Sample Exam – Answers

Sample Exam set A
Version 2.2

ISTQB® Automotive Software Tester Syllabus Specialist

Compatible with Syllabus version 2018

International Software Testing Qualifications Board

German Testing Board

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The ISTQB® Examination Working Group is responsible for this document.

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Revision History

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Version	Date	Remarks
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2.0	July 4, 2018	Updated in connection with ISTQB release
1.0	2015	First edition

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Introduction

Purpose of this document

The sample questions and answers and associated justifications in this sample exam set 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.

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.

Instructions

In this document you may find:

- Answer Key table, including for each correct answer:
  - K-level, Learning Objective, and Point value
- Answer sets, including for all questions:
  - Correct answer
  - Justification for each response (answer) option
  - K-level, Learning Objective, and Point value
- Additional answer sets, including for all questions [does not apply to all sample exams]:
  - Correct answer
  - Justification for each response (answer) option
  - K-level, Learning Objective, and Point value

- *Questions are contained in a separate document*

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Answer Key

Question Number (#)	Correct Answer	LO	K-Level	Points
1	d	AuT-1.3	K1	1
2	c	-	K1	1
3	b	-	K2	1
4	c	-	K1	1
5	a	AuT-2.1.1	K2	1
6	c		K2	1
7	c	AuT-2.1.2	K3	1
8	b	AuT-2.1.2	K3	1
9	b	AuT-2.1.2	K3	1
10	b	AuT-2.1.2	K3	1
11	c	AuT-2.2.1	K2	1
12	a	AuT-2.2.4	K2	1
13	a	AuT-2.2.3	K1	1
14	a	AuT-2.2.1	K2	1
15	a	AuT-2.2.2	K2	1
16	d	AuT-2.2.4	K2	1
17	a	AuT-2.2.5	K3	1
18	d	AuT-2.3.1	K1	1
19	b	AuT-2.3.3	K1	1
20	b	AuT-2.4.1	K1	1

Question Number (#)	Correct Answer	LO	K-Level	Points
21	d	AuT-2.4.2	K2	1
22	a	AuT-3.1.2	K1	1
23	d	AuT-3.1.4	K1	1
24	b	AuT-3.1.3	K2	1
25	c	AuT-3.2.1	K2	1
26	a	AuT-3.2.2	K1	1
27	d	AuT-3.2.2	K1	1
28	c	AuT-3.2.3	K2	1
29	b	AuT-3.2.4	K3	1
30	a	AuT-3.2.1	K2	1
31	c	AuT-3.2.3	K2	1
32	b	AuT-3.2.4	K3	1
33	c	AuT-3.2.3	K2	1
34	c	Keyword	K1	1
35	c	AuT-4.1.1	K2	1
36	b	-	K3	1
37	c	AuT-4.2.4	K1	1
38	c	AuT-4.2.3	K2	1
39	c	AuT-4.2.5	K3	1
40	d	-	K3	1

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Answers

Question Number (#)	Correct Answer	Explanation / Rationale	Learning Objective (LO)	K-Level	Number of Points
1	d	a) Is not correct. The Acceptance Stage is wrong b) Is not correct. The Release Stage is wrong c) Is not correct. The Implementation Stage is wrong d) Is correct. All stages are mentioned in the correct order	AuT-1.3	K1	1
2	c	a) Is not correct. The release recommendation has a considerable influence in the release b) Is not correct. The release provisions affect the test strategy c) Is correct. The testing affects the level of software maturity by the detection of defects, the release recommendation, however, cannot affect the level of maturity d) Is not correct. The scope of delivery can be considerably influenced by the release recommendation	-	K1	1
3	b	a) Is not correct. To insource an already running, outsourced projects again endangers the project objectives as internal resources must be trained and included in the project b) Is correct. By using effective methods and processes, interfacing issues, e.g. by misunderstandings, are reduced and minimized c) Is not correct. Qualification is important, but for the project objectives it does not matter if it is efficient d) Is not correct. Outsourcing means higher administrative efforts and it requires coordination with the contractor – in the short run, the efforts are higher and the project objectives are in danger	-	K2	1

