Sample Exam

Certified Automotive Tester
Foundation Level

Questions

ASTQB Created - 2018

American Software Testing Qualifications Board

ASTQB
American Software Testing Qualifications Board, Inc.

This exam should be completed in 60 minutes. Each question is worth 1 point.

#1. Which of the following statements is true regarding the influence of standards on project aspects?

    a. Standards improve efficiency by increasing the amount of time required to achieve the stated level of quality
    b. Standards influence the Project Management Triangle – time, cost, and quality
    c. Standards maximize the project and product risks that can be taken by the developer to create a better product
    d. Standards have minor influences on projects and often do not need to be adhered to

#2. There are no testing activities in which phase of the system lifecycle?

    a. Retirement
    b. Production
    c. Support
    d. Utilization

#3. In what ways are time, cost and quality competing project objectives?

    a. Car producers want increased quality being developed faster and with less cost
    b. Car producers are only concerned about the cost of development
    c. Car producers want to create more models faster and cheaper and will accept lower quality
    d. Car producers focus on quality and are not concerned if the development takes longer to achieve it

#4. Which of the following is the best definition of "Functional Safety"?

    a. Absence of unreasonable risk due to hazards caused by malfunctioning behavior of Electric/Electronic systems
    b. Minimizing unreasonable risk due to hazards caused by malfunctioning behavior of Electric/Electronic systems
    c. Absence of reasonable risk due to hazards caused by normal behavior of Electric/Electronic systems
    d. Minimizing unreasonable risk due to hazards caused by the normal behavior of Electric/Electronic systems

#5. Which of the following is required by ASPICE in test documentation?

a. Test model report
b. Integration analysis summary
c. Incident/deviation report
d. Software quality characteristic report

#6. What is the order of the capability levels from Level 0 to Level 3?

a. Incomplete process, Managed process, Performed process, Established process
b. Incomplete process, Established process, Managed process, Performed process
c. Incomplete process, Established process, Performed process, Managed process
d. Incomplete process, Performed process, Managed process, Established process

#7. Which of the following options correctly describe the rating levels, in terms of fulfilment of that capability indicator?

a. 0% up to 15% - F
   16% up to 50% - L
   51% up to 85% - N
   86% up to, and including 100% - P

b. 0% up to 15% - N
   16% up to 50% - P
   51% up to 85% - L
   86% up to, and including 100% - F

c. 0% up to 15% - N
   16% up to 50% - L
   51% up to 85% - P
   86% up to, and including 100% - F

d. 0% up to 15% - F
   16% up to 50% - L
   51% up to 85% - P
   86% up to, and including 100% - N

#8. In planning the test strategy for each test process, the test manager must consider which of the following?

a. Requirements at each test level and the need to minimize automation for enhanced test coverage
b. Reducing the ability to base testing on risk assessment vs. increasing the ability to repeat all automated test cases
c. Benefits of early testing and the increased costs of test environments at higher test levels
d. Need to repeat all lower level test cases at each level, leading to explosive growth in the number of tests over time

#9. You are the test manager planning the testing for an adaptive steering system. The adaptive steering adjusts the ratio between changes to the steering wheel and changes made to the front tires, based on vehicle speed. As the vehicle moves faster, movement of the steering wheel produces smaller changes in the front wheels. You are planning the early testing of the controller module code units.

Which of the following statements represents the most viable verification strategy and criteria for unit verification?

a. The verification strategy is to have all unit test results verified by an external commercial testing organization. All regression testing is performed in-house when necessitated by defects discovered during system testing. The criteria is to achieve 100% match between the unit tests and the regression tests.
b. The verification strategy is to use a code analyzer to perform static analysis on all code followed by functional testing against requirements. The criteria for unit verification are no issues labeled as critical or high by the code analyzer and 100% path coverage per unit.
c. The strategy is to focus on verification of functionality at the earliest possible stage, preferably during unit testing. The criteria for unit verification are 100% satisfaction of the unit's functional requirement, with no outstanding defect reports, and a 100% match of those results in regression testing.
d. The strategy is to not delay developers by testing during unit coding, but to conduct functional testing as part of the initial system integration. The criteria will be 100% decision coverage.

