

ISTQB[®] Foundation Level Certified Model-Based Tester

Sample Exam

Version 2015 – v1.0

International Software Testing Qualifications Board



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Revision History

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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

Which one of the following statements is the best definition of model-based testing?

Answer Set:

- A. A testing technique using models to generate automated scripts.
- B. A test design technique that uses state transition diagrams to design test cases.
- C. Acceptance testing using business process models.
- D. Testing based on or involving models.

Question 2 K2

A test team has decided to apply an MBT approach for a large banking system project at the system testing level.

Which one of the following statements describes a benefit of MBT you may expect for any kind of project?

Answer Set:

- A. MBT implies the generation of test scripts for automated test execution, which will reduce execution time and decrease the number of tester errors during test execution.
- B. The test team creates graphical MBT models and reviews them with business analysts to contribute to a common understanding of the requirements.
- C. The maintenance of the automated test scripts is now fully automated when changes to the MBT models have been done by the test team.
- D. MBT reduces the costs of test design, because the test team applies test selection criteria on existing system design models to generate various test suites covering the project test objectives.

Question 3 K2

Which one of the following statements best reflects realistic expectations from introducing MBT into the software development lifecycle?

Answer Set:

- A. MBT users do not need to understand test design techniques because test generation with MBT is fully automated.
- B. Carefully introducing changes to the whole test process when introducing MBT, including test team training, helps to obtain measurable progress.
- C. Adding an MBT tool without change in the existing organization and/or test process is an effective approach.
- D. Since reuse of a system design model is possible in MBT, after small investment, the usage of MBT in a development process is almost for free.

Question 4 K2

An MBT approach is used in a project. Which statement below regarding MBT activities is most correct?

Answer Set:

- A. MBT modeling activities should start as soon as possible, but not before having finished the detailed system design.
- B. MBT models reflect the system requirements, but do not consider the project test objectives.
- C. MBT activities in a test process should follow a strictly sequential order.
- D. Test selection criteria are used to drive test generation from the MBT model.

Question 5 K1

Which one of the following items are artifacts that can be generated from an MBT model?

Answer Set:

- A. Test basis, test cases and defect reports.
- B. Test cases, test suites and traceability matrix between generated tests and requirements.
- C. Test cases, test suites and test strategy.
- D. Test cases, defect reports and process guidelines.

Question 6 K2

Which one of the following statements best reflects the impact of MBT on software development lifecycles?

Answer Set:

- A. MBT keeps existing testing roles but it amends their tasks with specific MBT activities.
- B. MBT has no impact on the software development lifecycle.
- C. MBT requires a new role to manage the MBT-specific activities.
- D. MBT requires a separate process independent of the software development lifecycle.

Question 7 K2

Suppose a project team is using use case diagrams for business analysis. Now the project manager proposes model-based testing to improve testing.

Which one of the following statements is the best analysis made by the project manager related to the impact of MBT on requirements engineering (RE) activities?

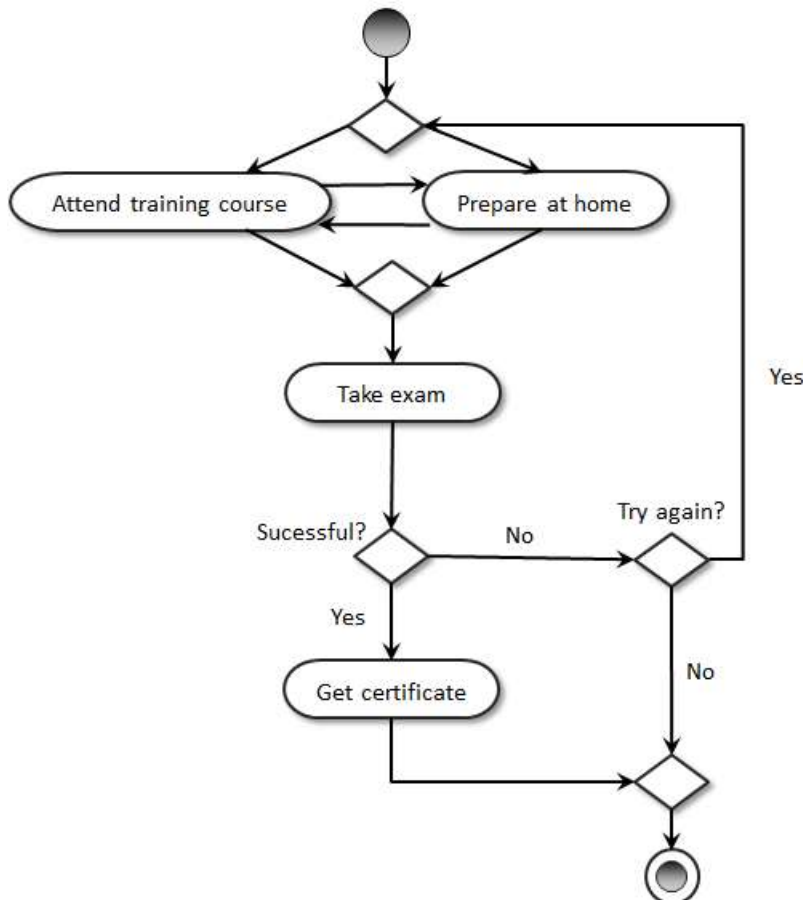
Answer Set:

