



**Swedish Software Testing Board (SSTB)
International Software Testing Qualifications Board (ISTQB)**

**Automotive Software Tester Certificate
in Software Testing
Version 2018**

**Examination Questions
2021-05-16**

**Time allowed: 1:00
(For non-native English speakers 1:15)**

**There are 40 questions, each question 1 point
You need 26 points or more to pass**

You have to follow directives given to you by the invigilator during the whole exam

**Mark your answers in the provided answer sheet. Try to answer all 40 questions.
Select one option per question if nothing else indicated. Erase any answer you
decide to change and mark your new chosen answer clearly.**

**You are not allowed to keep the questionnaire, other documents or notes. All papers
must be handed back to the invigilator at the end of the exam.**

9999

1.	<p>Which Automotive SPICE process is particularly important from the point of view of an employee in the role of a Certified Automotive Software Tester?</p> <ul style="list-style-type: none">a) Project managementb) Configuration managementc) System requirements analysisd) Software qualification test <p>Please select exactly 1 option</p>
2.	<p>Which statement is TRUE?</p> <ul style="list-style-type: none">a) A Hardware-in-the-Loop (HiL) test environment is a more realistic test environment than a Software-in-the-Loop (SiL) test environmentb) The amount of effort for design, commissioning, and maintenance of a Hardware-in-the-Loop (HiL) test environment is lower than a Software-in-the-Loop (SiL) test environmentc) The cost of a detected error in the test object is highest if the error is found in the Model-in-the-Loop (MiL) test environmentd) Hardware components are tested in a Software-in-the-Loop (SiL) test environment <p>Please select exactly 1 option</p>
3.	<p>The requirements for a car radio on system level are given below:</p> <ul style="list-style-type: none">1) After switching it on, the system shows the message "Welcome" for 3 seconds2) In a switched on state, the radio is in one of the states "active", "passive" or "in maintenance" and in a switched off state the last state is saved3) In a switched on state the radio function is engaged by pressing the button "Radio"4) If the CD function is engaged and no CD is in the drive, the system shows the message "No Disc" <p>Which of the following statements about the given quality criteria for requirements according to ISO/IEC/IEEE 29148 is TRUE?</p> <ul style="list-style-type: none">a) Requirement 4 is not unambiguousb) Requirement 3 is inconsistentc) Requirement 1 is not verifiabled) Requirement 2 is not singular <p>Please select exactly 1 option</p>

4.	What are the six stages in the system product life cycle according to ISO/IEC 24748? a) Concept, Implementation, Production, Utilization, Support, Retirement b) Concept, Development, Acceptance, Utilization, Support, Retirement c) Concept, Development, Production, Utilization, Support, Retirement d) Concept, Development, Production, Release, Support, Retirement Please select exactly 1 option
5.	Which of the following statements is TRUE? a) ISTQB defines the test techniques to be used depending on the test levels b) Automotive SPICE® defines the test techniques to be used for each test level c) Depending on the ASIL, the method tables of the ISO 26262 recommend test techniques that shall be used d) ISO 26262 and Automotive SPICE® define method tables for all mentioned test levels Please select exactly 1 option
6.	Which of the following statements regarding ASIL is TRUE? a) An ASIL is assigned to all hazards classified b) ASIL stands for "Automotive Security Integrity Level" c) The ASIL of a hazard is the result of the hazard analysis and risk assessment d) ASIL A represents the highest criticality, ASIL D the lowest one Please select exactly 1 option

