models.
- C. Incorrect. Maintenance of the generated automated test scripts would also require the maintenance of the test adaptation layer.
- D. Incorrect. Reuse of system design models is possible, but of limited use. In particular, it is not possible to cover all project test objectives without writing a targeted MBT model.

Point Value: 1

Question 3 K2

FM-1.1.2 (K2) - Describe misleading expectations and pitfalls of MBT

Answer and justification:

- A. Incorrect. To fulfill project test objectives, testers need to drive MBT test generation and to master test design techniques.
- B. Correct. MBT needs to adapt to the existing test process and organization.
- C. Incorrect. MBT is not just a matter of tooling but impacts the test organization and process.
- D. Incorrect. The reuse of system design models has its limits.

Point Value: 1

Question 4 K2

FM-1.2.1 (K2) - Summarize the activities specific to MBT when deployed in a test process

Answer and justification:

- A. Incorrect. Early testing is an important aspect of MBT. In a top-down approach, it is not necessary to know the detailed design of the system under test to start the modeling activities.
- B. Incorrect. MBT models should be developed on the basis of requirements AND project test objectives.
- C. Incorrect. Iterative and incremental development of MBT models is part of good practices in MBT.
- D. Correct. The use of test selection criteria to drive test generation is part of MBT activities.

Point Value: 1

Question 5 K1

FM-1.2.2 (K1) - Recall the essential MBT artifacts (inputs and outputs)

Answer and justification:

- A. Incorrect. Test basis are input to the MBT activities and defect reports cannot be generated from the MBT model.
- B. Correct.
- C. Incorrect. The test strategy is part of the input for MBT.
- D. Incorrect. Defect reports cannot be generated from the MBT model and process guidelines are part of the input for MBT activities.

Point Value: 1

Question 6 K2

FM-1.3.1 (K2) - Explain how MBT integrates into software lifecycle development processes

Answer and justification:

- A. Correct. MBT requires new activities for testers but not new roles.
- B. Incorrect. MBT impacts the software development life cycle. It amends the lifecycle with modeling activities.
- C. Incorrect. No new roles are required. Modeling activities require testers to learn new skills and enrich current roles.
- D. Incorrect. MBT integrates well with common variants of sequential and agile lifecycles.

Point Value: 1

Question 7 K2

FM-1.3.2 (K2) - Explain how MBT supports requirements engineering

Answer and justification:

- A. Correct. RE does not change. In fact RE gets earlier feedback. MBT supports requirements validation early by MBT models made.
- B. Incorrect. RE does not change. MBT analysts do not replace business analysts and do not perform requirements analysis for development, but for testing.
- C. Incorrect. RE does not change. MBT models do not replace system development models, because MBT models cover the project test objectives (which is generally not the case for system development models)..
- D. Incorrect. RE does not change. Requirements Analysis is still required.

Point Value: 1

Question 8 K3

FM-2.1.1 (K3) - Develop a simple MBT model for a test object and predefined test objectives using a workflow-based modeling language

Answer and justification:

- A. Incorrect. It is possible to pass the exam without attending a training course or without individual preparation at home.
- B. Incorrect. When repeating the exam, it is also possible to pass the exam without attending a training course or without individual preparation at home.
- C. Incorrect. If the exam taker succeeds the exam, he or she may no longer repeat it.
- D. Correct. It is not necessary to attend the training course prior to the exam.

Point Value: 1

Question 9 K3

FM-2.1.2 (K3) - Develop a simple MBT model for a test object and predefined test objectives using a state transition-based modeling language

Answer and justification:

- A. Correct. An action “/ return money” (or equivalent) missing after “cancel”.
- B. Incorrect. As soon as “[enough money]” is true, the automaton dispenses the beverage.
- C. Incorrect. There is an outgoing transition with the trigger “take beverage” from state “finished”.
- D. Incorrect. The user may select a beverage.

Point Value: 1

Question 10 K2

FM-2.1.3 (K2) - Classify an MBT model with respect to the subject and to the focus

Answer and justification:

The two models are respectively a structural description of the system (class diagram above) and a behavioral description of test cases. The latter one can be recognized by the “check” action. For this reason, only option C is correct.

Point Value: 1

Question 11 K2

FM-2.1.4 (K2) - Give examples of how an MBT model depends on the test objectives

Answer and justification:

- A. Incorrect. TO-1 requires a behavioral model
- B. Incorrect. TO-2 requires a structural model
- C. Correct. Subject and focus are correct
- D. Incorrect. TO-4 requires a structural system or test model

Point Value: 1

Question 12 K1

FM-2.2.1 (K1) - Recall examples of modeling language categories commonly used for MBT

Answer and justification:

- A. Correct. This is a UML behavior diagram.
- B. Incorrect. This is a UML structure diagram.
- C. Incorrect. This is a UML structure diagram.
- D. Incorrect. This is a UML structure diagram.