#10. Which of the below statements best describes an aspect of ASPICE traceability requirements?

a. ASPICE requires bidirectional traceability, both vertically and horizontally
b. ASPICE concentrates on vertical traceability from code to specifications
c. ASPICE concentrates on horizontal traceability from requirements to code
d. ASPICE requires bidirectional traceability from the original requirements but does not address change requests

#11. Why is it important for testers to participate responsibly in all phases of the software development lifecycle, and carry out their work with a continuous view of the overall context of the product development?

a. The tester is responsible for reporting back on all areas of the software development lifecycle in their summary report so they should have a good grasp on activities outside of their field of testing
b. It is the tester's role to ensure there is compliance with the functional-safety-relevant requirements across the whole project, not just in their testing activities
c. The tester must understand that their actions are not independent of other processes and can impact the safety of the final product
d. The tester may be asked, on occasion, to audit the work of others in the development team and so must be familiar with all aspects of product development

#12. Why are volumes 4, 5 and 6 of ISO 26262 of special interest to the tester?

a. These volumes contain the fundamental vocabulary and terminology that a tester should be familiar with, as well as the guidelines for how to apply ISO 26262 to their work
b. These volumes describe how safety-oriented analysis can be conducted by a tester
c. These volumes address the test-specific aspects and verification measures of system, software and hardware development
d. These volumes explain how to manage functional safety through testing

#13. What is the significance of a risk with ASIL D?

a. This risk carries low safety requirements. Safety goals and safety requirements should be drafted out accordingly.
b. This risk carries low safety requirements. It can be addressed by complying with the existing quality management.
c. This risk carries high safety requirements. Safety goals and safety requirements must be drafted out accordingly.
d. This risk carries high safety requirements. The project should be discontinued immediately.

#14. Which of the following statements is true regarding functional safety for E/E systems?

   a. IEC 61508 specifies that the integration tester is responsible for performing a risk analysis
   b. When a risk to life or limb has been identified, it must be eliminated
   c. Safety in the working environment and cybersecurity are key elements of Functional Safety
   d. Risks to life or limb must be mitigated until there is no unreasonable risk

#15. Which of the following is a task for a tester in the safety lifecycle?

   a. Search for possible risks from the very start of the project
   b. Follow a linear progression from product concept to product production
   c. Perform the majority of the system test effort during the product production phase
   d. Perform initial safety test planning in parallel with the developers during the product development phase

#16. Which of the following is true regarding ASIL?

   a. For ASIL A, there are no recommendations for or against the use of any particular test technique
   b. The ASIL for each module determines the required mitigating measure or test technique
   c. The highest ASIL often mandates the use of MC/DC for completeness
   d. At the lowest ASIL, justification is not required when using alternative measures

#17. You are the test manager planning the testing for an adaptive steering system. The adaptive steering adjusts the ratio between changes to the steering wheel and changes made to the front tires, based on vehicle speed. As the vehicle moves faster, movement of the steering wheel produces smaller changes in the front wheels. You are planning the early testing of the controller module code units.

The safety team has decided the portion of the software that takes charge when icy, slippery conditions are detected is ASIL C.

Given the table below, which of the following sets of methods should you apply?

		ASIL A	ASIL B	ASIL C	ASIL D
1	Formal Design Review	o	+	+	++
2	Boundary Value Analysis (BVA)	+	++	++	++
3	Fault Injection (FI) Testing	o	++	++	++
4a	Modified Condition/Decision (MC/DC) Testing	o	++	+	++
4b	Multiple Condition (MC) Testing	o	+	++	+
5	On Vehicle Testing	o	+	+	++

a. Apply BVA, FI, MC/DC; consider applying Formal Design Review and On Vehicle Testing
b. Apply BVA, FI, MC; consider applying Formal Design Review and On Vehicle Testing
c. Apply Formal Design Review, BVA, FI, MC/DC, MC; consider applying On Vehicle Testing
d. Apply Formal Design Review, BVA, MC/DC, MC, On Vehicle Testing; consider applying FI

#18. Which of the following statements best describes the objectives of AUTOSAR?

a. By standardizing basic software functionality of automotive ECUs, AUTOSAR aims to reduce the competition in implementation
b. AUTOSAR does not address sustainable use of natural resources as this would hinder competition in implementation
c. By supporting transferability and scalability, AUTOSAR encourages collaboration in the standards and competition in implementation
d. AUTOSAR prevents collaboration between partners by allowing and supporting the use of multiple different functional domains

#19. What is the AUTOSAR acceptance test?

   a. A test of software integration in a virtual environment
   b. A test of software integration in the real electronic control unit
   c. A test of the functional integration and connectivity of different electronic control units
   d. A test of the software system for compliance at the communication and application levels

#20. In what ways are ASPICE and ISO 26262 different?

   a. One applies to software development while the other applies to hardware development
   b. One depends on the criticality levels of ASIL while the other does not
   c. One affects the work of a tester while the other does not
   d. One applies to the process of product/system development while the other applies to the completed product/system

#21. Which of the following is correct regarding ASPICE, ISO 26262, and CTFL?

   a. There is a 1-to-1 mapping of ISTQB and ASPICE 3.0 test levels, but some ISO 26262 levels cover two ISTQB/ASPICE levels
   b. The CTFL syllabus provides ASIL test technique recommendations for each test level
   c. Method tables in ISO 26262 provide test technique recommendations based on ASIL levels
   d. ASPICE assigns suggested test techniques to each specified test level, based on method tables in the CTFL