<p>7.</p>	<p>You are the test manager for a tier-1-supplier and you are responsible for defining the component verification strategy and criteria according to Automotive SPICE® (SWE.4).</p> <p>The components to be verified are safety relevant ones (up to ASIL-B) as well as non-safety relevant components.</p> <p>According to the process requirements of the OEM, the supplier should confirm MISRA-compliance and comply with the guidelines for functional safety.</p> <p>Which of the following measures is INAPPLICABLE as part of a suitable verification strategy?</p> <ul style="list-style-type: none">a) Code reviews to check the understandability and correctness of comments in the source code of the componentsb) Dynamic Black-Box tests of the components with the objective of achieving 100% requirements coverage for the safety relevant componentsc) Tool-supported static analysis to achieve MISRA compliance of the source code of the componentsd) Tool-supported measuring of the condition coverage of the tested components, to ensure 100% plausibility of the test results <p>Please select exactly 1 option</p>
<p>8.</p>	<p>Which of the following statements regarding safety aspects is TRUE?</p> <ul style="list-style-type: none">a) For the development of automotive E/E systems, ISO 26262 describes requirements to ensure functional safetyb) Functional safety and cybersecurity of automotive E/E systems contradict each otherc) For the development of automotive E/E Systems, ISO 26262 describes the requirements to ensure cybersecurityd) Functional safety of an automotive E/E system can be assumed if unreasonable risks for people can be avoided during the normal operation of this system <p>Please select exactly 1 option</p>

9.	<p>According to Automotive SPICE® 3.x, which Software Test Qualification Process Capability Level is characterized by a combination of the following statements?</p> <p>Work products have been reviewed, established and have been re-leased. AND Process activities are planned towards objectives, monitored and adjusted. AND Requirements for work products are defined.</p> <p>a) Capability level 0 b) Capability level 3 c) Capability level 2 d) Capability level 1</p> <p>Please select exactly 1 option</p>
10.	<p>Which of the following statements is NOT true?</p> <p>a) In the Model-in-the-Loop (MiL) test environment, additional hardware is necessary b) A Model-in-the-Loop (MiL) test environment is used early in the development process c) In the Model-in-the-Loop (MiL) test environment, the test object exists as a model d) In the Model-in-the-Loop (MiL) test environment, the test object is readable for humans</p> <p>Please select exactly 1 option</p>
11.	<p>Which three items are all parts of a Hardware-in-the-Loop (HiL) test environment?</p> <p>a) Electric error simulation, signal processing, processor simulation b) Power supply, real-time capable computer, electric error simulation c) Test case generator, rest bus simulation, power supply d) Breakout box, software compiler, real parts</p> <p>Please select exactly 1 option</p>

12.	Which of the statements is true? a) In a closed-loop-system, the output signals of the test object are linked to the inputs of the test object via an environment model b) In an open-loop-system, the output signals of the test object are directly linked to the inputs of the test object c) In a closed-loop-system, the output signals of the test object are directly linked to the inputs of the test object d) In an open-loop-system, the output signals of the test object are linked to the inputs of the test object via an environment model Please select exactly 1 option
13.	Which of the following statements is <u>NOT</u> a description of a fault injection test? a) Fault injection tests insert faults in the system specification, e.g., as too low parameters for the required performance b) Fault injection tests insert faults in internal interfaces, e.g., as lost messages c) Fault injection tests insert faults in the behavior of external components to detect that the system can deal with erroneous situations d) Fault injection tests insert faults in the operating unit that show as internal defects Please select exactly 1 option
14.	Which statement regarding the test environment is true? a) For integration tests is only the Hardware-in-the-Loop (HiL) test environment suitable b) For system tests, a Model-in-the-Loop (MiL) and Hardware-in-the-Loop (HiL) test environments are both suitable. c) Any XiL test environment can be used on every test level d) For component tests a Model-in-the-Loop (MiL) test environment and Soft-ware-in-the-Loop (SiL) test environment are both suitable Please select exactly 1 option

