Sample Exam

Certified Automotive Tester
Foundation Level

Answers

ASTQB Created - 2018

American Software Testing Qualifications Board

ISTQB Automotive Tester Foundation Level
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Answer Key and Rationale

Question	Answer	Explanation / Rationale	Learning Objective (LO)	Number of Points
1	B	B is correct. Syllabus 1.2 (pg 13) describes how standards affect a project and how it should be used. Time, cost and quality have been defined as the project management triangle in the previous section. In this section, “Standards have an influence on major project aspects such as time, cost, quality…”. A is not correct. “Standards increase the efficiency… …to reduce the development time or cost at a stable quality”. C is not correct. “… they help to discover risks and defects early and to resolve them.” D is not correct. “Standards are part of the contractual or regulatory provisions and guidelines.”	AuTFL-1.2.1	1
2	D	D is correct. Syllabus 1.3 (pg 13) lists the phases of the system lifecycle, as well as the testing activities that typically occur in each phase. For utilization, no test activities are listed. A is incorrect as migration testing is needed. B is incorrect as end of the line testing is needed. C is incorrect as maintenance testing is needed.	AuTFL-1.3.1	1
3	A	A is correct. Syllabus 1.1 (pg 13) states “As the project objectives time, cost and quality are competing (“Project management triangle”) car makers and suppliers must strive for a more efficient system development, which allows for shorter development times despite increasing complexity, increasing quality requirements and smaller budgets”.	AuTFL-1.1.1	1
4	A	A is correct. Syllabus Definition (pg 49) defines the term “Functional Safety” as shown in the question. B is not correct because it includes “minimizing”. C is not correct because it includes “reasonable” and “normal behavior”. D is not correct because it includes “minimizing” and “normal behavior”.	Term	1
5	C	C is correct. Syllabus 2.1.2.4 (pg 19) lists the work products that ASPICE requires. These are: • Test specification • Test plan and strategy • Test result, test log, incident/deviation report and test summary	AuTFL-2.1.2.4	1

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6	**D**	D is correct. Syllabus 2.1.1.3 (pg 17) lists the order of the levels and their descriptions.	AuTFL-2.1.1.3	1
7	**B**	B is correct. Syllabus 2.1.2.2 (pg 18) lists the four rating levels, None, Partly, Largely, Fully	AuTFL-2.1.2.2	1
8	**C**	C is correct. Section 2.1.2.3 of the syllabus states "The tester knows early testing as a principle of testing. This also applies to the testing of software in the automotive environment. However, another aspect comes into play here because test environments at higher test levels are significantly more expensive." A is not correct because minimizing automation would not enhance the test coverage. B is not correct. Section 2.1.2.3 of the syllabus states "…the test manager may also ask the tester to repeat all automated test cases for each release." D is not correct. Note the word "may" in "…the test manager may also ask the tester to repeat all automated test cases for each release" from Section 2.1.2.3 of the syllabus.	AuTFL-2.1.2.3	1
9	**B**	B is correct. This strategy includes both dynamic and static testing, and the criteria are taken from the types of examples in section 2.1.2.5 of the syllabus. A is not correct. This choice focuses only on functionality. Section 2.1.2.5 of the syllabus states the verification strategy "also considers code review and static analysis." C is not correct. This "strategy" is only a "test strategy," as noted in section 2.1.2.3 of the syllabus, which states 'The test strategy "only" looks at dynamic tests. This is an addition to the verification strategy, which also considers code review and static analysis.' D is not correct. This "strategy" is only a "test strategy," as noted in section 2.1.2.3 of the syllabus, which states 'The test strategy "only" looks at dynamic tests. Excluding the requirement for unit testing is not a good practice.	AuTFL-2.1.2.5	1
10	**A**	A is correct. This is summarized from syllabus section 2.1.2.6. B is not correct. ASPICE does not concentrate on vertical traceability, plus the description comes from the description of horizontal traceability in syllabus section 2.1.2.6. C is not correct. ASPICE does not concentrate on horizontal traceability, plus the description comes from the description of vertical traceability in syllabus section 2.1.2.6. D is not correct. Syllabus section 2.1.2.6 states "In addition, the basic practice SUP.10.BP8 requires bidirectional traceability	AuTFL-2.1.2.6	1