#22. Which of these are typical parts of an automotive test environment?

   a. Computer, simulation software, data logger, measuring tools and laboratory protection
   b. Physical road surface, computer, driver, measuring tools, oscilloscope and external protection
   c. Computer, combustion engine, driver, oscilloscope, and laboratory protection
   d. Simulation software, camera, combustion engine, and laboratory protection

#23. Which test environment is defined as "dynamic testing conducted using a simulation model of the system in a simulated environment"?

    a. Software in the Loop
    b. Vehicle in the Loop
    c. Hardware in the Loop
    d. Model in the Loop

#24. Which of the below statements captures the difference between an Open Loop and a Closed Loop system?

    a. A Closed Loop system uses no environmental sensor inputs, relying on the driver's selection (such as with turn signals) for control decisions
    b. An Open Loop system, such as the switch controlling the headlights, does not use the resulting output as an input in making later decisions
    c. An example of an Open Loop system is the module maintaining the speed when cruise control is on, because it is "open" to using the current speed as an input
    d. A Closed-Loop system, such as the switch controlling the headlights, has the output "closed off," preventing it from affecting later decisions

#25. In what type of system is the controlling action or input independent of the output or changes in output?

    a. Closed-loop system
    b. Open-loop system
    c. Back-to-back system
    d. Bus system

#26. Which test environment is able to test for aberrations in expected behavior caused by different data types in the model, in the compiled software code, and by different memory spaces?

    a. SiL
    b. MiL
    c. HiL
    d. Components-HiL

#27. HiL test environment is most appropriate to use at which point in development?

a. When the hardware design is completed
b. When each individual software component is developed
c. When the completely developed product or a completed prototype is available
d. When there are discrepancies with the expected behavior and real behavior of the system

#28. You have been asked to test a system design that has been modelled by developers but not yet turned into a prototype. Which test environment should you use?

a. SiL
b. HiL
c. MiL
d. Component-HiL

#29. What is an Environment Model?

a. A prediction of how the final product will impact environmental sustainability, based on emissions data from testing
b. The simulation of the functional system design on a real-time capable computer
c. A part of a test environment that is able to simulate defects at the interfaces of a component or system
d. The abstraction of the real environment of a component or system (including other components, vehicle processes, and environment conditions) in a real-time simulation

#30. Which of the following is a correct statement regarding MiL?
a. Each component of the system, any combination of components, or the system as a whole can be tested in a MiL test environment
b. Early MiL testing of bus and physical behaviors (such as cable breaks and shorts) commonly removes the need for specialized hardware
c. MiL tests cannot be paused because there is no clock to set a common time for data capture across elements
d. The abstraction of modeling reduces complexity, keeping the environmental model simple as the scope of the functions increases

#31. Which of the following is a limitation when using a Hardware in the Loop (HiL) test environment?
    a. Components cannot be tested individually
    b. HiL focuses on finding functional defects in the hardware, not the software
    c. Real-time response is not measurable because all hardware components are simulated
    d. All tests are run in real-time and cannot be paused

#32. Which of the below statements best describes an attribute of an XiL test environment?
    a. HiL provides easy access to the test item
    b. MiL is furthest from reality
    c. SiL requires the most detailed test basis
    d. MiL is the most difficult to implement and maintain

#33. You are the test manager planning the testing for an adaptive steering system. The adaptive steering adjusts the ratio between changes to the steering wheel and changes made to the front tires, based on vehicle speed. As the vehicle moves faster, movement of the steering wheel produces smaller changes in the front wheels.

In the table below, test types are described in more detail and they are assigned to suitable test environments.

Test type	Description by Examples	MiL	SiL	HiL
Test reaction to configuration data	Check the influence of configuration data (such as parameter sets or variant coding) to the behavior of the test object	o	+	+
Test interaction at interfaces	Check internal and external interfaces of the test item	o	-	+
Prove usability	The observed test item should be usable as required and as expected by the user	-	o	+

Key: + recommended, o possible, - not sensible

Using this table, which statement is true?
    a. Tests of the reaction to configuration data should be done in either the SiL or the HiL environment, but cannot be done in the MiL environment
    b. Test of the interactions at interfaces are optional in the SiL environment
    c. Tests for usability can be done in the SiL environment and should be done in the HiL environment
    d. The SiL environment should only be used to test the reaction to configuration data

#34. Which of the below terms is defined as "A standard that describes the characteristics of a design or a design description of data or program components?"

 a. ASPICE
 b. Coding standard
 c. ECU configuration standard
 d. ISO 26262

#35. Which of the following is true regarding the usage of the MISRA-C:2012 guideline?

 a. "Required" guidelines may be neglected by the developer without written explanation
 b. Organizations can tailor the guidelines (higher or lower) as indicated by their market
 c. Directives that cannot be verified using static analysis tools should be rejected
 d. Application of the specified coding standards can help prevent anomalies in the code

#36. You are the test manager planning the testing for an adaptive steering system. The adaptive steering adjusts the ratio between changes to the steering wheel and changes made to the front tires, based on vehicle speed. As the vehicle moves faster, movement of the steering wheel produces smaller changes in the front wheels.

