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Sample Exam Paper

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(SET A4Q_TF4D_Sample-Exam-Answers_SetA_v1.0_EN)

A4Q TF4D Syllabus 2021 V.1.0 // Glossary

Sample Exam Paper

Testing Foundations for Developers – SET A

A4Q
Testing Foundations
for Developers

TF4D

Introduction

This is a sample exam. It helps candidates prepare for the certification exam. Included are questions whose structure, layout and format are like a regular exam.

This version of the sample exam questions for A4Q-TF4D has been compiled from the following sources:

- ISTQB® CTFL CORE 2018; V.3.1; SAMPLE EXAM SET A and SET B,
- CTAL 2019 (V.3.0) SAMPLE EXAM PAPER,
- and other supplemental questions created by a GTB working group.

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General information:

Number of questions: 40

Duration of the exam: 60 minutes

Total score: 40 (one point per question)

Score to pass the exam: 26 (or more)

Percentage of passing the exam: 65% (or more)

Questions on the topic
"Fundamentals of Testing"

Question 1		K1	Score	1.0

Which of the following provides the definition of the term test case?

Select exactly ONE option.

a)	Subset of the value domain of a variable within a component or system in which all values are expected to be treated the same based on the specification	☐
b)	A set of preconditions, inputs, actions, expected results and postconditions, developed based on test conditions	☐
c)	Work products produced during the test process for use in planning, designing, executing, evaluating and reporting on testing	☐
d)	A source to determine an expected result to compare with the actual result of the system under test	☐

Question 2		K1	Score	1.0

Which of the following statements is a valid objective for testing?

Select exactly ONE option.

a)	The test should start as late as possible so that development had enough time to create a good product	☐
b)	To validate whether the test object works as expected by the users and other stakeholders	☐
c)	To prove that all possible defects are identified	☐
d)	To prove that any remaining defects will not cause any failures	☐

Question 3		K2	Score	1.0

Which of the following statements correctly describes the difference between testing and debugging?

Select exactly ONE option.

a)	Testing identifies the source of defects; debugging analyzes the defects and proposes prevention activities	☐
b)	Dynamic testing shows failures caused by defects; debugging eliminates the defects, which are the source of failures	☐
c)	Testing does not remove faults; but debugging removes defects that cause the faults	☐
d)	Dynamic testing prevents the causes of failures; debugging removes the failures	☐

Question 4		K2	Score	1.0

Which is an important reason for testing in the software development process?

Select exactly ONE option.

a)	Through its results, testing can be used as a tool to evaluate the performance of developers.	☐
b)	Testing can help prevent possible failures of the software during operation.	☐
c)	Testing is always required by law.	☐
d)	Testing always ensures that all requirements are fully and correctly met.	☐

Question 5		K2	Score	1.0

Which of the following statements describes the relationship between testing and quality assurance?

Select exactly ONE option.

a)	Testing is part of quality assurance.	☐
b)	Testing always leads to better product requirements.	☐
c)	Testing early in the development process contributes little to quality assurance.	☐
d)	The more test cases are executed, the higher the quality of the software.	☐

Question 6		K2	Score	1.0

Which of the following is an example of a failure in a car cruise control system?

Select exactly ONE option.

a)	The developer of the system forgot to rename variables after a cut-and-paste operation	☐
b)	Unnecessary code that sounds an alarm when reversing was included in the system	☐
c)	The system stops maintaining a set speed when the radio volume is increased or decreased	☐
d)	The design specification for the system wrongly states speeds	☐

| Question 7 | | K2 | Score | 1.0 |

Which of the following is a defect rather than a root cause in a fitness tracker?