- A. RE activities will not change. The major impact on RE is the fact that MBT models will support validation of requirements by modeling the system from a testing perspective.
- B. RE activities will not change. The major impact is that requirements analysis is now performed by the skilled MBT analyst replacing the business analyst.
- C. RE activities will not change. The major impact is that MBT models are replacing system development models.

- D. RE activities will change. The requirements analysis activity is not required anymore, because MBT analysis and design is sufficient to analyze the requirements.

Question 8 K3

The given workflow diagram describes an ISTQB certification. It shows the behavior of the exam taker, who attends the training course and/or prepares for the exam at home, then takes the exam and gets the certificate.



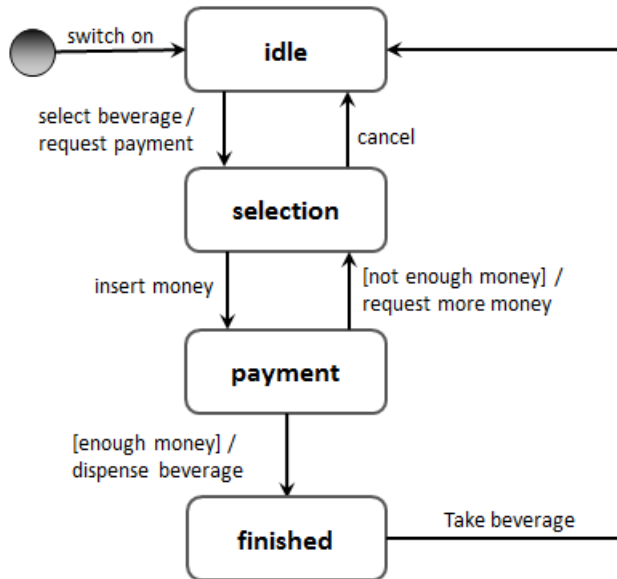
Which one of the following statements corresponds to the workflow described in the model?

Answer Set:

- A. The exam taker has to attend the training and to prepare individually at home to be able to pass the exam.
- B. After failing the exam, the exam taker willing to repeat the exam has to attend the training course again.
- C. Irrespective of the result, the exam taker may repeat the exam an unlimited number of times.
- D. It is possible to get the certificate without attending the training course.

Question 9 K3

The given state machine shows the behavior of a beverage dispenser, e.g., for soft drinks or coffee. It shows the functional interaction between a user of the dispenser, who can switch the dispenser on and select a beverage, and the dispenser that can request more money if an insufficient amount of money has been inserted. The model should be used for model-based testing of the beverage dispenser.



