



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

**Performance Testing Certificate
in Software Testing
Version 2018**

**Examination Questions
2021-09-26**

**Time allowed: 1:30
(For non-native English speakers 1:53)**

**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.**

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1.	<p>Which of the following performance testing activities should occur during unit testing?</p> <ul style="list-style-type: none">a) Testing key use cases and workflows using a top-down approachb) Testing data flows and workflows across interfacesc) Testing end-to-end behavior under various load conditionsd) Testing to evaluate resource utilization and potential bottlenecks <p>Please select exactly 1 option</p>
2.	<p>You are testing a sales application for an e-commerce system. You are particularly interested in the response time for when a user enters text to be used to search for an item in the database. You have noticed that the first time you ran the tests it took 5.00 seconds to respond, but subsequent queries with the same data are responding in 0.01 seconds.</p> <p>What should you have done during your scripting to prevent this issue?</p> <ul style="list-style-type: none">a) You need to be sure the cache is cleared because the query results are probably being cachedb) You need to log in each time to ensure that the transaction is performed againc) There is no issue, the system is just getting fasterd) You need to use a different user for each test to avoid the user's information being re-used without being restored <p>Please select exactly 1 option</p>
3.	<p>What is a method for testing transient states?</p> <ul style="list-style-type: none">a) Scalability testingb) Peak and valley testingc) Steady load testingd) Spike testing <p>Please select exactly 1 option</p>
4.	<p>Which of the following is an important principle in performance testing?</p> <ul style="list-style-type: none">a) The test results should match the stakeholders' expectations for system performanceb) The tests should be easy to create and understandc) The test results must be reproducible when the system under test is unchangedd) The tests should be executed in the production environment to provide the most accurate results <p>Please select exactly 1 option</p>

5.	<p>You are working on a project that tracks health history information for patients across a region.</p> <p>The number of records handled by the system is in the millions due to the large number of patients in the region. Patient information must be accessible to doctors in offices, hospitals, and urgent care facilities. The information should be presented to the requestor within three seconds of request.</p> <p>You have been asked to prepare a presentation for the technical stakeholders regarding your plan for performance testing. Which of the following is an example set of information that should be shared with these stakeholders?</p> <ul style="list-style-type: none">a) Because the cost of a performance test system is prohibitive, we will conduct the performance testing in the production environment using live data.b) The performance test system will cost \$240,000 which will include the hardware and setup. This system will allow us to create a test system that is representative of the production system and will allow us to simulate production-like conditions.c) Once configured, the performance test system will require data loading. Once loaded, we will next proceed to running a small set of sample scripts to verify the output. When those succeed, we will proceed with the performance test script which ramps up users at a rate of 10 per minute until we reach the target number of concurrent users. This load will then be maintained for 2 hours.d) The product risks include data contention issues, data access issues, locking issues that will reject concurrent requests, network bandwidth constraints, data seek errors, data seek slowdowns or bottlenecks, and difficulty for the user in processing the returned data. <p>Please select exactly 1 option</p>
6.	<p>When applying the principal performance testing activities, when should the test cases be ordered into performance test procedures?</p> <ul style="list-style-type: none">a) Test analysis and test designb) Test closurec) Test implementationd) Test planning <p>Please select exactly 1 option</p>
7.	<p>Which of the following is a failure that would typically be found by conducting a spike test?</p> <ul style="list-style-type: none">a) The system performs well for the expected load, but cannot scale to a larger loadb) The system performance gradually degradesc) The system provides inconsistent responses to errorsd) The system handles a sudden burst of activity, but cannot resume a steady state <p>Please select exactly 1 option</p>

8.	<p>Consider the following technical environments:</p> <ol style="list-style-type: none">1. Virtualized2. Dynamic/Cloud-based3. Client/Server and Browser-based4. Mobile5. Embedded6. Mainframe <p>Which of these is most likely to have a performance risk due to memory leaks?</p> <ol style="list-style-type: none">a) 1, 3, 4, 5b) 1, 2, 3, 6c) 1, 2, 4, 6d) 2, 3, 4, 5 <p>Please select exactly 1 option</p>
9.	<p>If you have an application that has a memory leak, what is the likely result you will see during performance testing?</p> <ol style="list-style-type: none">a) Response time will be consistently slowb) Response time will be slow, but only under heavy loadsc) Response time will degrade over timed) Response time will remain acceptable, but the error handling will degrade <p>Please select exactly 1 option</p>
10.	<p>What is the value of nesting transactions for performance testing?</p> <ol style="list-style-type: none">a) It allows the tester to measure a series of discrete transactionsb) It bypasses the network communication time by sending the transaction directly to the server that will process itc) It speeds the reporting time for the performance resultsd) It supports the concept of parent and child transactions <p>Please select exactly 1 option</p>