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Question Number (#)	Correct Answer	Explanation / Rationale	Learning Objective (LO)	K-Level	Number of Points
4	c	a) Is not correct. As system requirements analysis are only of secondary importance for the Certified Automotive Software Tester b) Is not correct. As configuration management is only of secondary importance for the Certified Automotive Software Tester c) Is correct. As a software qualification test assesses the integrated software based on the software requirements d) Is not correct. As project management is only of secondary importance for the Certified Automotive Software Tester	-	K1	1
5	a	a) Is correct. Is defined as dimension in Automotive SPICE® b) Is not correct. Is not defined as dimension in Automotive SPICE®, because the correct dimensions are the process and capability dimensions c) Is not correct. Is not defined as dimension in Automotive SPICE®, because the correct dimensions are the process and capability dimensions d) Is not correct. Is not defined as dimension in Automotive SPICE®, because the correct dimensions are the process and capability dimensions	AuT-2.1.1	K2	1
6	c	a) Is not correct. As none of the above-mentioned statements characterizes a capability level 0 b) Is not correct. As not all statements characterize a capability level 1 c) Is correct. As all above mentioned statements characterizes a capability level 2 d) Is not correct. A capability level 3 requires additional to all above mentioned statements a defined process that is capable of achieving its process out-comes		K2	1

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Question Number (#)	Correct Answer	Explanation / Rationale	Learning Objective (LO)	K-Level	Number of Points
7	c	a) Is not correct. As NOT FULFILLED is for ”None” b) Is not correct. As PARTLY FULFILLED is for ”Partly” c) Is correct. As LARGELY FULFILLED is for ”Largely” d) Is not correct. As FULLY FULFILLED is for ”Fully”	AuT-2.1.2	K3	1
8	b	a) Is not correct. As a regression test strategy does NOT define the test stage specific test environments. This distractor defines a test plan b) Is correct. As a regression test strategy defines the objective and the procedure for the selection of the test cases for the regression tests c) Is not correct. As a regression test strategy does NOT define the cross-test level procedure for the selection of regression tests. This distractor partly de-fines a master test plan d) Is not correct. As a regression test strategy is NOT an abstract description of the planned test stages and how to proceed within those test levels. This dis-tractor describes a test policy	AuT-2.1.2	K3	1
9	b	a) Is not correct. As Automotive SPICE® does not require traceability of the working hours of the tester to the completed test cases b) Is correct. As Automotive SPICE® from Version SPICE 3.0 also requires traceability of the specified test cases to the test results c) Is not correct. As Automotive SPICE® does not require traceability of the interface descriptions to the specified maintainability tests d) Is not correct. As Automotive SPICE® does not require traceability from customer requirements to integration tests. (Only the traceability between customer requirements and system requirements is required)	AuT-2.1.2	K3	1

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Question Number (#)	Correct Answer	Explanation / Rationale	Learning Objective (LO)	K-Level	Number of Points
10	b	a) Is not correct. As applicable, because according to the guidelines for safety (ISO 26262-6) all safety relevant components must be tested regarding the safety requirements b) Is correct. As inapplicable, because measuring the condition coverage would generally be a suitable measure, but the mentioned criteria for verification cannot be achieved this way c) Is not correct. As applicable, because tool-supported static analysis are a typical part of a verification strategy to confirm the MISRA-compliance d) Is not correct. As applicable, because code reviews as an addition to tool-supported static analysis are a typical part to confirm non-detectable verification criteria like	AuT-2.1.2	K3	1
11	c	a) Is not correct. As this is not a task of a tester, but of the safety manager b) Is not correct. As this is not a task of a tester, but of the safety manager c) Is correct. As this is the core of the safety culture d) Is not correct. As the tester only carries out specific measures (typically ones that are connected to the test) in the area of functional safety, but not all of them	AuT-2.2.1	K2	1
12	a	a) Is correct. As the hazard analysis and risk assessment can add an ASIL to hazards b) Is not correct. As ASIL D shows the highest criticality, ASIL A the lowest c) Is not correct. As there can be hazards identified in the hazard analysis and risk assessment, which do not get any ASIL assigned, but are classified as QM (Quality Management) d) Is not correct. As ASIL stands for Automotive Safety Integrity	AuT-2.2.4	K2	1

