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Sample Exam (Including Answer and Justification)

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ISTQB® Foundation Level Model-Based Tester 2015

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Version 1.0

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22 International Software Testing Qualifications Board

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Foundation Level Working Party: 2008 - 2015

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Revision History

Version	Date	Remarks
Version beta 1.0	2015/05/08	First beta release

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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 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 cause-effect graph to design test cases.
- C. Acceptance testing using business process models.
- D. Testing based on/or involving models.

->

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

Justification:

- A. Incorrect – Model-based testing is used for manual or automated test execution.
- B. Incorrect – Model-based testing supports and automate a large variety of test design techniques, not only cause-effect graphing.
- 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

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 does NOT describe an expected benefit?

Answer Set:

- A. Manual test scripts are automatically generated from the MBT models, which helps the test team to decrease the number of faults in the testware.
- 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 of to the MBT models have been done by the test team.
- D. From one MBT model, the test team uses different test selection criteria to generate various test suites covering the project test objectives and reducing the cost of test design.

->

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

Justification:

- A. Incorrect – Automated generation of testware in the MBT process helps to reduce errors.
- B. Incorrect – A benefit of MBT is to facilitate a shared understanding of requirements between testers and other stakeholders using MBT models.

- C. Correct – Maintenance of the generated automated test scripts would also require the maintenance of the adaptation layer.
- D. Incorrect – Different test selection criteria applied on an MBT model generate different test suites and help to address the project test objectives.

Point Value: 1

Question 3 K2

Which one of the following statement 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 models is possible in MBT, after small investment, usage of MBT in development process is almost for free.

->

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

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

An MBT approach is used in a project. Which statement below regarding MBT activities is NOT consistent with the fundamental MBT process?

Answer Set:

- A. MBT models are developed early in the project by the test team and feedback is given to business analysts.
- B. MBT model reflect the system requirements but do not consider the project test objectives.
- C. The implemented process for MBT follows an iterative and incremental approach.
- D. Test selection criteria are used to drive test generation from the MBT model.

->

FM-1.2.1 (K2) - Summarize activities of the fundamental MBT process

Justification:

- A. Incorrect – Early testing is an important aspect of MBT.
- B. Correct – 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 the fundamental MBT process.
- D. Incorrect – The use of test selection criteria to drive test generation is part of the fundamental MBT process.

Point Value: 1

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 project management plan.
- D. Test cases, defect reports and process guidelines.

->

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

Justification:

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

Point Value: 1

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 specifics 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

->

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

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

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.

->

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

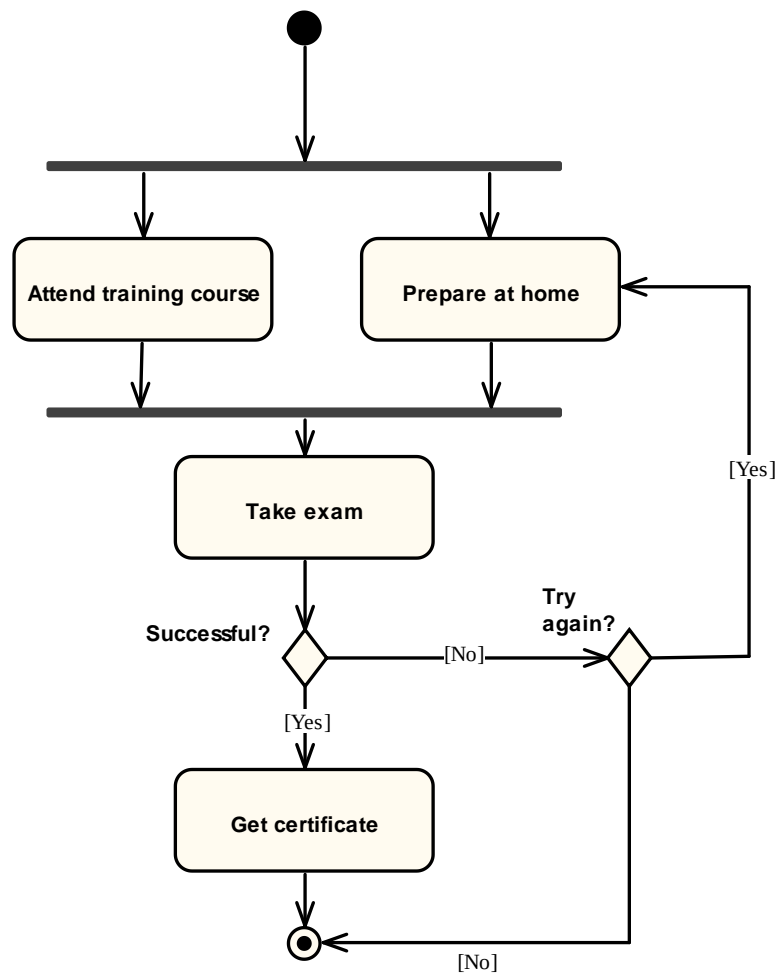
Justification:

- 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 analyst do not replace business analyst and do not perform requirements analysis for development, but for testing.
- C. Incorrect – RE does not change. MBT analyst do not replace business analyst and do not perform requirements analysis for development, but for testing.
- D. Incorrect – RE does not change. Requirements Analysis is still required.

Point Value: 1

Question 8 K3

The given workflow diagram describes the workflow of an ISTQB certification. It shows the behavior of the exam taker, who attends the training course and prepares 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 first, before being able to prepare individually at home.
- B. After failing the exam, the exam taker willing to repeat the exam may attend the training course again.
- C. 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.

->

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

Justification:

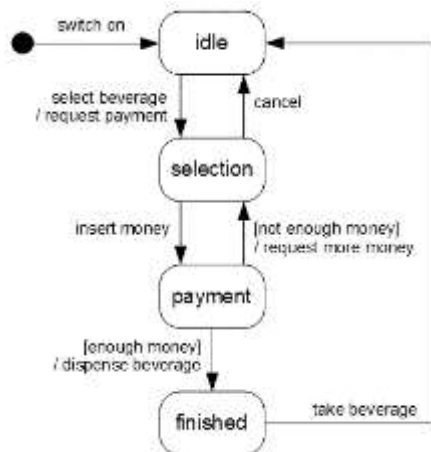
- A. Incorrect – The two activities between the parallel bars (split and join) are performed in parallel. It is not possible to skip one of them.
- B. Incorrect – The exam taker has to prepare the second time at home.

- C. Correct – There is no limitation in the model regarding the number of loops.
- D. Incorrect – It is not possible to bypass the activities between the parallel bars.

Point Value: 1

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 or 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.

->

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

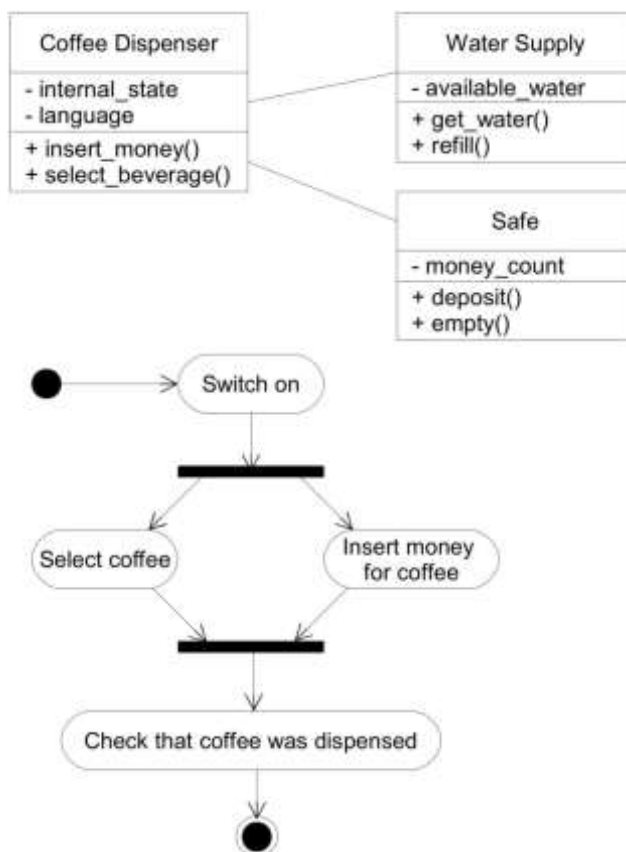
Justification:

- A. Correct. Something like “/ return money” after “cancel” is missing.
- 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. There is no way to switch the beverage dispenser off.