11.	<p>You are working on a project that tracks health history information for patients across a region.</p> <p>The number of records handled by the system is in the millions due to the large number of patients in the region. Patient information must be accessible to doctors in offices, hospitals, and urgent care facilities. The information should be presented to the requestor within three seconds of request.</p> <p>One of the operational profiles you have identified is an emergency room doctor. You have determined that this person will access the system 10 times per shift (a shift is 10 hours) and that they will normally update 6 patient records for each access by entering notes into the database regarding the patient's treatment. They will print those patient records to be retained in the patient file at the hospital. For new patients, another user will enter the information into the system.</p> <p>The shifts these doctors work are: 7am – 5pm (day shift), 2pm – midnight (evening shift), 9pm to 7am (night shift). There are 1000 doctors that work the day shift, 1000 that work the evening shift, and 500 that work the night shift.</p> <p>Assuming an even distribution of the system access across a shift, what is the highest number of concurrent accesses on the system from these doctors?</p> <ul style="list-style-type: none">a) 12 000b) 2 000c) 1 000d) 6 000 <p>Please select exactly 1 option</p>
12.	<p>If you are testing from the UI and you need to simulate the amount of time it will take a real user to read a prompt and enter data in a field, what should you implement in your test script?</p> <ul style="list-style-type: none">a) Think timeb) Latency timec) Wait timed) Reading time <p>Please select exactly 1 option</p>
13.	<p>What is the purpose of a load generator tool?</p> <ul style="list-style-type: none">a) It simulates user behavior according to the operational profilesb) It maintains a load on the user interface to accurately mimic user response timec) It creates a load on the network to allow testing for collisionsd) It feeds data to the dashboard showing how the system is responding to the load <p>Please select exactly 1 option</p>

14.	<p>What is one of the advantages to conducting performance tests at the protocol level?</p> <ul style="list-style-type: none">a) It is the easiest method for manual scriptingb) It is the best way to evaluate the total user experiencec) It is the best way to handle data correlationd) It is scalable because the client is bypassed <p>Please select exactly 1 option</p>
15.	<p>What is the best method to use for verifying that a performance test script added users to a system?</p> <ul style="list-style-type: none">a) Use the script to verify that the users exist in the databaseb) Manually check via an application to see if the users were createdc) Use the script to verify through the application that the users were createdd) Check the error output from the script to verify no errors occurred <p>Please select exactly 1 option</p>
16.	<p>You are working on a project that tracks health history information for patients across a region.</p> <p>The number of records handled by the system is in the millions due to the large number of patients in the region. Patient information must be accessible to doctors in offices, hospitals, and urgent care facilities. The information should be presented to the requestor within three seconds of request.</p> <p>Given this information, when is the best time in the project to analyze and assess the performance risks?</p> <ul style="list-style-type: none">a) Repeatedly throughout the requirements, development, and performance testingb) After design but prior to codingc) During the requirements phase and again just prior to executing the performance testsd) During system testing and again prior to the performance tests <p>Please select exactly 1 option</p>

17.	<p>Consider the following technical environments:</p> <ol style="list-style-type: none">1. Single computer2. Multi-tier system3. Distributed4. Virtualized5. Dynamic/Cloud-based6. Client/Server and Browser-based7. Mobile8. Embedded9. Mainframe <p>Which of these is most likely to have a performance risk due to connectivity issues?</p> <ol style="list-style-type: none">a) 5, 6, 7, 9b) 2, 3c) 2, 4, 5, 8d) 7, 8 <p>Please select exactly 1 option</p>
18.	<p>Should performance test results be aggregated?</p> <ol style="list-style-type: none">a) No, the results should be analyzed individually so that all variations are understoodb) Yes, this is the best way to focus on the outliers in the performance metricsc) No, the results from each test should be reported and tracked separatelyd) Yes, this gives a better overall picture of the performance of the system and helps to identify trends <p>Please select exactly 1 option</p>

19. You are working on a project that tracks health history information for patients across a region.

The number of records handled by the system is in the millions due to the large number of patients in the region. Patient information must be accessible to doctors in offices, hospitals, and urgent care facilities. The information should be presented to the requestor within three seconds of request.