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Question Number (#)	Correct Answer	Explanation / Rationale	Learning Objective (LO)	K-Level	Number of Points
13	a	a) Is correct. As the volumes 4, 6 are explicitly mentioned in 2.2.3.2 b) Is not correct. As volume 3 is only of minor relevance for the software tester and is not even mentioned in 2.2.3.2 c) Is not correct. As volume 2 is only of minor relevance for the software tester and is not even mentioned in 2.2.3.2 d) Is not correct. As volume 5 addresses hardware-specific aspects which are less important to the software tester	AuT-2.2.3	K1	1
14	a	a) Is correct. As ISO 26262 is a standard / norm for functional which is applicable to (automotive) E/E, and therefore provides requirements (among others) to achieve functional safety b) Is not correct. Functional safety and cybersecurity are aspects of E/E systems that must be separated from each other. A lack of Cybersecurity might impact functional safety (for example via a denial-of-service attack). However, an E/E system can be functional safe and secure at the same time, so the two characteristics don't contradict each other c) Is not correct. As ISO 26262 defines functional safety as absence of unreasonable risk due to hazards caused by malfunctioning behavior of E/E. ISO 26262 does not focus on the safety of the intended function during normal operation d) Is not correct. As functional safety must be separated from cybersecurity and ISO 26262 only offers limited statements regarding cybersecurity	AuT-2.2.1	K2	1

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Question Number (#)	Correct Answer	Explanation / Rationale	Learning Objective (LO)	K-Level	Number of Points
15	a	a) Is correct. As the tester contributes to multiple phases, but executing tests mainly takes place in the phase of product development b) Is not correct. As the tester carries out activities related to test planning and test design in the concept phase, but does not execute tests in this phase c) Is not correct. As the focus of the test execution is the product development phase d) Is not correct. As the focus of the test execution is the product development phase	AuT-2.2.2	K2	1
16	d	a) Is not correct. As there is no compelling causal connection (”must”) between the number of methods and the extent of testing. Further, a higher ASIL does not necessarily require more procedures b) Is not correct. As there is no compelling causal connection (”must”) between the number of methods and the number of derived test cases and a higher ASIL does not necessarily require more procedures c) Is not correct. As a higher ASIL typically requires more, or more intensive test methods. However, there is no rule that requires to double the number of recommended test design techniques and test types which each ASIL d) Is correct. As a higher ASIL typically requires more, or more intensive test methods, which typically lead to more test cases and therefore to an increased extent of testing	AuT-2.2.4	K2	1

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Question Number (#)	Correct Answer	Explanation / Rationale	Learning Objective (LO)	K-Level	Number of Points
17	a	Due to the numbering scheme for the methods, i.e., 1a, 1b and 1c, it is clear that these are alternative methods, i.e. usually at least one method must be selected. a) Is correct. As the justification is correct (see CTFL) and therefore in ASIL A a method is used that is at least as good as the highly recommended statement coverage for ASIL A. Furthermore, branch coverage is recommended for ASIL A anyway b) Is not correct. As the order of the methods in the table does not matter and for ASIL B, branch coverage is highly recommended as well. Thus, a really plausible content-related justification is necessary to explain why this meth-od is not used c) Is not correct. As the justification does not suffice to eliminate the strongly recommended modified condition decision coverage for ASIL D. This would only be possible, if there were no multiple conditions, as in exactly this special case, 100% MC/DC and 100% branch coverage provide the same result d) Is not correct. As the justification is factually wrong (counter-example: empty else-branches, see CTFL) and thus, the highly recommended branch coverage for ASIL B is not used	AuT-2.2.5	K3	1
18	d	a) Is not correct. As AUTOSAR defines an open architecture b) Is not correct. As AUTOSAR is compliant with international standards c) Is not correct. As AUTOSAR supports a variety of domains d) Is correct	AuT-2.3.1	K1	1