Point Value: 1

Question 10 K3

The following models show two different viewpoints on 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 a test.
- 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 the environment.
- D. At least one of the models is a structural description of the system.

->

FM-2.1.3 (K3) - Apply classification scheme to MBT models with respect to the subject (system vs. environment vs. test) and to the focus (structure vs. behavior)

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 D is correct.

Point Value: 1

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 WRONG?

Answer Set:

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

->

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

Justification:

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

Point Value: 1

Question 12 K1

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

Answer Set:

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

->

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

Justification:

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

Point Value: 1

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 recommend first?

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.

->

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

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

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. Dogmatic quality.

->

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

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 – Dogmatic quality does not exist.

Point Value: 1

Question 15 K2

Which two of the following scenarios correspond to common mistakes MBT newcomers tend to commit?

Select TWO options

Answer Set:

- A. One MBT model tries to address three test levels: integration testing, system testing and acceptance testing.
- B. MBT is used in combination with manual test execution.
- C. The MBT model for system testing describes the system under test in all details.
- D. The MBT model is developed on the basis of the test objectives.
- E. Different test suites are generated from the same MBT model with various test selection criteria.

->

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

Justification:

- A. Correct – Beginners tend to put everything into one model. The model becomes extremely complex and is no longer as useful as it could be.
- B. Incorrect – MBT can be used either in combination with manual or automated test execution.
- C. 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.
- D. Incorrect – Developing the MBT model on the basis of project test objectives is a best practice in model-based testing.
- E. Incorrect – An MBT model can be used to generate several test suites with different test selection criteria.

Point Value: 1

Question 16 K2

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

Answer Set:

- A. It becomes easier to review the MBT model.
- B. Linking requirements to models makes it possible to generate test cases for selected requirements.
- C. The information facilitates impact analysis in case of requirement changes.
- D. Linking requirements to MBT models facilitates debugging activities at the code level.

->

FM-2.3.3 (K2) - Explain the advantages of linking requirements to models during MBT modeling activities

Justification:

- A. Incorrect – When requirements are linked with model elements, it becomes easier to review how each requirement is modeled.
- B. Incorrect – 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.
- D. Correct – In principle, code debug is not specifically facilitated by MBT.

Point Value: 1

Question 17 K2

Which one of the following statements about additional information into the MBT model is most true?

Answer Set:

- A. MBT models always contain detailed instructions regarding test execution.
- B. The MBT model is the central repository for all stakeholder information.
- C. Indicating additional information such as priorities or risks in the MBT model may facilitate test project management.
- D. Linking MBT model elements to the source code of the test object is good practices in model-based testing

->

FM-2.3.4 (K2) - Provide examples of additional information that can be added to the MBT Model

Justification:

- A. Incorrect – Adding information regarding test execution may be very useful but is not mandatory.
- B. Incorrect – The MBT model supports test analysis and design activities but is not necessarily the central test repository.
- C. Correct – Test managers may base their decision regarding schedule on those information.
- D. Incorrect – In general, an MBT model has nothing to do with the source code of the test object.

Point Value: 1

Question 18 K2

In a project regarding the development of 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 statements is NOT a right guideline for such MBT project?

Answer Set:

- A. A subset of BPMN has been defined to be used to draw the MBT models for the project.
- B. Modeling patterns for some typical business flows are proposed.
- C. Syntactical naming rules are defined according with the business domain knowledge.
- D. Some relevant test cases for the application have been drafted as part of the modeling guidelines.

->

FM-2.3.5 (K2) - Explain the necessity of guidelines for MBT

Justification:

- A. Incorrect – Defining a subset of an existing modeling language is part of possible MBT modeling guidelines.
- B. Incorrect – Modeling patterns help to share common structure of MBT models within a team.
- C. Incorrect – Syntactical naming rules help foster a similar syntax and semantics of MBT models from various authors.
- D. Correct – Providing test cases as part of MBT modeling guidelines is not relevant.