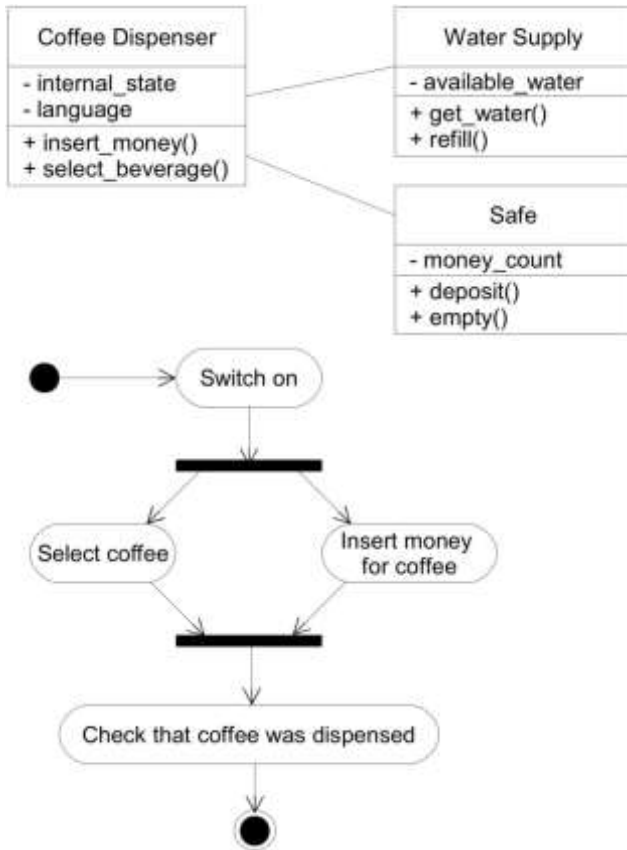
A reviewer of the model created four comments against the model. Which one of the following comments is correct?

Answer Set:

- A. After selecting a beverage and inserting an insufficient amount of money, the model does not require that money is returned.
- B. After selecting the beverage, the user always has to insert an infinite amount of money without getting the selected beverage.
- C. After selecting the beverage and paying for it, the user cannot take the beverage from the dispenser.
- D. After selecting the beverage and canceling the choice, the user has to switch the beverage dispenser on and off again.

Question 10 K2

The following models show two different viewpoints of a coffee dispenser. Please classify the models and select the one correct option below.



Answer Set:

- A. At least one of the models is a structural description of test cases.
- B. At least one of the models is a behavioral description of the system.
- C. At least one of the models is a behavioral description of test cases.
- D. At least one of the models is a structural description of the environment.

Question 11 K2

Suppose the following test objectives are specified in a project:

- TO-1) validate the business workflows.
- TO-2) verify whether all system interfaces exist as specified.
- TO-3) validate that the system corresponds to the needs of different user profiles.
- TO-4) verify the correct implementation of input data ranges.

Which one of the following combinations between test objectives and MBT model subject and focus is correct?

Answer Set:

- A. TO-1 requires a structural system model.
- B. TO-2 requires a behavioral test model.
- C. TO-3 requires a behavioral environment model.
- D. TO-4 requires a structural environment model.

Question 12 K1

In MBT, behavioral models are often used for test generation. Which one of the following diagrams is a behavioral model?

Answer Set:

- A. A state transition diagram.
- B. A class diagram.
- C. A deployment diagram.
- D. A package diagram.

Question 13 K1

You have to test the performance of an IT system and you are asked to recommend a model to derive tests from. Which one would you first recommend?

Answer Set:

- A. A usage model, as that model allows representing the prospective usages of the system.
- B. A decision table, as that table allows representing the rule sets of the IT system.
- C. A state diagram, as that model allows representing normal, maximum and overload states of the system.
- D. A feature model, as that model allows representing non-functional requirements.

Question 14 K1

As a reviewer, you have to check whether an MBT model is adequate for the given test objective. How is the corresponding quality criterion defined?

Answer Set:

- A. Syntactic quality,
- B. Semantic quality,
- C. Pragmatic quality,
- D. Portability quality.

Question 15 K2

Which one of the following scenarios corresponds to a common mistake MBT newcomers tend to commit?

Answer Set:

- A. MBT is used in combination with manual test execution.
- B. The MBT model for system testing tries to describe the system under test in complete detail.
- C. The MBT model is developed on the basis of the test objectives.
- D. Different test suites are generated from the same MBT model with various test selection criteria.

Question 16 K2

Which one of the following statements about linking requirements to MBT models is most correct?

Answer Set:

- A. Linking requirements to models makes it easier to layout the MBT model.
- B. Linking requirements to models makes it possible to generate test cases for selected requirements.
- C. The link between requirements and model elements facilitates root cause analysis in case of errors in the model.
- D. Linking requirements to MBT models facilitates debugging activities at the code level.

Question 17 K2

In a project regarding the development of a new banking system, a model-based testing approach based on business process modeling with BPMN is used. MBT modeling guidelines are defined for the project.

Which one of the following topics is most probably found in modeling guidelines for such MBT project?

Answer Set:

- A. A full description of UML diagrams and model elements.
- B. Proposed modeling patterns for typical business flows.
- C. Naming rules based on the naming conventions defined in coding guidelines.
- D. Sample drafts of test cases relevant for testing the application.