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		between change requests and work products affected by the change requests."		
11	**C**	C is correct. Syllabus 2.2.1.2 (pg 21) states: "Everybody must understand their impact on the development process and the safety of the final product." "The participants must understand that their own actions do not happen independently of other processes." "This responsibility does not end with the product launch. It continues until the end of the system lifecycle."	AuTFL-2.2.1.2	1
12	**C**	C is correct. Syllabus 2.2.3 (pg 22) lists the volume number with their volume names. In 2.2.3.2, the specific volumes 4, 5 and 6 are described to be of "special interest". "… these volumes focus on the test and verification specific aspects of the system (Volume 4, including system validation) and software level (Volume 6). If hardware-specific aspects are also relevant for this work, the tester will find those in volume 5." A is not correct. This option describes volumes 1 and 10. B is not correct. This option describes volume 9. D is not correct. This option describes volume 2.	AuTFL-2.2.3.2	1
13	**C**	C is correct. Syllabus 2.2.4.1 (pg 23) states that "The ISO 26262 defines four levels: from ASIL A for low, up to ASIL D for high safety requirements". It also explains that "For each risk identified by this analysis, he/she determines an ASIL with the help of one of the methodologies defined in the standard. In the next step, he drafts safety goals and safety requirements. These use the same ASIL as the risk they are based on". A and B are not correct because ASIL D is a high safety requirement. D is not correct because the syllabus does not mention that a project should be automatically discontinued due to a high ASIL.	AuTFL-2.2.4.1	1
14	**D**	D is correct. This is a meld of syllabus section 2.2.1.1 statements "If there is an actual risk, he identifies suitable measures to mitigate their possible impact" and "Functional Safety is defined as absence of unreasonable risk due to hazards caused by malfunction behaviour [SIC] of E/E systems." A is not correct. Syllabus section 2.2.1.1 states "the person responsible for safety therefore needs to analyse [SIC] potential risks." B is not correct. Syllabus section 2.2.1.1 states the risk must be mitigated "to an acceptable level of risk." C is not correct. Syllabus	AuTFL-2.2.1.1	1

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		section 2.2.1.1 states “Safety in the working environment and cybersecurity are not in the focus of ISO 26262 [Functional Safety].”		
15	**A**	A is correct. Section 2.2.2 states “The safety lifecycle describes the phases of a safety-oriented product development. It starts with the first product idea and the search for possible risks.” B is not correct. The lifecycle is not linear. Section 2.2.2 states “Changes to the product within the third phase lead to a return to the first or second phase, depending on their extent.” C is not correct. Section 2.2.2 states “The tester at supplier works mostly in the first two phases,” which come before the product production phase. D is not correct. Section 2.2.2 states “The activities of test planning normally take place within the concept phase.	AuTFL-2.2.2.1	1
16	**D**	D is correct. Syllabus section 2.2.4.2 states “For lower level ASIL, the execution of the specified measures is often optional.” A is not correct. Syllabus section 2.2.4.2 states “For example, use of equivalence partitioning and boundary value analysis are recommended for ASIL A.” B is not correct. Syllabus section 2.2.4.2 states “…there can be significantly different test efforts for safety requirements with different ASILs for one product.” C is not correct. No methods are mandatory. Syllabus section 2.2.4.2 states “Depending on the particular level of the ASIL, the ISO 26262 standard recommends the execution of different measures or packages of measures.	AuTFL-2.2.4.2	1
17	**B**	B is correct. For ASIL C, BVA, FI and MC are highly recommended. Formal Design Review and On Vehicle are recommended. MC/DC is not needed because the tester can choose either MC/DC or MC and MC has the higher recommendation. A is not correct because it uses MC/DC when it should use MC because MC has the higher recommendation on the optional choice. C is not correct because it requires FDR when that is only recommended and also has both MC/DC and MC when only one is needed. D is not correct because it requires FDR and On Vehicle when these are only recommended and does not apply FI testing.	AuTFL-2.2.5	1
18	**C**	C is correct. Syllabus 2.3.1 (pg 25) lists the project objectives for AUTOSAR and describes its leading principle as “Collaboration in the standards, competition in the implementation”. AUTOSAR “Supports the transferability… …scalability… …definition of an open	AuTFL-2.3.1	1