Point Value: 1

Question 19 K2

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

Which example shows a best re-use 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 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.

->

FM-2.3.6 (K2) - Provide examples where reuse of existing models (from requirements phase or development phase) is or is not appropriate

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 reuse for user acceptance testing.
- D. Incorrect – A detailed implementation model is in general not reusable for MBT because it focused on implementation information and not on the requirements for test purposes.

Point Value: 1

Question 20 K1

Consider the following tools supporting the MBT modeling process. Which tool does NOT provide support for writing syntactically correct MBT models?

Answer Set:

- A. UML modeling tool
- B. State/transition diagram editor.
- C. Domain-specific language editor.
- D. Vector-based drawing tool.

->

FM-2.3.7 (K1) - Recall tool types supporting specific MBT modeling activities

Justification:

A, B and C are specialized model editors that know about the syntax of the modeling language used. Only D is a general-purpose drawing tool without any specific support for modeling activities. Thus, D is the correct answer.

Point Value: 1

Question 21 K2

Which one of the following statements is NOT true regarding the advantages of adapting test planning to manage project constraints and priorities for a team using MBT models?

Answer Set:

- A. MBT will always accelerate test execution and debugging.
- B. Automated test scripts may be produced from MBT model and then help to start automation earlier if required.
- C. MBT allows starting test design in earlier project phases.
- D. MBT Models with information on risk and priorities help to manage test planning.

->

FM-2.3.8 (K2) - Describe how MBT models help to adapt test planning to project constraints and priorities

Justification:

- A. Correct – MBT sometimes accelerates test execution (by generating more effective tests) and sometimes accelerates debugging (with the help of a model simulator) but not always.
- B. Incorrect – MBT may accelerate automation.
- C. Incorrect – MBT modeling can start in an early phase of the project.
- D. Incorrect – MBT may be used to prioritize tests.

Point Value: 1

Question 22 K2

Which two of the following statements regarding iterative model development, review and validation are true?

Select TWO options

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. Regular reviews of the MBT are essential for early requirements validation.
- E. Iterative MBT model development, review and validation don't allow the testers to adjust the MBT model to test objectives.

->

FM-2.3.9 (K2) - Summarize iterative MBT model development, review and validation

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 higher level of abstraction.
- D. Correct. Iterative model development alone will not improve the requirements, unless the MBT tester discusses the findings with stakeholders.
- E. Incorrect. During reviews, the tester verifies whether the MBT model focuses on the correct aspects to be tested.

Point Value: 1

Question 23 K1

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

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.

->

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

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 (see ISTQB glossary).
- D. Incorrect – Test selection criteria are neither part of the test adaption layer, not limited to automated test execution.

Point Value: 1

Question 24 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)

->

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

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.