Which of the following is a technical objective for performance that could be applicable to this project?

- a) The system must perform at or above the level of the legacy system when handling a similar load and responding to a similar request
- b) The system must be able to scale to 10 million patient records with no degradation in the performance
- c) The response time must remain the same when the disaster recovery system is in use rather than the primary system and the switchover must cause no discernable downtime
- d) The response time must be within three seconds from the time the request is sent when there are 100 concurrent users making similar requests

Please select exactly 1 option

20. What is a pay-as-you-go tool?

- a) A monitoring tool that populates the dashboard with pertinent metrics based on what you have paid to monitor
- b) A server-based tool that provides you with full ownership of the tool for your usage
- c) A tool that provides the ability to test from multiple points of presence for load generation
- d) A tool with a licensing agreement that requires you to pay only for the number of virtual users and instances that you actually use

Please select exactly 1 option

<p>21.</p>	<p>You are working on a project that tracks health history information for patients across a region.</p> <p>The number of records handled by the system is in the millions due to the large number of patients in the region. Patient information must be accessible to doctors in offices, hospitals, and urgent care facilities. The information should be presented to the requestor within three seconds of request.</p> <p>One of the operational profiles you have identified is an emergency room doctor. You have determined that this person will access the system 10 times per shift (a shift is 10 hours) and that they will normally update 6 patient records for each access by entering notes into the database regarding the patient's treatment. They will print those patient records to be retained in the patient's file at the hospital. For new patients, another user will enter the information into the system.</p> <p>The shifts these doctors work are: 7am – 5pm (day shift), 2pm – midnight (evening shift), 9pm to 7am (night shift). There are 1000 doctors that work the day shift, 1000 that work the evening shift, and 500 that work the night shift.</p> <p>Assuming an even distribution of the system access across a shift, which of the following is the proper load profile for these doctors?</p> <ul style="list-style-type: none">a) Separate tests for 120,000 transactions per hour and 30,000 transactions per hourb) 6250 transaction per hourc) Stepped ramp-up with 7 hours at 21,000 transactions, 3 hours at 27,000 transactions, 3 hours at 36,000 transactions, 11 hours at 66,000 transactionsd) Steady ramp-up increasing the transactions by 15,000 per hour starting at 15,000 transactions and ending at 150,000 transactions <p>Please select exactly 1 option</p>
<p>22.</p>	<p>What happens when the performance test system is not equivalent to the production environment?</p> <ul style="list-style-type: none">a) The results will be easier to understand because the system can be configured for a particular testb) Projects become more reliable because of the targeted focus and this results in risk being reducedc) The tests will tend to run more quickly because they are not burdened by production datad) Projections become less reliable, and risk increases because the results may not be representative <p>Please select exactly 1 option</p>

23.	<p>Which of the following is the best description of spike testing?</p> <ul style="list-style-type: none">a) It focuses on the ability of the system to handle loads that are at or beyond the expected peak loadb) It focuses on the ability of the system to meet future efficiency requirementsc) It focuses on the ability of the system to respond to quick and extreme changes in loadd) It focuses on the ability of the system to handle loads that are gradually increased to reach the expected maximum <p>Please select exactly 1 option</p>
24.	<p>You are working on a project that tracks health history information for patients across a region.</p> <p>The number of records handled by the system is in the millions due to the large number of patients in the region. Patient information must be accessible to doctors in offices, hospitals, and urgent care facilities. The information should be presented to the requestor within three seconds of request.</p> <p>You have been asked to write a performance test plan for this project. Which of the following is the information you will need to deal with the most critical performance objective?</p> <ul style="list-style-type: none">a) How is user access authenticated and authorizedb) What is the expected use of the data after it has been presented to the userc) Who can access what data and how often will they do itd) Where will the data be stored and how much storage is available <p>Please select exactly 1 option</p>

25. You are working on a project that tracks health history information for patients across a region.

The number of records handled by the system is in the millions due to the large number of patients in the region. Patient information must be accessible to doctors in offices, hospitals, and urgent care facilities. The information should be presented to the requestor within three seconds of request.

What is the best way to address the performance testing for the response time?

- a) Conduct a network assessment to ensure there are no latency issues between the database server and the web servers, then test with a network scanner to ensure no collisions are occurring that might cause performance delays
- b) Test from the UI with the full data set loaded to ensure the response time will be adequate when the database is loaded
- c) Conduct a technical review of the database implementation and conduct a performance test from the UI with the full database loaded
- d) Test via the web services at the API level to ensure access to the data is fast enough without having the testing complicated by the UI

Please select exactly 1 option

26. You are working on a project that tracks health history information for patients across a region.

The number of records handled by the system is in the millions due to the large number of patients in the region. Patient information must be accessible to doctors in offices, hospitals, and urgent care facilities. The information should be presented to the requestor within three seconds of request.