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Question Number (#)	Correct Answer	Explanation / Rationale	Learning Objective (LO)	K-Level	Number of Points
19	b	a) Is not correct. As AUTOSAR SW-C can be tested virtually in an RTE-Simulation b) Is correct. As the RTE can be used for stimulating the software c) Is not correct. As the AUTOSAR acceptance test is optional d) Is not correct. As AUTOSAR also provides the infrastructure for a functionality spread over several electronic control units via VFB and therefore supports cross-control unit tests	AuT-2.3.3	K1	1
20	b	a) Is not correct. As Automotive SPICE® defines the ability of the product development process, no matter on which supplier level b) Is correct. As this statement is true for Automotive SPICE®, but not for the ISO 26262 c) Is correct. As ISO 26262 is supposed to avoid these risks d) Is correct. As ISO 26262 defines these requirements	AuT-2.4.1	K1	1
21	d	a) Is not correct. As Automotive SPICE® does usually not make any statement regarding the test techniques to be used per test level b) Is not correct. As ISTQB® usually defines the test techniques independently from the test levels c) Is not correct. As method tables are only defined by the ISO 26262 and not by Automotive SPICE® d) Is correct. As the ISO 26262 provides method tables and the recommendations of techniques that depend on the ASIL	AuT-2.4.2	K2	1
22	a	a) Is correct. As all three items are included in the list in paragraph 3.1.2 b) Is not correct. The report database is not part of the test environment as the test report is a downstream step in the test process c) Is not correct. The specification documents are needed in the test design and the test case generation. However, these documents are not part of the test environment d) Is not correct. Data management tools are up- or downstream systems in the test process, which are not part of the test environment	AuT-3.1.2	K1	1

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Question Number (#)	Correct Answer	Explanation / Rationale	Learning Objective (LO)	K-Level	Number of Points
23	d	a) Is not correct. The environment model does not belong to the electronic control unit (ECU) b) Is not correct. The watchdog is not an interface, but a supervision mechanism of the software processes c) Is not correct. The supply voltage is not an information carrier d) Is correct. All three interfaces are mentioned in 3.1.4 as information interfaces	AuT-3.1.4	K1	1
24	b	a) Is not correct. In a closed-loop-system the link of the output signals to the inputs of the test object is not direct, but via the environment model b) Is correct. The stimulation in the closed-loop-system takes into consideration the outputs of the test object c) Is not correct. This statement describes a closed-loop-system d) Is not correct. This statement is an extension of answer c.) and describes a closed-loop-system	AuT-3.1.3	K2	1
25	c	a) Is not correct. The test object is readable for humans, as it exists as a model and is not yet compiled b) Is not correct. The test object in a Model-in-the-Loop (MiL) test environment is usually a model and not yet compiled c) Is correct. The Model-in-the-Loop (MiL) test environment does not need additional hardware d) Is not correct. The environment model of a Model-in-the-Loop (MiL) test environment is usually implemented in the same development environment as the test object and can therefore be used very early in the development process	AuT-3.2.1	K2	1
26	a	a) Is correct. Test execution takes place on a computer without specific hardware, i.e. no additional hardware is necessary b) Is not correct. The source code of the test object is compiled c) Is not correct. A wrapper generates access points in the test object d) Is not correct. The number of access points is limited by the wrapper	AuT-3.2.2	K1	1