15.	<p>Which statement regarding a Model-in-the-Loop (MiL) test environment is most likely TRUE?</p> <ul style="list-style-type: none">a) The test execution duration of the simulation depends on the complexity of the model and the computing power of the test systemb) The environment model provides extensive implementations of physical processes (like for example electromagnetic compatibility or cable breaks)c) The simulation of the Model-in-the-Loop (MiL) test environment can only be started and stopped. Pausing the simulation is not possibled) Access to bus and diagnosis interfaces are implemented in the environment <p>Please select exactly 1 option</p>
16.	<p>ISO 26262 recommends the use of specific test design techniques and test types depending on the Automotive Safety Integrity Level (ASIL). Which statement is TRUE?</p> <ul style="list-style-type: none">a) For safety requirements with a higher ASIL, more extensive testing in comparison to safety requirements with a lower ASIL often occurs, as the recommended test design techniques and test types lead to more test casesb) For safety requirements with a higher ASIL, more extensive testing must be done in comparison to safety requirements with a lower ASIL, as the recommended test design techniques and test types lead to more test casesc) For safety requirements with a higher ASIL, more extensive testing must be done in comparison to safety requirements with a lower ASIL, as the number of recommended test design techniques and test types is higherd) For safety requirements with a higher ASIL, a more extensive testing in comparison to safety requirements with a lower ASIL often occurs, as the number of recommended test design techniques and test types doubles with each ASIL <p>Please select exactly 1 option</p>
17.	<p>Which two volumes of ISO 26262 are the MOST IMPORTANT ones for the Automotive Software tester?</p> <ul style="list-style-type: none">a) Volume 2 (Management of functional safety) and volume 6 (Product development at the software level)b) Volume 3 (Concept phase) and volume 6 (Product development at the software level)c) Volume 5 (Product development at the hardware level) and volume 6 (Product development at the software level)d) Volume 4 (Product development at the system level), volume 6 (Product development at the software level) <p>Please select exactly 1 option</p>

18.	<p>Which of the following statements about regression test strategy is TRUE, according to Automotive SPICE®?</p> <ul style="list-style-type: none">a) The regression test strategy typically defines the cross-test stage procedure for the selection of regression testsb) The regression test strategy defines the test stage specific test environments and which tests are to be executed in which test environmentsc) The regression test strategy is an abstract description of the planned test levels and how to proceed within those test stages. It is valid for one organization or one program, for one or more projectsd) The regression test strategy defines the selection of appropriate test cases for regression testing, including a set of test cases selected as a basis set to be executed <p>Please select exactly 1 option</p>
19.	<p>Which of the following statements regarding AUTOSAR is TRUE?</p> <ul style="list-style-type: none">a) AUTOSAR is not compliant to international standardsb) AUTOSAR standardizes the basic functionality of the software of automotive control devicesc) AUTOSAR supports only AUTOSAR-control unitsd) AUTOSAR defines a closed architecture, which can only be used by the companies, who are members of the AUTOSAR consortium <p>Please select exactly 1 option</p>
20.	<p>What is especially important in the selection of test design techniques in the context of ISO 26262? Choose the BEST POSSIBLE answer.</p> <ul style="list-style-type: none">a) The recommendation of the ISO 26262 for the identified ASIL is the decisive factor for the selection of the test design techniquesb) White-box-test design techniques should be preferred over black-box-test design techniques, as the tester can take advantage of knowledge of the codec) Intuitive test design techniques should always be preferred over structure based test design techniquesd) The combination of the suitability of the test basis and the test level together with a high risk of non-detected errors is the decisive factor for the test design techniques to be selected <p>Please select exactly 1 option</p>

21.	Which tests are typically performed in a Software-in-the-Loop (SiL) test environment? a) Performance tests of the target hardware b) Tests of the response time for diagnosis requests c) Interface and integration tests d) Tests for electromagnetic compatibility Please select exactly 1 option
22.	You are a member of a test team and you are to test the software code of an electronic control unit. The electronic control unit has been provided as a model and as a development board by the development team, as no electronic control unit hardware is available yet. The test is supposed to ensure the mechanisms for error detection and error handling in the electronic control unit work properly. Which test environment is to be preferred in this situation given the test types? a) A Software-in-the-Loop (SiL) test environment, as development boards are available and error detection is to be tested b) If no electronic control unit hardware is available, the software cannot be tested c) A Hardware-in-the-Loop (HiL) test environment, as errors for the test of the error handling can only be simulated in this test environment d) A Model-in-the-Loop (MiL) test environment, as no hardware is available yet and the test object is available as a model Please select exactly 1 option
23.	Which of the following statements is TRUE? a) The release provisions of the test object do NOT have any influence on the work of the Certified Automotive Software Tester b) The release recommendation does NOT have any influence on the scope of delivery c) The release recommendation of the Certified Automotive Software Tester does NOT have any influence on the level of maturity of the corresponding software d) The release recommendation of the Certified Automotive Software Tester does NOT have any influence on the release Please select exactly 1 option