Point Value: 1

Question 13 K1

FM-2.2.2 (K1) - Recall typical representatives of modeling language categories relevant for different systems and project objectives.

Answer and justification:

- A. Correct. Usage models are well suited as a basis to derive performance tests as they represent typical usages for that system.
- B. Incorrect. Decision tables model logical rules of an IT system, which relate to the functionality of that system, but not to its performance.
- C. Incorrect. State diagrams may be helpful, but they are not the first choice.
- D. Incorrect. Feature models are well suited to represent the variants in the context of a software product line (for example), but they have nothing to do with performance testing.

Point Value: 1

Question 14 K1

FM-2.3.1 (K1) - Recall quality characteristics for MBT models

Answer and justification:

- A. Incorrect. An MBT model may be syntactically correct but inadequate for the given test objective.

- B. Incorrect. An MBT model may be semantically correct but inadequate for the given test objective.
- C. Correct. Pragmatic quality means that the MBT model fits the target.
- D. Incorrect. Portability has nothing to do with adequacy of the MBT model to the test objective.

Point Value: 1

Question 15 K2

FM-2.3.2 (K2) - Describe classic mistakes and pitfalls during modeling activities for MBT

Answer and justification:

- A. Incorrect. MBT can be used in combination with either manual or automated test execution.
- B. Correct. The pragmatic aspect of models has been disregarded. The MBT model should focus on the test objective and not aim to be as complete as possible.
- C. Incorrect. Developing the MBT model on the basis of project test objectives is a best practice in model-based testing.
- D. Incorrect. An MBT model can be used to generate several test suites with different test selection criteria.

Point Value: 1

Question 16 K2

FM-2.3.3 (K2) - Explain the advantages of linking requirements and process related information to the MBT model

Answer and justification:

- A. Incorrect. With increasing number of model elements, it becomes more difficult to keep the model layout readable.
- B. Correct. This linking information is mandatory to be able to generate test cases on the basis of the coverage of selected requirements.
- C. Incorrect. When requirements are linked with model elements, it becomes easier to analyze the impact of requirements changes, but does not support root cause analysis in case of errors in the model.
- D. Incorrect. In principle, code debugging is not specifically facilitated by MBT.

Point Value: 1

Question 17 K2

FM-2.3.4 (K2) - Explain the necessity of guidelines for MBT

Answer and justification:

- A. Incorrect. MBT tools usually take only a subset of an existing modeling language as input. Defining this subset is part of possible MBT modeling guidelines.
- B. Correct. Modeling patterns help to share common structure of MBT models within a team.

- C. Incorrect. MBT modeling guidelines are different from coding guidelines. Syntactical naming rules help foster a similar syntax and semantics of MBT models from various authors, but they should be easy to understand by non-technical stakeholders.
- D. Incorrect. Providing test cases as part of MBT modeling guidelines is not relevant.

Point Value: 1

Question 18 K2

FM-2.3.5 (K2) - Provide examples where reuse of existing models (from requirements phase or development phase) is or is not appropriate

Answer and justification:

- A. Incorrect. If a model is used to automatically generate the code, using it to generate the tests will only test the code generator (which is not the test objective of the project in general).
- B. Correct. If adequate with the test objectives and the MBT tooling, requirements models may be reused and adapted.
- C. Incorrect. A low-level architecture model is a structural model than cannot be reused for user acceptance testing.
- D. Incorrect. A detailed implementation model is, in general, not reusable for MBT because it focuses on implementation information and not on the requirements for test purposes.

Point Value: 1

Question 19 K1

FM-2.3.6 (K1) - Recall tool types supporting specific MBT modeling activities

Answer and justification:

A, B and C are specialized model editors that know about the syntax of the modeling language used. Thus, D is the correct answer.

Point Value: 1

Question 20 K2

FM-2.3.7 (K2) - Summarize iterative MBT model development, review and validation

Answer and justification:

- A. Incorrect. Especially in a top-down modeling approach, the level of detail is rather low during the first reviews.
- B. Incorrect. MBT models may also become quite complex and pure inspections, especially across different diagrams, are no longer sufficient. Validation of the generated test cases is necessary to ensure that the tests fulfill the expectations.
- C. Correct. Iterative model development allows the MBT tester to start specifying tests early in the development process because that can be done first on a higher level of abstraction.
- D. Incorrect. MBT supports early requirement validation, but does not replace it. The focus of model validation is completely different.