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Question Number (#)	Correct Answer	Explanation / Rationale	Learning Objective (LO)	K-Level	Number of Points
27	d	a) Is not correct. Realistic runtimes of diagnosis requests can only be deter-mined, if the environment model simulated the target hardware in detail, be-cause the target hardware is not available in the Software-in-the-Loop (SiL) test environment. Such tests would typically be carried out in a Hardware-in-the-Loop (HiL) test environment, as a detailed hardware simulation takes a lot of effort b) Is not correct. EMV-Tests are only possible in Software-in-the-Loop (SiL) test environment if the environment model would simulate the target hardware in detail, because the target hardware is not available in Software-in-the-Loop (SiL) test environment. Such tests would typically be carried out in a Hardware-in-the-Loop (HiL) test environment, as a detailed hardware simulation takes a lot of effort c) Is not correct. As no hardware exists yet, performance tests are impossible to implement in a Software-in-the-Loop (SiL) test environment d) Is correct. Interface and integration tests are typical parts of a Software-in-the-Loop (SiL) test environment	AuT-3.2.2	K1	1
28	c	a) Is not correct. The test case generator is a software tool for the generation of test cases and is not part of the test environment b) Is not correct. The software compiler is part of the build environment and is not part of the test environment c) Is correct. The listed parts are all included in the list from paragraph 3.2.3.1 d) Is not correct. The processor simulation is not a part of the Hardware-in-the-Loop (HiL) test environment, as real hardware is available for the test object	AuT-3.2.3	K2	1

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Question Number (#)	Correct Answer	Explanation / Rationale	Learning Objective (LO)	K-Level	Number of Points
29	b	a) Is not correct. Model-in-the-Loop (MiL) and Software-in-the-Loop (SiL) test environments are suitable mainly for integration tests. The Hardware-in-the-Loop (HiL) test environment is specialized to system tests b) Is correct. Model-in-the-Loop(MiL) and Software-in-the-Loop(SiL) test environments are suitable for component test c) Is not correct. A Model-in-the-Loop (MiL) test environment is not suitable for system tests d) Is not correct. Not every test environment can be used on every test level	AuT-3.2.4	K3	1
30	a	a) Is correct. The more complex a system, the more computing time or more power a computer needs to provide all information b) Is not correct. These access points are not common in the Model-in-the-Loop (MiL) test environment c) Is not correct. This implementation is not common in the Model-in-the-Loop (MiL) test environment d) Is not correct. Pausing is one of the biggest advantages of a Model-in-the-Loop (MiL) test environment	AuT-3.2.1	K2	1

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Question Number (#)	Correct Answer	Explanation / Rationale	Learning Objective (LO)	K-Level	Number of Points
31	c	a) Is not correct. The overall system requirements can be tested at the system HiL, but not at the Component Hardware-in-the-Loop (HiL) test environment b) Is not correct. The driving behavior is a complex function and is carried out by several electronic control units. Thus, the Component Hardware-in-the-Loop (HiL) test environment is not suitable c) Is correct. At the Component Hardware-in-the-Loop (HiL) test environment, single electronic control units and their functions are tested d) Is not correct. To test the data exchange between electronic control units, at least two electronic control units (ECU´s) are necessary. Thus, those tests must be carried out at the System Hardware-in-the-Loop (HiL) test environment	AuT-3.2.3	K2	1

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Question Number (#)	Correct Answer	Explanation / Rationale	Learning Objective (LO)	K-Level	Number of Points
32	b	a) Is not correct. The cost for error handling increases in the test environments in the following order: MiL, SiL, HiL test environment. Costs are therefore lowest in the Model-in-the-Loop (MiL) test environment b) Is correct. The closeness to reality increases in the test environments in the following order: MiL, SiL, HiL test environment. The HiL test environment is the most realistic in comparison to the other test environments c) Is not correct. The effort for the commissioning and maintenance increases in the test environments in the following order: MiL, SiL, HiL test environment. The efforts are therefore highest in the Hardware-in-the-Loop (HiL) test environment d) Is not correct. The necessary level of maturity of the test object increases in the test environments in the following order: MiL, SiL, HiL test environment. In a Software-in-the-Loop (SiL) test environment the test object typically does not include target hardware, but only the software	AuT-3.2.4	K3	1
33	c	a) Is not correct. As there is no hardware, which can be used in the Hardware-in-the-Loop (HiL) test environment b) Is not correct. As a Software-in-the-Loop (SiL) test environment does not re-quire additional hardware like a development board c) Is correct. As no hardware is available and the test object is available as a model, a Model-in-the-Loop (MiL) test environment is to be preferred d) Is not correct. Even without the hardware, tests are already possible	AuT-3.2.3	K2	1
34	c	a) Is not correct. Not compliant with the definition of the term b) Is not correct. Not compliant with the definition of the term c) Is correct. See definition of the term d) Is not correct. Not compliant with the definition of the term	Keyword	K1	1