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		architecture… …Standardization of basic software functionality of automotive electronic control units". A is not correct. AUTOSAR is not designed to reduce competition, its goal is to encourage competition. B is not correct. AUTOSAR "Supports a sustainable use of natural resources". D is not correct. AUTOSAR "Supports the collaboration between various partners".		
19	**D**	D is correct. Syllabus 2.3.3 (pg 26) describes four different test levels at which the work of tester is influenced by AUTOSAR. "The AUTOSAR acceptance test is a test of the software system which ensures the compliance of the AUTOSAR functionality at the communication and application levels. The execution of the AUTOSAR acceptance test is optional." A is not correct due to the first bullet point in the section: "Software component test and software integration test in a virtual environment…". B is not correct due to the second bullet point in the section: "Software test and software integration tests in the real control unit…". C is incorrect due to the fourth bullet point in the section: "System integration test: Functional integration and connection of different electronic control units…"	AuTFL-2.3.3	1
20	**B**	B is correct. Syllabus 2.4.1 (pg 26) describes the difference in objectives between ASPICE and ISO 26262. "To do so, ASPICE defines assessable criteria for these processes. In contrast to the ISO 26262, these are independent of the criticality and of the product's ASIL level." A is not correct. This difference does not exist. C is not correct. Both ASPICE and ISO 26262 influence the work of a tester. D is not correct. Both apply to the development of the product/system.	AuTFL-2.4.1	1
21	**C**	C is correct. From syllabus section 2.4.2 "In the ISO 26262 on the other hand, there are individual method tables for each test level (see chapters 2.2.5 and 2.2.4.2). These provide the tester with recommendations depending on the ASIL level as to which techniques he should use." A is not correct. There is no 1-to-1 mapping of ISTQB and ASPICE 3.0 test levels, because there is no ASPICE equivalent to the ISTQB acceptance test level in Table 2 in section 2.4.2 of the syllabus. B is not correct. ASIL levels are defined in ISO 26262; the ISTQB CTFL syllabus does not discuss ASIL levels. D is not correct. According to syllabus section 2.4.2, "ASPICE also does not generally assign any techniques to test levels."	AuTFL-2.4.2	1

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		Further, method tables are found in ISO 26262, not the CTFL.		
22	**A**	A is correct. Syllabus 3.1.2 (pg 29) lists the parts a test environment consists of and gives examples. The answer options are built from these examples. B is not correct. A physical road surface and driver are not required. Environment models will model these. C is not correct. A physical combustion engine and driver are not required for the same reason as above. D is not correct. A physical combustion engine is not required for the same reason as above.	AuTFL-3.1.2	1
23	**D**	D is correct. This definition for Model in the Loop can be found in syllabus Definitions section (pg 50).	Term	1
24	**B**	B is correct. Example from syllabus section 3.1.3.1 "In the interior and chassis electronic there are many examples of Open-Loop systems (see lights and switches)." A is not correct. This fits the description for Open Loop systems from syllabus section 3.1.3.1 "In the interior and chassis electronic there are many examples of Open-Loop systems (see lights and switches)." C and D are not correct. Per syllabus section 3.1.3.2, "…a Closed-Loop system (also known as in-the-Loop) takes the output of the test item into consideration."	AuTFL-3.1.3	1
25	**B**	B is correct. Syllabus Definitions (pg 50) defines Open-Loop system as "A system in which controlling action or input is independent of the output or changes in output".	Term	1
26	**A**	A is correct. Syllabus 3.2.2.2 describes the situation in which SiL test environment is applied in. "If the developer generates source code based on a model, the real behavior of the software can be different to the expected behavior. This can be caused by different data types in the model (mostly floating point) and in the compiled software (mostly fixed point) and also by different memory spaces. These aberrations in the expected behavior can be tested for the first time in a SiL test environment."	AuTFL-3.2.2.2	1
27	**C**	C is correct. "If the test item is available as a prototype or if it is already completely developed, the tester can use a HiL test environment to execute tests." – Syllabus 3.2.3.1 (pg 32). A is not correct. MiL is more appropriate. A model could be created from the	AuTFL-3.2.3.1	1

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		design, but you can't do HiL because there is no hardware yet, only the design. B is not correct. MiL is more appropriate. "During the development … the tester can also test single components up to an entire system." – Syllabus 3.2.1.2 (pg 31). D is not correct. SiL is more appropriate. "These aberrations in the expected behavior can be tested for the first time in a SiL test environment." – Syllabus 3.2.2.2 (pg 32).		
28	**C**	C is correct. Syllabus 3.2.1.1. (pg 21) explains that MiL is used when the test item is only available as a model. "In a MiL test environment, the test item is available as a model. This model is executable but not compiled for a special hardware. Such models are modelled by the developers… ".	AuTFL-3.2.1.1	1
29	**D**	D is correct. This is the definition for Environment Model (Automotive) – Syllabus Definitions (pg 49). A and B are not correct. C is not correct and is the definition for Fault Insertion Unit.	Term	1
30	**A**	A is correct. Syllabus section 3.2.1.2 states "…the tester can also test single components up to an entire system." B is not correct. Syllabus section 3.2.1.2 states "But it is not common to enable the environment model to simulate bus or diagnosis functions or physical behavior (such as cable breaks or shorts)." C is not correct. Syllabus section 3.2.1.2 states "…big advantage is that the tester can pause the simulation at any time to execute detailed analysis and assessments." D is not correct. Syllabus section 3.2.1.2 states "The environment model becomes more complex as the scope of functions of the test item increases. The aspects of reality and environmental factors are very complex. The execution times for the models also increases disproportionately."	AuTFL-3.2.1.2	1
31	**D**	D is correct. Syllabus section 3.2.3.2 states "The reason for this is that the software is running on a real hardware". A is incorrect because Syllabus section 3.2.3.2 states "The HiL test environment can be used for component tests, integration tests and system tests". B is incorrect Syllabus section 3.2.3.2 states "The objective is, among other things, to find functional and non-functional defects in the software and hardware". C is incorrect because Syllabus section 3.2.3.2 states "The reason for this is that the software is running on a real hardware".	AuTFL-3.2.3.2	1