You have a technical team conducting the performance tests and they are comfortable with programming the performance test scripts for re-usability and maintainability. You are now looking for a tool to use for this testing. You have found one that is compatible with your environment and will be able to generate a load via the protocols in use. The team has looked at it and they are comfortable that they can code in the tool and will be able to create their scripts with little training.

Because there are many stakeholders for this testing, you have verified that the tool provides excellent monitoring and reporting capabilities. You have verified with the various system administrators that they are comfortable with the tool and happy to use its monitoring capabilities in addition to their own tools during the testing.

What do you still need to verify before selecting this tool?

- a) The ability of the tool to meet your requirements for concurrent virtual users
- b) The availability of a record/playback capability for your testers to use
- c) The project schedule
- d) The ease with which your team can code the required performance scripts

Please select exactly 1 option

<p>27.</p>	<p>You are working on a project that tracks health history information for patients across a region.</p> <p>The number of records handled by the system is in the millions due to the large number of patients in the region. Patient information must be accessible to doctors in offices, hospitals, and urgent care facilities. The information should be presented to the requestor within three seconds of request.</p> <p>You have been asked to prepare a presentation for the business stakeholders regarding your plan for performance testing.</p> <p>Which of the following is an example set of information that should be shared with these stakeholders?</p> <ul style="list-style-type: none">a) Once configured, the performance test system will require data loading. Once loaded, we will next proceed to running a small set of sample scripts to verify the output. When those succeed, we will proceed with the performance test script which ramps up users at a rate of 10 per minute until we reach the target number of concurrent users. This load will then be maintained for 2 hours.b) The performance test system will cost \$240,000 which will include the hardware and setup. This system will allow us to create a test system that is representative of the production system and will allow us to simulate production-like conditions.c) The product risks include data contention issues, data access issues, locking issues that will reject concurrent requests, network bandwidth constraints, data seek errors, data seek slowdowns or bottlenecks, and difficulty for the user in processing the returned data.d) Because the cost of a performance test system is prohibitive, we will conduct the performance testing in the production environment using live data. <p>Please select exactly 1 option</p>
<p>28.</p>	<p>If performance testing is being conducted for software that is written in C++, what do you need to monitor that wouldn't be a concern if the software was written in Python?</p> <ul style="list-style-type: none">a) Network latencyb) Memory usec) Batch processingd) Connectivity <p>Please select exactly 1 option</p>

29.	<p>Which of the following is the best description of load testing?</p> <ul style="list-style-type: none">a) It focuses on the ability of the system to handle loads that are at or beyond the expected peak loadb) It focuses on the ability of the system to handle loads that are gradually increased to reach the expected maximumc) It focuses on the ability of the system to meet future efficiency requirementsd) It focuses on the ability of the system to respond to quick and extreme changes in load <p>Please select exactly 1 option</p>
30.	<p>You are working on a project that tracks health history information for patients across a region.</p> <p>The number of records handled by the system is in the millions due to the large number of patients in the region. Patient information must be accessible to doctors in offices, hospitals, and urgent care facilities. The information should be presented to the requestor within three seconds of request.</p> <p>You have conducted your tests and have determined the following metrics:</p> <ul style="list-style-type: none">< 3 second response time: 85% of the time< 5 second response time: 90% of the time<10 second response time: 95% of the time< 60 second response time: 100% of the time <p>Given this information, how should you present the results to the stakeholders?</p> <ul style="list-style-type: none">a) The test failed; the system is too slow. The requirements should be reviewed to ensure that <3 seconds is required 100% of the time.b) The response time for 90% of the tests is probably acceptable, but more tuning is needed to bring down the 95% response time.c) The response time for 100% of the tests is unacceptable and tuning will be required to bring it down to <3 seconds.d) 85% of the time the performance goal is met, so the system should be accepted based on industry standards. <p>Please select exactly 1 option</p>