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Question Number (#)	Correct Answer	Explanation / Rationale	Learning Objective (LO)	K-Level	Number of Points
35	c	a) Is not correct. ”Required” guidelines may only be disregarded by the developer, if he can provide a compelling reason b) Is not correct. Organizations can intensify the binding character of a rule for themselves c) Is correct. Coding standards help to avoid anomalies. Typical violation of coding standards are part of these anomalies d) Is not correct. Directives are not fully testable by static analysis tools	AuT-4.1.1	K2	1
36	b	a) Is not correct. The requirement is verifiable, and can thus be verified in an easy system test b) Is correct. The requirement 2 can be split in two partial requirements: in the one about the inner states in a switched on state and in the statement about the switched off state c) Is not correct. the requirement 3 is not inconsistent d) Is not correct. The test requirements are unambiguous. It is mentioned clearly what should be considered	-	K3	1
37	c	a) Is not correct b) Is not correct. Requirements are the basis here, not the test object. The described technique would also be more a review of the requirements c) Is correct d) Is not correct	AuT-4.2.4	K1	1
38	c	a) Is not correct. This statement is correct b) Is not correct. This statement is correct c) Is correct. This statement is wrong, as fault injection tests are not about errors in requirements, but about errors in the system d) Is not correct. This statement Is correct	AuT-4.2.3	K2	1

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Question Number (#)	Correct Answer	Explanation / Rationale	Learning Objective (LO)	K-Level	Number of Points
39	c	a) Is not correct. Each test technique has its own strengths and weaknesses. None of them should generally be preferred over another. Especially if the source code as a starting point does not exist, white box test design techniques cannot be used b) Is not correct. The selection depends on several factors, not only on the ASIL. Mentioned are: state of the art, test basis, risk observation, test level c) Is correct. The selection depends on several factors. Even though the mentioning of the ASIL as stated in table 6 of the syllabus is missing, the mentioning of 3 of the most principal factors makes this answer the closest to perfect d) Is not correct. If this was the case, then one would not need to include the white-box test design techniques in the considerations about the different test techniques. Especially if it is about the coverage of the source code, structure based techniques are the method of choice	AuT-4.2.5	K3	1

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<table>
<tr><th>Question Number (#)</th><th>Correct Answer</th><th>Explanation / Rationale</th><th>Learning Objective (LO)</th><th>K-Level</th><th>Number of Points</th></tr>
<tr><td>40</td><td>d</td><td>The following truth table belongs to the decision (B1 AND B2) OR B3:
<table>
<tr><th>B1</th><th>B2</th><th>B3</th><th>(B1 AND B2) OR B3</th></tr>
<tr><td>TRUE</td><td>TRUE</td><td>TRUE</td><td>TRUE</td></tr>
<tr><td>TRUE</td><td>TRUE</td><td>FALSE</td><td>TRUE</td></tr>
<tr><td>TRUE</td><td>FALSE</td><td>TRUE</td><td>TRUE</td></tr>
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<tr><td>FALSE</td><td>FALSE</td><td>FALSE</td><td>FALSE</td></tr>
</table>
This shows that the three given test cases show the influence of the requirements B1 and B3 on the result: The tests 1 and 2 only differ by the value for B1 and lead to a different result. For B3, it is tests 2 and 3. Between tests 1 and 3, several requirements are changed. Thus, a test is missing, which shows the isolated influence of B2.

a) Is not correct. this test does not show the impact of only one parameter in comparison to any of the earlier mentioned tests
b) Is not correct. B2 is TRUE. As B2 is always TRUE in the three given tests, it should be FALSE
c) Is not correct. is equivalent to test 2, only B2 has changed, but in this test and in test 2, FALSE comes up as a result, so this test is not suitable as an in-put for the coverage goal of B2
d) Is correct. This test shows together with test 1 the isolated influence of B2</td><td>-</td><td>K3</td><td>1</td></tr>
</table>

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