24. Which of the following statements regarding AUTOSAR is TRUE?

- a) The integration test of the AUTOSAR software in a virtual test environment cannot be implemented, as real hardware is necessary
- b) AUTOSAR-specific tests are limited to the software of a single control device
- c) The RTE is a suitable test interface for the system test of the software
- d) The AUTOSAR acceptance test must be performed to prove the AUTOSAR conformity of the software

Please select exactly 1 option

25. The following table shows an ISO 26262 methods table regarding code coverage metrics.

Methods		ASIL			
		A	B	C	D
1a	Statement coverage	++	++	+	+
1b	Branch coverage	+	++	++	++
1c	Modified condition decision coverage (MC/DC)	+	+	+	++

Which of the following decisions documented in the test plan is consistent with the above methods table?

- a) For ASIL B, statement coverage is used and branch coverage is not used, as 100% statement coverage implies 100% branch coverage
- b) For ASIL B, statement coverage is used and branch coverage is not used, as it is positioned at a higher position in the table and is therefore more important
- c) For ASIL A, branch coverage is used and statement coverage is not used, as 100% branch coverage implies 100% statement coverage
- d) For ASIL D, MC/DC coverage is used as it is the only possible option

Please select exactly 1 option

<p>26.</p>	<p>Below is a decision with three single conditions (B1 AND B2) OR B3. The task for the tester is to design test cases according to the principle of the modified condition decision test (MC/DC).</p> <p>The tester has already designed three test cases:</p> <ol style="list-style-type: none">1) B1 = TRUE, B2 = TRUE, B3 = FALSE2) B1 = FALSE, B2 = TRUE, B3 = FALSE3) B1 = FALSE, B2 = TRUE, B3 = TRUE <p>Which of the following test cases is necessary to achieve 100% modified condition decision coverage?</p> <ol style="list-style-type: none">a) B1 = TRUE, B2 = FALSE, B3 = FALSEb) B1 = TRUE, B2 = TRUE, B3 = TRUEc) B1 = TRUE, B2 = FALSE, B3 = TRUEd) B1 = FALSE, B2 = FALSE, B3 = FALSE <p>Please select exactly 1 option</p>
<p>27.</p>	<p>Which of the following statements regarding the objectives of Automotive SPICE® and the ISO 26262 is NOT TRUE?</p> <ol style="list-style-type: none">a) ISO 26262 has the objective of rating the capability of the development processes of the supplier by using assessmentsb) Automotive SPICE® has the objective of rating the capability of the development processes of the sub-contractors by using assessmentsc) ISO 26262 has the objective of defining requirements for the processes and methods to be used by the tester in the development of E/E-Systemsd) ISO 26262 has the objective of avoiding risks from systematic errors during development by specifying suitable requirements and processes <p>Please select exactly 1 option</p>
<p>28.</p>	<p>Which of the following statements BEST describes the contribution of an Automotive Software tester in the safety lifecycle?</p> <ol style="list-style-type: none">a) The tester executes tests related to functional safety primarily during the concept phaseb) The tester executes tests related to functional safety primarily during the product development phasec) The tester executes tests related to functional safety primarily during the post-release phase, while in productiond) The tester executes tests related to functional safety to the same extent in all phases of the safety lifecycle <p>Please select exactly 1 option</p>