Consider the following requirements received by the developers:

AdSS-Requirement: The Adaptive Steering System must perform modulation of tire directional control when the car reaches 20 MPH, with linear increases in modulation until the maximum modulation is applied at 70 MPH and above. When speed exceeds 70 MPH the Adaptive Steering System will provide feedback by vibrating the steering wheel.

AdSS-Requirement: There must be no feedback to the driver through the steering wheel when the Adaptive Steering System is functioning; the modulation applied must be undetectable by the user.

AdSS-Requirement: When the driver turns off the Adaptive Steering System, complete control of the vehicle shall be surrendered to the driver as soon as safety permits.

According to ISO/IEC/IEEE-29148:2011 Which requirement characteristic should be addressed to improve this set of requirements?

 a. Measurable
 b. Consistent
 c. Achievable
 d. Balanced

#37. You are the test manager planning the testing for an adaptive steering system. The adaptive steering adjusts the ratio between changes to the steering wheel and changes made to the front tires, based on vehicle speed. As the vehicle moves faster, movement of the steering wheel produces smaller changes in the front wheels.

The decision to moderate a wheel's turning rate involves three binary (true or false) factors: ACTIVE, which indicates the system is activated; SPEED, which indicates the vehicle speed exceeds the 20 MPH threshold; and STRESSED, which indicates the turn rate already in effect is at the maximum allowable level and is about to lose traction.

The module should be triggered if SPEED or STRESSED is triggered and the system is set to ACTIVE, as described in the table below.

CASE	SPEED	STRESSED	ACTIVE	MODERATE
1	TRUE	TRUE	TRUE	TRUE
2	TRUE	TRUE	FALSE	FALSE
3	TRUE	FALSE	TRUE	TRUE
4	TRUE	FALSE	FALSE	FALSE
5	FALSE	TRUE	TRUE	TRUE
6	FALSE	TRUE	FALSE	FALSE
7	FALSE	FALSE	TRUE	FALSE
8	FALSE	FALSE	FALSE	FALSE

To achieve 100% Modified Condition/Decision Coverage (MC/DC) which set of test cases should be used?

a. Cases 3, 5, 6, and 7
b. Cases 1, 2, 3, and 4
c. Cases 2, 4, 6, and 8
d. Cases 1, 3, 5, and 7

#38. Which of the following describes back-to-back testing?

a. Running unit tests, integration tests, system tests, and acceptance tests in a continuous loop
b. Testing the same component multiple times, injecting a different fault each time, and comparing how each fault is handled
c. Running the components of a system concurrently to find any electrical or functional interference
d. Running the same test on multiple versions of the same software and comparing the results

#39. When conducting requirements-based testing, what is the problem when requirements are very detailed?

a. More time is required during requirements analysis which reduces the amount of time the tester has available to actually execute the tests
b. It is difficult to conclude which test results satisfy which requirements during analysis of test results, if the requirements are too specific
c. The tester may become frustrated at the detail required and design low-quality test cases
d. The tester may not be able to test all the requirements and prioritization of the test cases will be needed

#40. You are the test manager planning the testing for an adaptive steering system. The adaptive steering adjusts the ratio between changes to the steering wheel and changes made to the front tires, based on vehicle speed. As the vehicle moves faster, movement of the steering wheel produces smaller changes in the front wheels.

You are planning the system integration testing for the latest controller update which is ASIL B. Together with stakeholders, you considered the test approach and examined the formal risk analysis report, leading to the chart below. Which test techniques should be selected and in which order (from highest priority to lowest priority) should the tests be conducted?

	Test design technique	Recommended for use with ASIL B?	Test basis suitable?	Risk, if defect not detected?	Test level "system integration test" reasonable?
1	Requirements-based testing	++	YES	++	YES
2	Equivalence partitioning	++	YES	+	YES
3	Boundary value analysis	++	NO	++	NO
4	Statement testing	-	YES	-	NO
5	Decision testing	+	YES	+	NO
6	MC/DC	+	NO	+	NO
7	Error guessing	-	YES	-	NO
8	Fault injection	+	NO	-	NO
9	Back-to-back Testing	++	YES	++	YES

a. 1, 9, 2
b. 1, 2, 3, 9
c. 1, 2, 9, 5, 4, 7
d. 1, 9, 2, 3, 5, 6, 8