31.	<p>If your performance test is testing the speed with which database requests are sent and received, which protocol is being used?</p> <ul style="list-style-type: none">a) ODBCb) RESTc) HTTPd) SMTP <p>Please select exactly 1 option</p>
32.	<p>Which of the following is a true statement regarding tracking metrics for network latency during a performance test?</p> <ul style="list-style-type: none">a) Network latency is difficult to track and should not be included in the performance metricsb) Low latency could indicate a network bandwidth problem that could negatively impact performancec) Network latency is too variable to be useful during performance tuningd) High latency could indicate a network bandwidth problem that could negatively impact performance <p>Please select exactly 1 option</p>
33.	<p>If your performance test is testing the speed of the response of a web service, which protocol is being used?</p> <ul style="list-style-type: none">a) HTTPb) RESTc) ODBCd) SMTP <p>Please select exactly 1 option</p>

34.	<p>You are working on a project that tracks health history information for patients across a region.</p> <p>The number of records handled by the system is in the millions due to the large number of patients in the region. Patient information must be accessible to doctors in offices, hospitals, and urgent care facilities. The information should be presented to the requestor within three seconds of request.</p> <p>One of the operational profiles you have identified is an emergency room doctor. You have determined that this person will access the system 10 times per shift (a shift is 10 hours) and that they will normally view 6 patient records for each access. They will print those patient records to be retained in the patient file at the hospital. They will also enter notes into the database regarding the patient's treatment. For new patients, another user will enter the information into the system.</p> <p>You have created a performance script that logs in as a doctor (from a list of doctors) and then performs the patient look ups. When you run the script, the login works, but then you are not able to perform the patient look ups. You are getting an error that indicates the user is not known to the system.</p> <p>What is likely your problem?</p> <ul style="list-style-type: none">a) The login information from the previous user is cached by the system and you need to clear the cache before you can log in as a new userb) The script needs to pass the login username/password for each transactionc) You cannot use the same user to log in and do the patient look ups because the user has expiredd) The script is not capturing and re-using the system identifier for the user <p>Please select exactly 1 option</p>
35.	<p>When is it appropriate to generate load via the application's APIs?</p> <ul style="list-style-type: none">a) When only small numbers of test instances are availableb) When the UI is likely to change but the transactions must be processed as if they were created through the UIc) When testing must be conducted at the communications protocol leveld) When many testers are available who can represent the real users <p>Please select exactly 1 option</p>

36.	<p>What is a concern when using a properly configured load generation tool to build the background load for the performance tests?</p> <ul style="list-style-type: none">a) The load generated may affect the production system and the production datab) The load generator log reports may be difficult to read, resulting in problems with interpreting the performance resultsc) The load generator may experience performance problems and will not be able to maintain a steady loadd) The load generated will contain invalid data <p>Please select exactly 1 option</p>
37.	<p>What is the purpose of having a ramp up period at the beginning of performance tests?</p> <ul style="list-style-type: none">a) To ensure the performance monitoring tools are workingb) To allow the system to achieve a steady state before taking measurementsc) To allow the system to achieve an orderly shut down after the testsd) To increase the number of users beyond the desired load <p>Please select exactly 1 option</p>
38.	<p>In what way are log analysis tools helpful for collecting metrics?</p> <ul style="list-style-type: none">a) They monitor the systems while the performance tests are conducted and report on the behavior during the testsb) They scan the various server logs and compile metrics for occurrences that were recorded during the test executionc) They write the performance results to the server logs for later manual analysisd) They create the system load and monitor the system performance <p>Please select exactly 1 option</p>

39.	<p>You are working on a project that tracks health history information for patients across a region.</p> <p>The number of records handled by the system is in the millions due to the large number of patients in the region. Patient information must be accessible to doctors in offices, hospitals, and urgent care facilities. The information should be presented to the requestor within three seconds of request.</p> <p>One of the operational profiles you have identified is an emergency room doctor. You have determined that this person will access the system 10 times per shift (a shift is 10 hours) and that they will normally view 6 patient records for each access. They will print those patient records to be retained in the patient's file at the hospital. They will also enter notes into the database regarding the patient's treatment. For new patients, another user will enter the information into the system.</p> <p>Given this information, what is missing to construct the operational profile for this user class?</p> <ul style="list-style-type: none">a) Batch processing of the patient upload information has not been consideredb) The number of users across the system for this role is not knownc) Other system components that may be required (x-ray upload, lab results reporting) have not been consideredd) No interviews were conducted to better understand the user class <p>Please select exactly 1 option</p>
40.	<p>When applying the principal performance testing activities, when should risk identification and analysis occur?</p> <ul style="list-style-type: none">a) Test closureb) Test analysis and test designc) Test planningd) Test implementation and execution <p>Please select exactly 1 option</p>

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

Sample Exam