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32	**B**	B is correct. The relevant information is provided in syllabus section 3.2.4.1 (pg 33). A is incorrect because HiL provides low access to the test item. C is incorrect because HiL requires more detail than SiL. D is incorrect because MiL is the easiest to implement and maintain.	AuTFL-3.2.4.1	1
33	**C**	C is correct as this answer reflects the content of the last row “Prove usability”. A is incorrect because the ‘o’ in the MiL column indicates such testing is possible. B is incorrect because the ‘-‘ in the SiL column indicates such testing is not sensible. D is incorrect because the bottom row has an ‘o’ in the SiL column, so testing is possible and should be considered. (see syllabus section 3.2.4.2, table 4)	AuTFL-3.2.4.2	1
34	**B**	B is correct. This is the definition of “Coding Standard” as described in the Definitions section of the syllabus.	Term	1
35	**D**	D is correct because Syllabus section 4.1.1 states “Coding standards help to avoid anomalies in the software, which can possibly lead to defects”. A is incorrect because Syllabus section 4.1.1 states that ““required” guidelines may only be neglected by the developer if he can conclusively explain it.” B is incorrect because Syllabus section 4.1.1 states that “Organizations can individually intensify the requirement of a rule or directive, but they can never lower it”. C is incorrect because Syllabus section 4.1.1 states that “Directives are not entirely verifiable by static analytic tools. The reason for that is that they rather refer to details of the development process or documents outside of the software”.	AuTFL-4.1.1	1
36	**B**	B is correct. Consistent is a requirement characteristic in the cited specification. The requirements are not consistent as one says to provide feedback through the steering wheel while the other says that no feedback should be provided. A, C and D are incorrect because they are not quality characteristics listed in syllabus section 4.1.2.	AuTFL-4.1.2	1
37	**A**	A is correct. The explanation is given below: In order to accomplish MC/DC coverage, you have to test the T/F for each atomic condition (Speed, Stressed, Active) and the T/F for the decision outcome (Moderate). In addition, you have to test that if any one of the items changed,	AuTFL-4.2.1	1

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		it would affect the outcome (so you can see if the test is actually checking all the values). Cases 3, 5, 6 cover all the values for the atomic conditions (condition coverage). Cases 5 and 6 cover all the values for the decision outcome (decision coverage). The combination of Case 3 and Case 7 tests that the outcome changes based on the value of SPEED. The combination of Case 5 and Case 7 tests that the outcome changes based on the value of STRESSED. The combination of Case 5 and Case 6 tests that the outcome changes based on the value of ACTIVE. B is incorrect because SPEED is always true, so condition coverage for SPEED is not met. C is incorrect because the outcome is always false, so decision coverage is not met. D is incorrect because ACTIVE is always true so condition coverage for ACTIVE is not met.		
38	**D**	D is correct. Back-to-back testing in the simplest case is testing test items that are different versions of the same software by executing the same test cases and comparing the results. A, B and C do not fit the definition or usage of back-to-back testing.	AuTFL-4.2.2	1
39	**D**	D is correct. Syllabus 4.2.4 (pg 40) states “On the other hand, the tester may not be able to test all the requirements if they are very detailed. Here, a prioritization of the test cases is mandatory.” A is incorrect because the tester should prioritize testing in order to fit the project timeline. B is incorrect because the tests should be designed with clear requirements in mind and the results will be able to be traced back to these requirements. C is incorrect because, although it may be frustrating, the tester should still strive to maintain the quality of testing.	AuTFL-4.2.4	1
40	**A**	A is correct. 1, 9 and 2 are the only options that are suitable and reasonable for this level of testing. 1 would logically come first as it will likely be the basis for the rest of the testing. 9 is a higher risk than 2, so should be tested first.	AuTFL-4.2.5	1