Point Value: 1

Question 21 K1

Chapter 3 - Term (K1) – Recall the definition of test selection criteria according to the ISTQB glossary

Answer and justification:

- A. Incorrect. Test selection criteria have nothing to do with reviews.
- B. Incorrect. There are other ways to avoid test case explosion.
- C. Correct (refer to 'test selection criteria' in the ISTQB glossary).
- D. Incorrect. Test selection criteria are neither part of the test adaptation layer, not limited to automated test execution.

Point Value: 1

Question 22 K1

Chapter 3 - Term (K1) – Recall the definition of model coverage according to the ISTQB glossary

Answer and justification:

- A. Correct (see ISTQB glossary).
- B. Incorrect. Model coverage refers to the generated test cases (not requirements).
- C. Incorrect. Model coverage is not directly related to random coverage.
- D. Incorrect. In the MBT context, model coverage relates to the MBT model, not to the code.

Point Value: 1

Question 23 K2

FM-3.1.1 (K2) - Classify the various families of test selection criteria used for test generation from models

Answer and justification:

- i. Incorrect. This scenario describes requirement-based test selection.
- ii. Incorrect. This scenario describes a situation, where transition coverage was the aim, but has not been reached.
- iii. Correct. This scenario describes scenario-based test selection.
- iv. Correct. This scenario describes project-driven test selection.
- v. Incorrect. This scenario describes a specific case of data coverage.
- vi. Incorrect. This scenario describes full path coverage.

Hence

- A. Incorrect
- B. Correct
- C. Incorrect
- D. Incorrect

Point Value: 1

Question 24 K3

FM-3.1.2 (K3) - Generate test cases from an MBT model to achieve given test objectives in a given context

Answer and justification:

- A. Incorrect. There is no way to cover “Room available = yes” and “Given up = yes” in one path.
- B. Correct. It is possible to cover all decision points with two paths (e.g. “Start -> Search hotel (yes) -> Request reservation (yes) -> Confirm reservation (yes) -> End” and “Start -> Search hotel (no) -> Search hotel (yes) -> Request reservation (no) -> End”).
- C. Incorrect. It is possible to obtain 100% decision coverage with three test cases, but the minimum number is two.
- D. Incorrect. It is possible to obtain 100% decision coverage with four test cases, but the minimum number is two.

Point Value: 1

Question 25 K2

FM-3.1.3 (K2) - Provide examples of model coverage, data-related, pattern- and scenario-based and project-based test selection criteria

Answer and justification:

- A. Incorrect. In some sense, it is possible to tests "paths" in structural MBT models by, for example, creating objects of given types (for a class diagram) and check the relations between them defined by the edges. However, this is NOT common practice in industry.
- B. Incorrect. A business process represents business flows, NOT states and transitions.
- C. Incorrect. Gateways are a modeling element used for business process modeling, not for textual models.
- D. Correct. Transition pair coverage is a common criterion for state diagrams.

Point Value: 1

Question 26 K2

FM-3.1.4 (K2) - Recognize how MBT test selection criteria relate to ISTQB Foundation Level test design techniques

Answer and justification:

- i. Correct. For example in activity diagrams, each boundary value may be represented by an action.
- ii. Correct. Decision table is part of test design techniques.
- iii. Incorrect. Even if it is always recommended to work with models, use case testing without models is possible.
- iv. Incorrect. MBT supports validation activities very well.
- v. Incorrect. State machine is a possible modeling language for MBT, but not the only one.

Hence

- A. Incorrect
- B. Incorrect
- C. Correct
- D. Incorrect

Point Value: 1

Question 27 K1

FM-3.2.1 (K1) - Recall degrees of test artifact generation automation

Answer and justification:

- A. Incorrect. This is a common misunderstanding. An MBT approach without test generation tools has low maturity, but it is definitely an MBT approach.
- B. Incorrect. In the highest maturity approach, the model is the master and the derived artifacts are used as is without further post-processing.
- C. Correct. A common usage of MBT is to let the tool generate test cases following some coverage criteria and to manually add some specific scenario-based tests.
- D. Incorrect. More artifacts like test scripts or traceability matrix can be automatically generated from an MBT model.

Point Value: 1

Question 28 K3

FM-3.2.2 (K3) - Apply given test selection criteria to a given MBT model

Answer and justification:

- A. Incorrect. In the note, the probabilities are given to be used by stochastic test case selection.
- B. Incorrect. The entire model is not really apt to test the workflow.
- C. Correct. Selecting specific paths is exactly the idea of scenario-based test selection. An example for such a scenario is: Create request 1, Solve request 1, Create request 2, Create request 3, Solve request 3, View statistics
- D. Incorrect. We know nothing about the requirements. To apply requirements coverage as selection criterion, we need at least a link to a requirement in the MBT model.