Question 18 K2

The reuse of existing design models is usually appreciated by industry as it lowers costs. Consider the following examples where an existing design model shall be used as input to MBT instead of developing completely new MBT models.

Which one of the following examples shows a best-practice reuse of an existing model?

Answer Set:

- A. Model-driven engineering was used in the project to automatically derive the implementation of the system from a model. A separate MBT model is not necessary and this model will be reused to generate all test cases to test the system.
- B. A requirements model of the business processes has been developed during the business analysis phase. The test team decided to reuse and adapt it for model-based testing.
- C. A model of the architecture of the system, describing component interaction at a low level, is available from the development team. The test team decided to reuse it in the context of model-based testing for user acceptance testing.
- D. A detailed implementation model was used to derive the implementation of a system. The model is accessible to the MBT tool and can be used to check that the implementation correctly implements the requirements.

Question 19 K1

Consider the following tools supporting the MBT modeling process. Which tool provides support for writing syntactically correct MBT models?

Answer Set:

- A. UML modeling tool.
- B. State/transition diagram editor.
- C. Domain-specific language editor.
- D. All of the above.

Question 20 K2

Which one of the following statements regarding iterative model development, review and validation is true?

Answer Set:

- A. At least some parts of the MBT model must be specified to its final degree of detail, before the stakeholders can perform their first review.
- B. Regular reviews of the MBT model are sufficient to assure that tests generated from the MBT model will fulfill the expectations.
- C. Iterative model development allows the MBT tester to start specifying tests early in the development process.
- D. Validation of the MBT model replaces requirements validation.

Question 21 K1

Which one of the following definitions best describes test selection criteria in the MBT context?

Answer Set:

- A. Model-based testers apply test selection criteria to determine the test cases ready for review.
- B. Test selection criteria are specific to MBT, because they are the only possibility to avoid test case explosion.
- C. Model-based testers apply test selection criteria to guide the generation of test cases or to select test cases in order to limit the size of a test suite.
- D. Test selection criteria are part of the test adaption layer for automated test execution in MBT.

Question 22 K1

Which one of the following definitions best describes model coverage in the MBT context?

Answer Set:

- A. Model coverage characterizes the degree to which model elements are planned to be or have been exercised by a test suite.
- B. Model coverage characterizes the degree to which the previously defined requirements are covered by the MBT model.
- C. Model coverage defines a random coverage of the model expressed as percentage.
- D. Model coverage is a white box test selection criteria measured during test execution.

Question 23 K2

The following list enumerates different statements about MBT test case selection.

- i. The selected tests cover the requirements linked to model elements.
- ii. The selected tests check all transitions in the state diagram except one.
- iii. The selected tests cover specific, previously defined scenarios.
- iv. The selected tests cover all tests that require some specific equipment.
- v. The selected tests check all equivalence partitions defined for a given data domain.
- vi. The selected tests cover all paths through the MBT model.

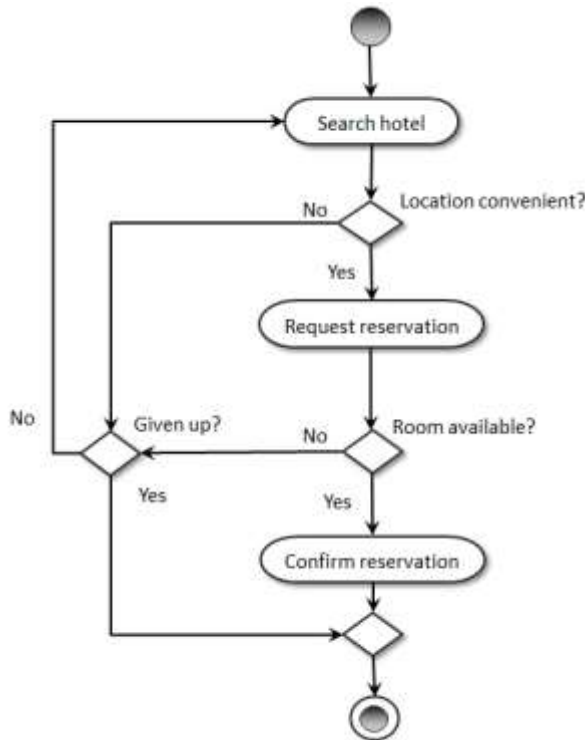
TWO of them do NOT describe coverage-based test selection. Which ones?