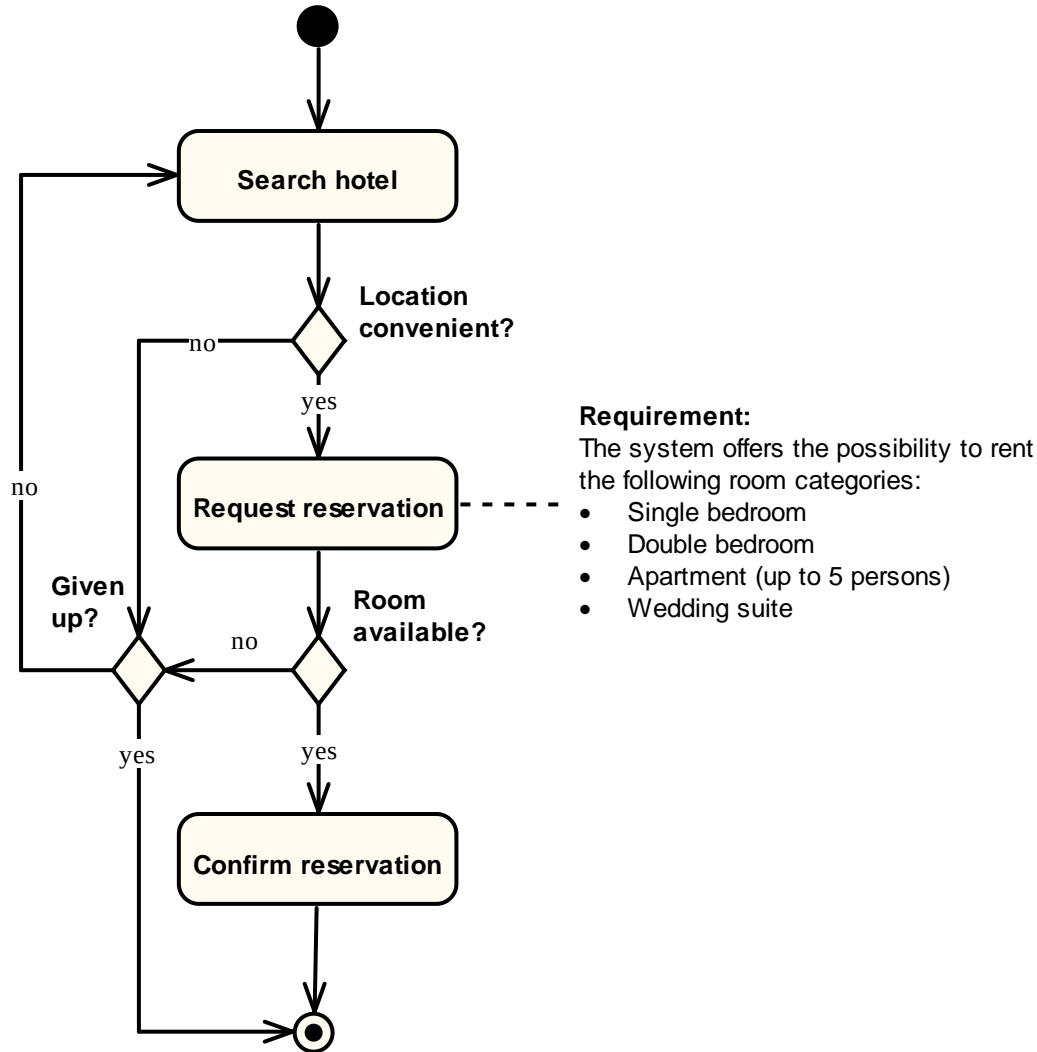
Hence

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

Point Value: 1

Question 25 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

->

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

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 -> Request reservation -> Confirm reservation -> End" and "Start -> Search hotel -> Search hotel -> Request reservation -> 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 26 K2

Which one of the followings statements is a typical combination of test selection criteria and MBT model?

Answer Set:

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

->

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

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. Path coverage is a common criterion (usually ignoring loops).

Point Value: 1

Question 27 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)

->

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

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 28 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.

->

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

Justification:

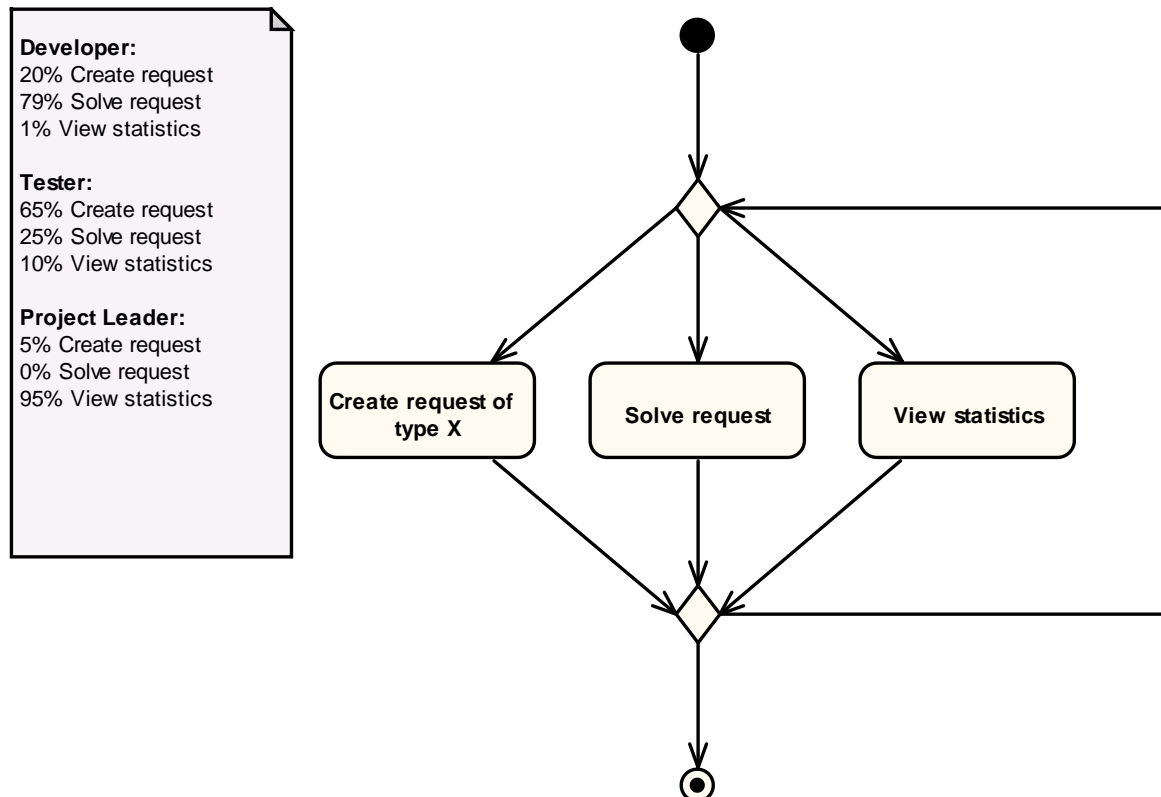
- A. Incorrect. This is a common misunderstanding. An MBT approach without test generation tools has low maturity, but it is definitely an MBT approach.
- B. Incorrect. In the highest maturity approach, the model is the master and the derived artifacts are used as is without further post-processing.
- 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 29 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.

->

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

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 requirement. To apply requirements coverage as selection criterion, we need at least a link to a requirement in the MBT model.

Point Value: 1

Question 30 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.

->

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

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 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.

Which one of the following statements regarding abstract and concrete test cases is NOT true in this project context?

Answer Set:

- A. The test team may generate abstract test cases from the MBT model.
- B. In order to generate concrete test cases, the MBT model needs to be completed with information that links the high level business actions with completely defined test actions and provides data values.
- C. The test team can generate concrete test cases from this MBT model.
- D. The test team can provide a test adaptation layer specification to provide the information required to generate the concrete test cases.

->

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

Justification:

- A. Incorrect – The MBT model developed so far in the project makes it possible to generate abstract test cases.
- B. Incorrect – Information that links the high level business actions with completely defined test actions and provides test data values is required to allow generation of concrete test cases.
- C. Correct – The MBT model developed so far in the project does not make it possible to generate concrete test cases.
- D. Incorrect – 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

Which two of the following statements regarding MBT methods for test execution are true?
Select TWO options

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.
- E. An adaptation layer is required for automated test execution either offline or online.

->

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

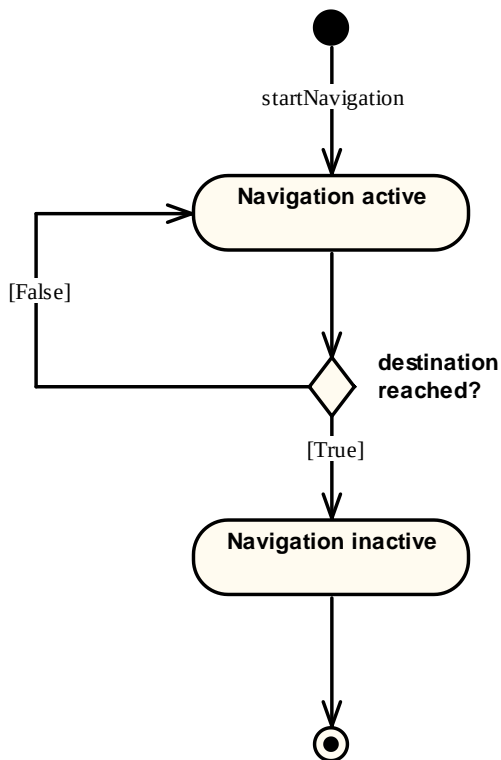
Justification:

- 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 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.
- E. Correct – The adaptation layer code bridges the abstraction gap between the MBT model and the test object.