Point Value: 1

Question 29 K2

FM-3.2.3 (K2) - Describe good practices of MBT test selection criteria

Answer and justification:

- A. Incorrect. Combining test selection criteria is a good MBT practice.
- B. Incorrect. This is only true for composition of criteria (intersection).
- C. Correct. We may add the test cases obtained with different test selection criteria to obtain a larger set of test cases, which fits the test objective better.
- D. Incorrect. This is a possible, but not the only way to combine test selection criteria.

Point Value: 1

Question 30 K1

Chapter 4 - Term (K1) – Recall the definition of online MBT according to the ISTQB glossary

Answer and justification:

- A. Correct (see ISTQB glossary).
- B. Incorrect. Automated test execution is not a specific characteristic of online MBT (with respect to offline MBT).
- C. Incorrect. Online and offline MBT are two different MBT approaches, which differ in the way the test cases are generated. Online MBT requires even more automated tool support than offline MBT.
- D. Incorrect. Online MBT is not specifically related to project-based coverage criteria.

Point Value: 1

Question 31 K2

FM-4.1.1 (K2) - Explain the difference between abstract and concrete test cases in the MBT context

Answer and justification:

- A. Incorrect. The MBT model developed so far in the project does not contain sufficient information to generate concrete test cases for automated execution.
- B. Incorrect. It is possible to add the required information on detailed test actions and data values in the MBT model and to generate concrete test cases using the same MBT tool as before.
- C. Incorrect. It strongly depends on the degree of abstraction of the MBT model, whether an experienced tester will be able to execute the generated test cases. However, the tester qualification has to be domain- (and even project-) specific to enable him or her.
- D. Correct. The adaptation layer specification provides information such as linking high level business actions with completely defined test actions and providing test data values.

Point Value: 1

Question 32 K2

FM-4.1.2 (K2) - Explain the different kinds of test execution in the MBT context

Answer and justification:

- A. Incorrect. MBT is used with manual and automated test execution.
- B. Correct. Offline MBT test execution is often linked with exporting of generated tests to the test management tool.
- C. Incorrect. In principle, online test execution cannot be used with manual test execution (because of the large number of tests obtained from the MBT model).
- D. Incorrect. Offline test execution means that the test cases are generated first and executed afterwards.

Point Value: 1

Question 33 K3

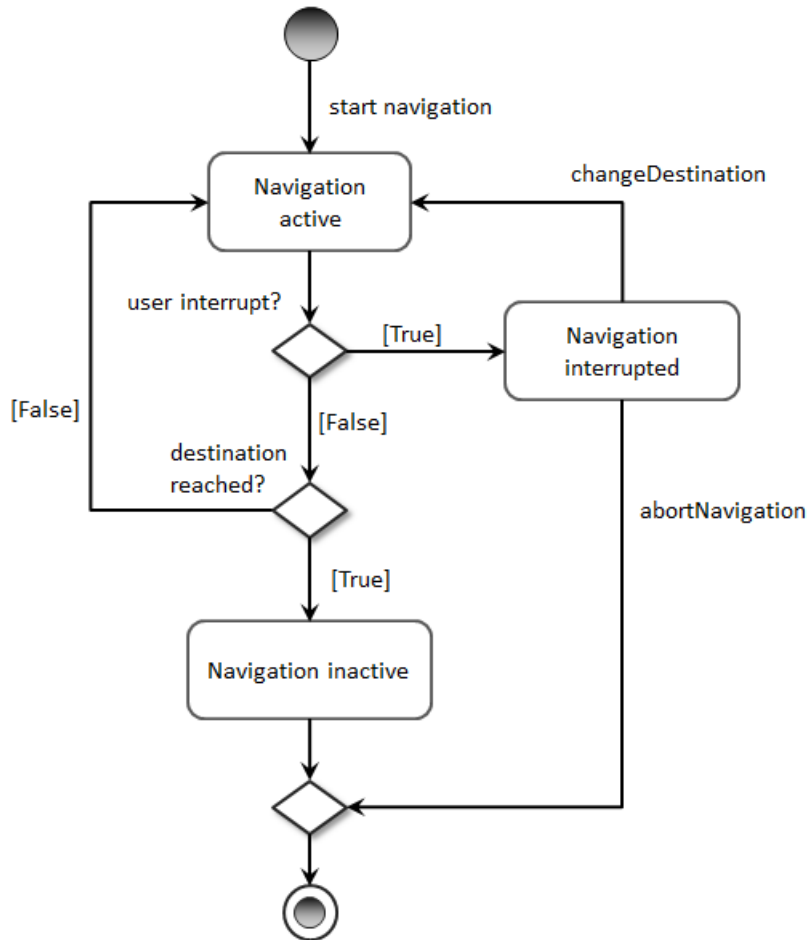
FM-4.1.3 (K3) - Perform updates of an MBT model and test generation caused by changes in requirements, test object or test objectives