Answer Set:

- A. (i) and (ii)
- B. (iii) and (iv)
- C. (v) and (vi)
- D. (ii) and (v)

Question 24 K3

The system under test is an online booking portal. From the MBT model shown in the figure, several sets of test cases can be selected.



What is the minimum number of test cases required to obtain 100% decision coverage?

Answer Set:

- A. 1
- B. 2
- C. 3
- D. 4

Question 25 K2

Which one of the following statements is a typical combination of test selection criteria for an MBT model?

Answer Set:

- A. Path coverage on structural models.
- B. Transition coverage on business process models.
- C. Gateway coverage on textual models.
- D. Transition pair coverage on state diagrams.

Question 26 K2

MBT does not replace other test design techniques, but supports them. Which two of the following statements can be considered as correct regarding this support?

- i. It is possible to model boundary values in the MBT model.
- ii. MBT allows the combination of behavioral MBT models with decision tables.
- iii. Use case testing without models is impossible.
- iv. MBT only supports verification activities, but no validation activities.
- v. State machine modeling is the only way to use MBT.

Answer Set:

- A. (ii) and (v)
- B. (i) and (iv)
- C. (i) and (ii)
- D. (iii) and (v)

Question 27 K1

Tooling plays an important role in model-based testing and influences the degree of test artifact generation.

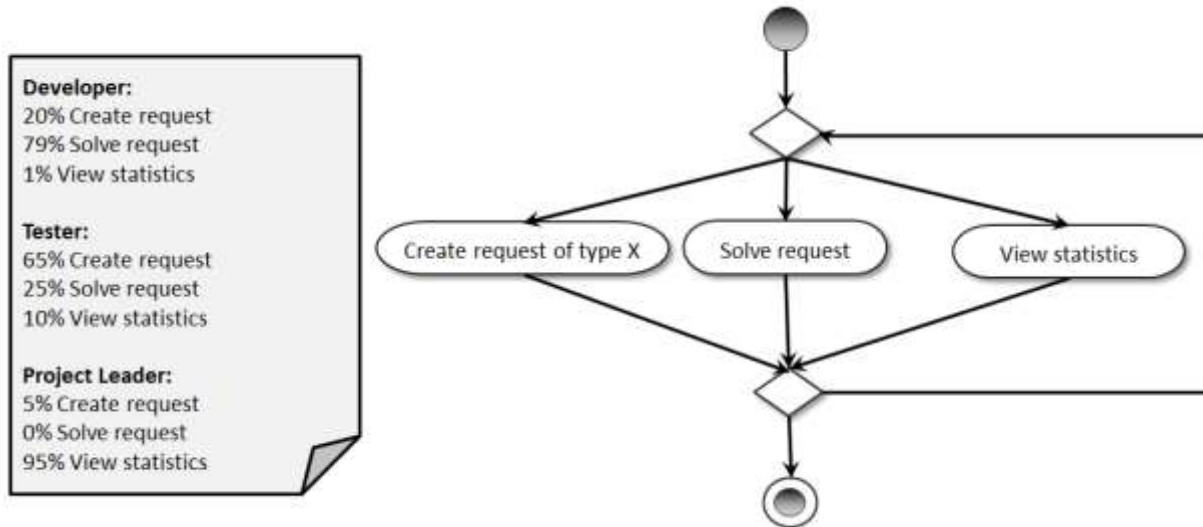
Which one of the following statements regarding automated test artifact generation is most correct?

Answer Set:

- A. MBT automatically implies tool-based test artifact generation.
- B. Even in a completely automated MBT approach, some post-processing of the generated test artifacts is required prior to test execution.
- C. Even if a test artifact generator is used, manual test case selection may add value to the test process.
- D. Only test cases can be automatically generated from an MBT model.

Question 28 K3

The following MBT model describes the main user activities of a change request management system:



Which of the following statements regarding test selection criteria is correct?

Answer Set:

- A. To test the usage profiles given in the note, stochastic test case selection is not useful.
- B. 100% transition coverage is the best test selection criterion to check the change request management workflow.
- C. Scenario-based test case selection allows you to select specific sequences from the model.
- D. It is possible to achieve 100% requirements coverage with the given information.

Question 29 K2

Which one of the following statements regarding test selection criteria applied to MBT models in practice is most correct?