Select exactly ONE option.

a)	Because the author of the requirements was unfamiliar with the domain of fitness training, he therefore wrongly assumed that users wanted heartbeat in beats per hour	☐
b)	The tester of the smartphone interface had not been trained in state transition testing, so missed a major defect	☐
c)	An incorrect configuration variable implemented for the GPS function could cause location problems during daylight saving times	☐
d)	Because the designer had never worked on wearable devices before, she as designer of the user interface therefore misunderstood the effects of reflected sunlight	☐

| **Question 8** | | K2 | **Score** | **1.0** |

Mr. Test has been testing software applications on mobile devices for a period of 5 years. He has a wealth of experience in testing mobile applications and achieves better results in a shorter time than others. Over several months, Mr. Test did not modify the existing automated test cases and did not create any new test cases. This leads to fewer and fewer defects being found by executing the tests. What principle of testing did Mr. Test not observe?

Select exactly ONE option.

a)	Testing depends on the environment	☐
b)	Exhaustive testing is not possible	☐
c)	Repeating of same tests will not find new defects	☐
d)	Defects cluster together	☐

Questions on the topic
"Testing Throughout the Software Development Lifecycle"

Question 9		K1	Score	1.0

Which of the following statements is a correct definition for regression testing?

Select exactly ONE option.

a)	Testing to see if defects have been introduced into unchanged areas of the software.	☐
b)	Testing the impact of a changed environment to an operational system.	☐
c)	Testing the changes to an operational system.	☐
d)	Testing after fixing a defect to confirm that a failure caused by that defect no longer occurs.	☐

Question 10		K2	Score	1.0

Which of the following terms is a white-box test technique?

Select exactly ONE option.

a)	Decision testing	☐
b)	Performance efficiency testing	☐
c)	Code review	☐
d)	Equivalence partitioning	☐

Question 11		K2	Score	1.0

Which of the following statements BEST compares the purposes of confirmation testing and regression testing?

Select exactly ONE option.

a)	The purpose of regression testing is to ensure that all previously run tests still work correctly, while the purpose of confirmation testing is to ensure that any fixes made to one part of the system have not adversely affected other parts	☐
b)	The purpose of confirmation testing is to check that a previously found defect has been fixed, while the purpose of regression testing is to ensure that no other parts of the system have been adversely affected by the fix	☐
c)	The purpose of regression testing is to ensure that any changes to one part of the system have not caused another part to fail, while the purpose of confirmation testing is to check that all previously run tests still provide the same results as before	☐
d)	The purpose of confirmation testing is to confirm that changes to the system were made successfully, while the purpose of regression testing is to run tests that previously failed to ensure that they now work correctly	☐

Question 12		K2	Score	1.0

Which of the following should NOT be a trigger for maintenance testing?

Select exactly ONE option.

a)	Decision to test the maintainability of the software	☐
b)	Decision to test the system after migration to a new operating platform	☐
c)	Decision to test if archived data is possible to be retrieved	☐
d)	Decision to test after "hot fixes"	☐

| **Question 13** | | K2 | **Score** | **1.0** |

Which of the following statements CORRECTLY describes a role of impact analysis in Maintenance?

Select exactly ONE option.

a)	Impact analysis is used when deciding if a fix to a maintained system is worthwhile	☐
b)	Impact analysis is used to identify how data should be migrated into the maintained system	☐
c)	Impact analysis is used to decide which hot fixes are of most value to the user	☐
d)	Impact analysis is used to determine the effectiveness of new maintenance test cases	☐

A4Q
Testing Foundations
for Developers

Questions on the topic
"Static Testing"

Question 14		K1	Score	1.0

Which of the following statements is a correct definition for the checklist-based review?

Select exactly ONE option.

a)	A review technique guided by a list of questions or required attributes.	☐
b)	A type of review that follows a defined process and has a formally documented output.	☐
c)	A type of static testing in which a work product or process is evaluated by one or more individuals to identify defects or to propose improvements.	☐
d)	A review technique in which a work product is evaluated from the perspective of different stakeholders.	☐

Question 15		K1	Score	1.0

Which of the following is a correct definition of cyclomatic complexity?