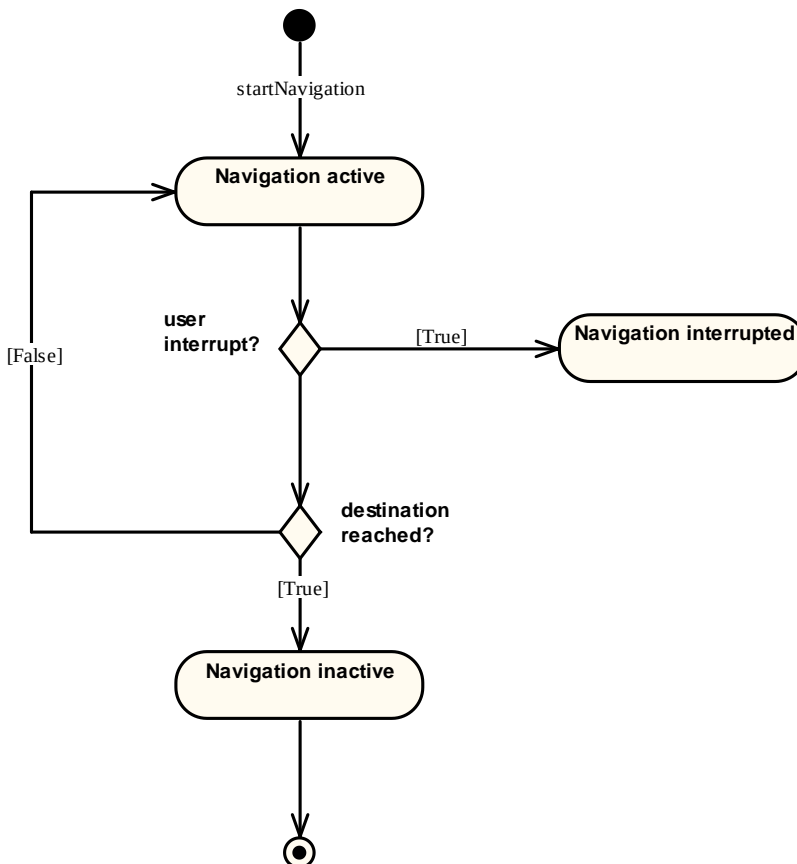
Point Value: 1

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”. 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)

->

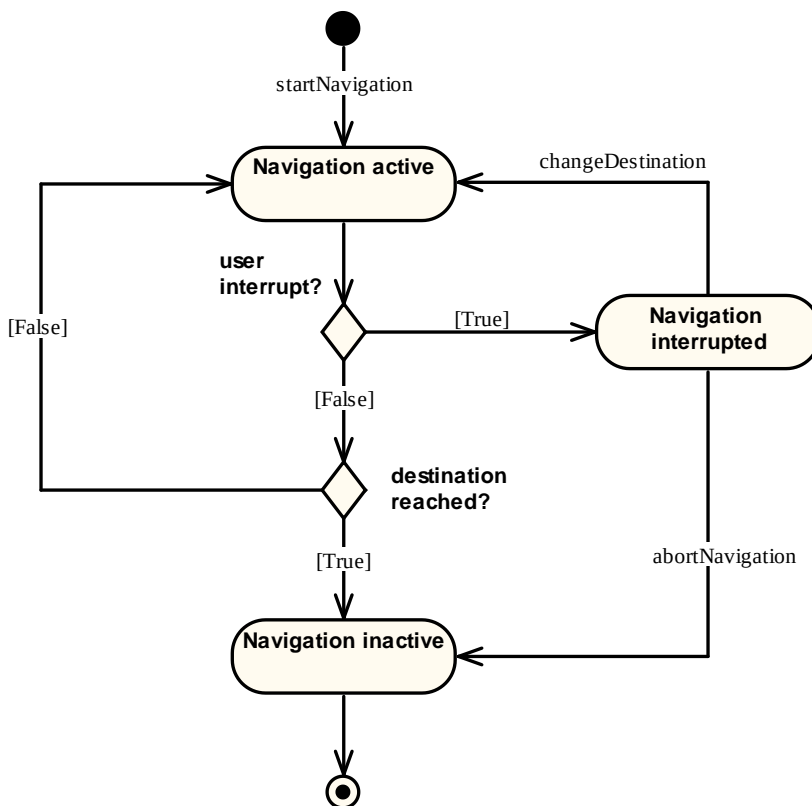
FM-4.1.3 (K3) - Perform updates of an MBT model and test generation caused by changes in requirements, test object or test objectives