Answer Set:

- A. In MBT, testers avoid combining test selection criteria.
- B. Combining test selection criteria always decreases the number of test cases.
- C. Combining test selection criteria may increase the number of test cases.
- D. The correct way to combine test selection criteria is to apply full requirements coverage first and then another criterion.

Question 30 K1

Which one of the following statements best defines online model-based testing?

Answer Set:

- A. A model-based testing approach whereby test cases are generated and executed simultaneously.
- B. The term "Online MBT" covers all model-based testing approaches where the generated test cases are automatically executed.
- C. Online MBT refers to model-based testing approaches using semi-automated tool support.
- D. A model-based testing approach whereby test cases are generated using project-based coverage criteria.

Question 31 K2

A test team decided to use an MBT approach in the context of an HRMS – Human Resources Management System - testing project. They first produce an MBT model reflecting the main business processes with high level business actions, but without detailed test actions and concrete data values.

Which one of the following statements regarding abstract and concrete test cases is most true in this project context?

Answer Set:

- A. The test team can generate concrete test cases from this MBT model and execute them automatically without further adaptation.
- B. In order to obtain concrete test cases from this MBT model, additional MBT tools are required.
- C. The generated test cases are sufficiently detailed if executed manually by a certified tester.
- D. The test team can provide a test adaptation layer specification to provide the information required to generate the concrete test cases.

Question 32 K2

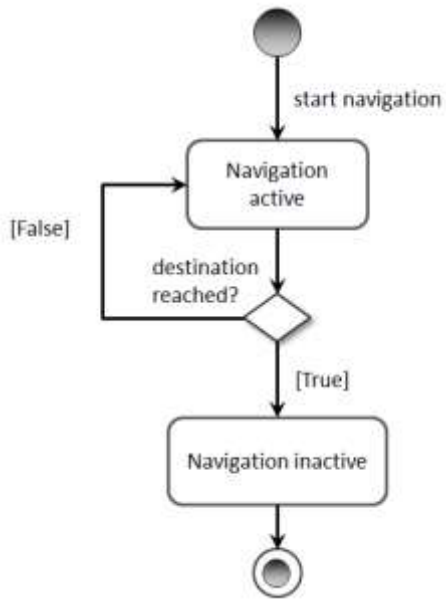
Which one of the following statements regarding MBT methods for test execution is true?

Answer Set:

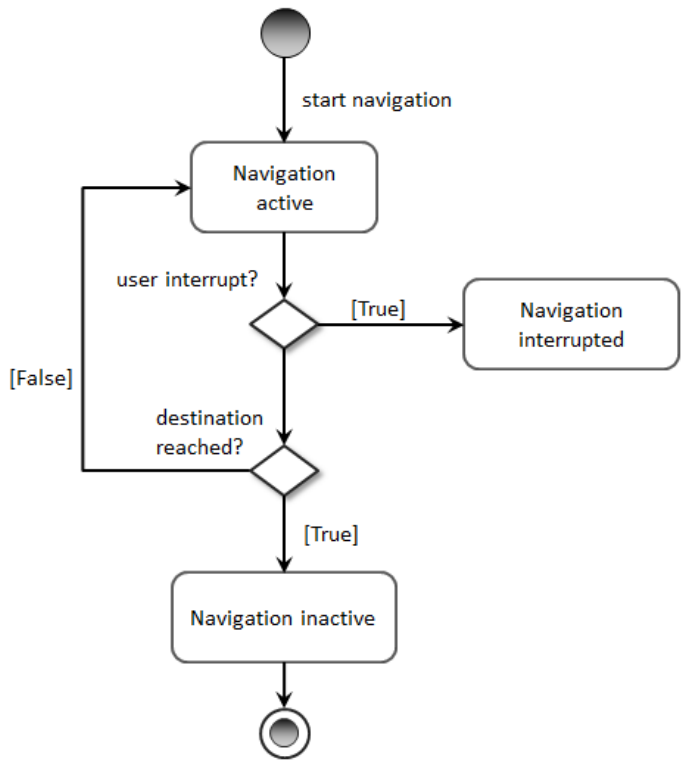
- A. MBT is not used with manual test execution.
- B. When using offline MBT test execution, generated test cases can be exported to the test management tool.
- C. Online test execution is generally applied with manual test execution.
- D. Offline execution implies test generation and test execution simultaneously.