29.	<p>With which of the measures listed below can the objectives of an increasingly complex software development project be best achieved in the short run?</p> <ul style="list-style-type: none">a) By insourcing an outsourced projectb) By using effective methods and processesc) By ensuring efficient qualification of employeesd) By outsourcing of complex projects <p>Please select exactly 1 option</p>
30.	<p>Which of the following statements regarding requirement-based tests is CORRECT?</p> <ul style="list-style-type: none">a) Requirement based tests are only focused on the coverage of requirements and do not allow the use of intuitive or explorative testsb) Requirement based tests have the objective to cover requirements with test casesc) Requirement based tests verify the test object independently from the quality of the customer requirements for the fulfilment of customer requestsd) Requirement based tests have the objective to test the requirements until they are consistent and complete <p>Please select exactly 1 option</p>
31.	<p>Which interfaces are used to collect and distribute information in an electronic control unit (ECU)?</p> <ul style="list-style-type: none">a) Analogue and digital inputs, bus system and diagnosis interfaceb) Analogue and digital inputs, watchdog and internal data memoryc) Environment model, bus system and diagnosis interfaced) Analogue and digital inputs, supply voltage and diagnosis interface <p>Please select exactly 1 option</p>
32.	<p>Imagine you are participating in an Automotive SPICE® – Assessment in your role as integration tester and you are receiving the information that your process has been assessed as "L," using the process at-tribute PA 1.1. Which ONE of the following options is correct?</p> <ul style="list-style-type: none">a) "L" partly fulfilledb) "L" not fulfilledc) "L" fully fulfilledd) "L" largely fulfilled <p>Please select exactly 1 option</p>

33.	Which items are part of an automotive specific test environment? a) Control computer, simulation software, data logger b) Measuring devices, specification documents, laboratory c) Real-time capable computer, network accesses, report database d) Data management tool, operating system, environment model Please select exactly 1 option
34.	Which test is typically performed at a Component Hardware-in-the-Loop (HiL) test environment? a) Test of the data exchange between the electronic control units b) Test of the driving behavior of the chassis c) Test of the overall system requirements for the vehicle d) Test of the electronic control unit functions for correct behavior Please select exactly 1 option
35.	Which of the following is a dimension defined in Automotive SPICE? a) Objective dimension b) Process dimension c) Resource dimension d) Time dimension Please select exactly 1 option
36.	Which statement regarding coding standards is TRUE? a) A coding standard defines the necessary test specification languages (e.g. test automation, test case selection) b) A coding standard defines the necessary modelling techniques (e.g. states, state transitions) c) A coding standard defines the necessary development practices (e.g. commenting, naming conventions) d) A coding standard defines the necessary test practices (e.g. test techniques, test logging) Please select exactly 1 option

37.	Which of the following statements regarding MISRA C:2012 is TRUE? a) MISRA guidelines are fully testable by static analysis tools b) Rules of the category mandatory should avoid typical coding anomalies c) The binding character of guidelines is predefined for every organization d) Rules of the category required must not be neglected by the developer, even if he gives a reason Please select exactly 1 option
38.	Which traceability requirements are referenced in Automotive SPICE® 3.x? a) Traceability of the testers' working hours to the executed test cases b) Traceability of the specified test cases to the test results c) Traceability of the customer requirements to the specified integration tests d) Traceability of interface description to the specified maintainability tests Please select exactly 1 option
39.	Which of the following statements is <u>NOT</u> true? a) In the Software-in-the-Loop (SiL) test environment, a wrapper is necessary to stimulate and observe inputs and outputs b) In the Software-in-the-Loop (SiL) test environment, additional hardware is necessary c) In the Software-in-the-Loop (SiL) test environment, the number of access points is limited by the wrapper d) In the Software-in-the-Loop (SiL) test environment, the test object exists as compiled object code Please select exactly 1 option
40.	Which statement BEST describes the contribution of an Automotive Software tester to the safety culture? a) The tester carries out all activities that are related to functional safety b) The tester ensures that all project team members contribute to the safety culture c) The tester contributes to the development phases of the safety lifecycle d) The tester checks if all processes required for functional safety activities are implemented Please select exactly 1 option

Please return this questionnaire and all your notes together with your answer sheet at the end of the examination.

Sample Exam