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

A test team is using MBT to generate manual test scripts at the system testing level for a Human Resource Management System project.

Which one of the following statements regarding MBT test adaptation for test execution is NOT true?

Answer Set:

- A. Testers need to read the MBT model to proceed to manual test execution.
- B. A mapping is done prior to test execution between abstract test data value in the model and concrete test data value for test execution.
- C. The MBT model remains at the right abstract level regarding project test objectives, and adaptation information is provided to automatically generate test procedure specifications.
- D. The MBT model represents the business workflows and rules to be tested in order to fulfill test objectives during test generation on the basis of test selection criteria.

->

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

Justification:

- A. Correct. The test team generates manual test scripts, so testers do NOT need to read the MBT model during manual test execution
- B. Incorrect. This is a good practice to keep the MBT model at the right abstraction level.
- C. Incorrect. Adaptation information is required to automatically test procedure specifications.
- D. Incorrect. The test cases are generated from the MBT model and test selection criteria.

Point Value: 1

Question 35 K2

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

Answer Set:

- A. Process automation and reuse effects.
- B. High number of test cases automatically generated from the MBT model.
- C. Systematic coverage of the MBT model.
- D. Reducing the time-to-market.

->

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

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 increases the testing costs, since an improvement in systematic coverage for itself leads to a higher coverage and thus a higher number of test cases increasing the test execution effort if not taking into account generation strategies.
- 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

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

Which one of the followings 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 monitor requirements coverage from the 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.

->

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

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

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 into 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 total workload of the project.

->

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

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 total workload of the project itself is not very useful to measure the impact of MBT in this context.

Point Value: 1

Question 38 K1

An MBT approach is used on a project. Which sentence below regarding MBT deployment is NOT a good practice?

Answer Set:

- A. MBT is used both for manual and automated testing.
- B. Configuration management is used for MBT generated test cases but not for the MBT models.
- C. MBT automated test scripts are used in continuous integration.
- D. The traceability between requirements and MBT model elements is managed.

->

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

Justification:

- A. Incorrect. MBT can be used for manual and automated testing.
- B. Correct. Configuration management should be used for MBT models.
- C. Incorrect. Using MBT automated test scripts in continuous integration is a good practice.
- D. Incorrect. Traceability between requirements and MBT model elements is mandatory to produce the traceability matrix between test cases and requirements.

Point Value: 1

Question 39 K1

Cost factors of MBT relate to initial costs and running costs. Which one of the followings 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.

->

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

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 tool maintenance).

Point Value: 1

Question 40 K2

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

Which sentence below regarding MBT tool integration is NOT a good practice?

Answer Set:

- A. The MBT tool exports the generated test cases to the test management tool.
- B. Automated test scripts are generated by the MBT tool independently of the test automation framework.
- C. Requirements are imported into the MBT tool and synchronized.
- D. The traceability matrix between test cases and requirements is produced by the MBT tool and then exported to the test management tool.

->

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

Justification:

- A. Incorrect. The export of generated test cases into the test management tool is a good practice.
- B. Correct. Automated test scripts should be generated by the MBT tool in a format compatible with the test automation framework.
- C. Incorrect. Importation of requirements into the MBT tool to support traceability is a good practice.
- D. Incorrect. The MBT tool should generate the traceability matrix and export it to the test management tool.

Point Value: 1