Question 33 K3

The test team created a first version of an MBT model for testing a car navigation system:



Now, a new requirement turned up. It shall be possible to change the destination or to abort the navigation. The test team decided to add a new decision “userInterrupt?”, plus a new state “Navigation interrupted” to the existing MBT model and to connect them by a transition with guard “True”. Therefore, the test team created a second version of the MBT model:



Consider the following adaptations of this second MBT model:

- i. Add a transition “abortNavigation” between the decision “userInterrupt” and state “Navigation inactive”.
- ii. Add a guard “False” to the transition between the decision “userInterrupt?” and the decision “destination reached?”.
- iii. Add a transition with trigger “abortNavigation” between the new state “Navigation interrupted” and the existing state “Navigation inactive”.
- iv. Add a transition with trigger “changeDestination” between the new state “Navigation interrupted” and the existing state “Navigation active”.
- v. Add a guard “False” to the transition between the state “Navigation active” and the decision “userInterrupt”.

Which one of the following combination of adaptations is correct in order to cover the new requirement in the MBT model?

Answer Set:

- A. (i), (ii) and (iii)
- B. (ii), (iii) and (iv)
- C. (iii), (iv) and (v)
- D. (ii), (iii) and (v)

Question 34 K2

A test team is using MBT to generate manual test scripts at system testing level.

Which one of the following statements regarding MBT test adaptation for test execution is most true?

Answer Set:

- A. In the case of manual test execution, testers need to read the MBT model to proceed to manual test execution.
- B. If abstract test cases are generated from the MBT model, a test automation engineer has to develop the test adaptation layer prior to any test execution.
- C. In the case of automated test execution, the test automation engineer adds test adaptation layer information to the MBT model to enable automated generation of concrete test cases.
- D. In general, specifying a test adaptation layer helps separating platform- and implementation-specific aspects from business workflows and rules to be tested.

Question 35 K2

Which one of the following expected benefits of MBT may best lead to a financial benefit for the test effort?

Answer Set:

- A. Process automation and reuse effects.
- B. Higher number of test cases automatically generated from the MBT model compared to a set of manually created test cases.
- C. Systematic coverage of the MBT model.
- D. Reducing the time-to-market.

Question 36 K2

A company decided to deploy an MBT approach to test an embedded satellite flight guidance system, at the system testing level for functional testing. The motivation for using MBT is to improve the testing process.

Which one of the following characteristics of the MBT approach is the most relevant in this context?

Answer Set:

- A. The company combines various types of test selection criteria to achieve test objectives, and monitors requirement coverage through MBT tests.
- B. In the case where models for code generation are used, these models are fully reused for MBT without modification.
- C. All tests are executed manually.
- D. The MBT models are limited to structural aspects.

Question 37 K1

A company decided to use MBT for acceptance testing of a transport ticketing system.

Which one of the following metrics would a test manager use to best measure the progress of MBT activities?

Answer Set:

- A. The number of requirements managed and traced in the MBT model, and requirements coverage (percentage) by generated test cases
- B. The effort (in person-days) done for code development.
- C. The number of bugs discovered in the component testing phase.
- D. The effort (in person-days) spent on developing test models and applying test selection criteria.

Question 38 K1

An MBT approach is deployed in a project. Which one of the following statements describes good practice?

Answer Set:

- A. Deploying MBT with manual test execution requires additional risk management.
- B. Configuration management does not have to cover the MBT models, if the generated test cases are controlled.
- C. For projects applying continuous integration, MBT should be used for higher test levels only (system testing, user acceptance testing).
- D. Establishing traceability between requirements and MBT model elements is part of an MBT approach.

Question 39 K1

Cost factors of MBT relate to initial costs and running costs. Which one of the following is an initial MBT cost?

Answer Set:

- A. MBT modeling and model validation efforts.
- B. MBT tool evaluation.
- C. Test adaptation efforts.
- D. Tooling support costs.

Question 40 K2

An MBT approach is used for a hospital management software project at the system testing level. A test management tool and a test automation framework are used in the project. The requirements are stored in a spreadsheet.

Which one of the following statements regarding MBT tool integration describes good practice in the given project context?

Answer Set:

- A. The MBT tool exports the generated test cases to the test management tool.
- B. To generate automated test scripts for the test automation framework, both tools should be purchased from the same vendor.
- C. Requirements are specified in the MBT tool and synchronized with the test management tool.
- D. The test automation framework automatically mirrors the test results back into the model.