Answer and justification:

- i. Incorrect. Distractor; This may be a part of a possible alternative solution, but in the given situation, it is wrong, because it short-circuits the state "Navigation interrupted".
- ii. Correct. see figure below
- iii. Correct. see figure below
- iv. Correct. see figure below
- v. Incorrect. There is no decision this guard refers to.

Hence

- A. Incorrect
- B. Correct
- C. Incorrect
- D. Incorrect



Point Value: 1

Question 34 K2

FM-4.2.1 (K2) - Explain which kind of test adaption may be necessary for test execution in MBT

Answer and justification:

- A. Incorrect. The test team generates manual test scripts, so testers do NOT need to read the MBT model during manual test execution
- B. Incorrect. The answer is true for automated test execution, but not in general.
- C. Incorrect. The test automation engineer implements the test adaptation layer according to the adaptation layer specification, which may be contained in the MBT model or provided externally.
- D. Correct. It is a good practice to keep the MBT model at a higher abstraction level and to separate logical aspects from implementation details.

Point Value: 1

Question 35 K2

FM-5.1.1 (K2) - Describe ROI factors for MBT introduction

Answer and justification:

- A. Correct.
- B. Incorrect. Rather it increases the testing costs, since a higher number of test cases leads to increasing test execution effort.
- C. Incorrect. Rather it may increase the testing costs, since an improvement in systematic coverage for itself leads to a higher coverage and thus may lead to a higher number of test cases compared to a set of manually created test cases increasing the test execution effort.
- D. Incorrect. This can lead to a financial benefit for the product vendor (e.g. due to higher market acceptance) but it will not lead to direct financial benefits for the test project.

Point Value: 1

Question 36 K2

FM-5.1.2 (K2) - Explain how the objectives of the project influence the characteristics of the MBT approach

Answer and justification:

- A. Correct. Combining test selection criteria and coverage monitoring improves the quality of testing.
- B. Incorrect. Separate models for development and MBT activities (enabling the tester's mindset and encouraging independence) help to improve the quality of testing.
- C. Incorrect. High degree of process automation including the generation of test artifacts and the execution of tests to reduce human errors
- D. Incorrect. Functional testing requires that behavioral aspects are modeled.

Point Value: 1

Question 37 K1

FM-5.1.3 (K1) - Recall selected metrics and key performance indicators to measure the progress and results of MBT activities

Answer and justification:

- A. Correct.
- B. Incorrect. In this context, MBT is used for acceptance testing and has no impact on code development.
- C. Incorrect. In this context, MBT is used for acceptance testing and has no impact on component testing.
- D. Incorrect. The spent effort is not the best measure for progress in this context.

Point Value: 1

Question 38 K1

FM-5.2.1 (K1) - Recall good practices for test management, change management and collaborative work when deploying MBT

Answer and justification:

- A. Incorrect. MBT can be used for manual and automated testing. The risk is higher for projects using test automation.
- B. Incorrect. Configuration management should be used for MBT models.
- C. Incorrect. Using MBT automated test scripts in continuous integration is a good practice.
- D. Correct. Traceability between requirements and MBT model elements is mandatory to produce the traceability matrix between test cases and requirements and to apply requirement coverage-based test selection.

Point Value: 1

Question 39 K1

FM-5.2.2 (K1) – Recall cost factors of MBT

Answer and justification:

- A. Incorrect. MBT modeling is a running cost.
- B. Correct. Evaluating tools is an initial cost.
- C. Incorrect. Test adaptation efforts are running cost.
- D. Incorrect. Tooling is a running cost (because of tool maintenance).

Point Value: 1

Question 40 K2

FM-5.2.3 (K2) - Give examples of the integration of the MBT tool with requirements management, test management and test automation tools

Answer and justification:

- A.** Correct. The export of generated test cases into the test management tool is a good practice.
- B.** Incorrect. Most MBT tools provide features to configure different output formats and, thus, generate automated test scripts in a format compatible with the test automation framework.
- C.** Incorrect. Usually, requirements are imported into the MBT tool to support traceability.
- D.** Incorrect. In some cases, it is possible to mirror execution results back into the MBT model, but this required specific tool support and is not common practice.

Point Value: 1