Select exactly ONE option.

a)	The maximum number of linear, independent paths through a program.	☐
b)	The degree to which a component or system has a design and/or internal structure that is difficult to understand, maintain and verify.	☐
c)	The coverage of sequences of N+1 transitions.	☐
d)	The coverage of all outcomes of the atomic conditions that independently affect the overall decision outcome.	☐

Question 16		K1	Score	1.0

Which of the following is a correct definition for the pairwise integration testing?

Select exactly ONE option.

a)	A type of integration testing that targets pairs of components that interact as shown in a call graph.	☐
b)	A test level that focuses on interactions between components or systems.	☐
c)	A type of integration testing in which all of the nodes that connect to a given node are the basis for the integration testing.	☐
d)	Testing in which the test items are interfaces and interactions between integrated components.	☐

Sample Exam Paper

Testing Foundations for Developers – SET A

A4Q

TF4D

Testing Foundations
for Developers

Question 17		K3	Score	1.0

You have been asked to take part in a checklist-based review of the following excerpt from the requirements specification for a library system:

Librarians can:

1. Register new borrowers
2. Return books from borrowers
3. Accept fines from borrowers
4. Add new books to the system with their ISBN, author and title
5. Remove books from the system
6. Get system responses within 5 seconds

Borrowers can:

7. Borrow a maximum of 3 books at one time
8. View the history of books they have borrowed/reserved
9. Be fined for failing to return a book within 3 weeks
10. Get system responses within 3 seconds
11. Borrow a book at no cost for a maximum of 4 weeks
12. Reserve books (if they are on-loan)

All users (librarians and borrowers):

13. Can search for books by ISBN, author, or title
14. Can browse the system catalogue
15. The system shall respond to user requests within 3 seconds
16. The user interface shall be easy-to-use

You have been assigned the checklist entry that requires you to review the specification for inconsistencies between individual requirements (i.e. conflicts between requirements).

Which of the following CORRECTLY identifies inconsistencies between pairs of requirements?

Select exactly ONE option.

a)	6-10, 6-15, 7-12	☐
b)	6-15, 9-11	☐
c)	6-10, 6-15, 9-11	☐
d)	6-15, 7-12	☐

Sample Exam Paper

Testing Foundations for Developers – SET A

A4Q
TF4D
Testing Foundations
for Developers

Question 18		K3	Score	1.0

Below is the pseudo-code for an EASY program:

```
00    program EASY
01    var1, var2, var3 : integer
02    easy: boolean
02    begin
03         read ( var2 )
04         read ( var1 )
05         read (easy)
06         If (easy = true) then
07                 var3 = var2 + var1
08                 print ( var3 )
09                 if var1 = 5 then
10                         print ( var1 )
11                 else
12                         print ( var1+1 )
13                 endif
14                 var2 = var2 + 1
15         else
16                 var2 = 0
17                 write ( "Wow – that was tricky!" )
18            endif
19    write ( var2 )
20    end program EASY
```

What is the cyclomatic complexity for the program?

Select exactly ONE option.

a)	2	☐
b)	4	☐
c)	1	☐
d)	3	☐

Question 19		K2	Score	1.0

Below is the pseudo-code for a program that calculates and prints sales commissions:

```
00  program Calculate Commission
01  total, number : integer
02  commission_hi, commission_lo : real
03  begin
04      read ( number )
05      while number ≠ -1 loop
06          total = total + number
07          read ( number )
08      endloop
09      if total > 1000 then
10          commission_hi = 100 + 0.2 * ( total – 1000 )
11      else
12          commission_lo = 0.15 * total
13      endif
14      write ( "This salesman's commission is:")
15      write ( commission_hi )
16  end program Calculate Commission
```

The code contains data flow anomalies on lines 6 and 12 (highlighted text).

Which examples of data flow anomalies are to be found on these lines?

Select exactly ONE option.

a)	line 6: variable "total" is not assigned a value before using it line 12: variable "commission_lo" is defined but subsequently not used	☐
b)	line 6: an invalid value is assigned to variable "total" line 12: variable "commission_lo" is redefined before it is used	☐
c)	line 6: variable "total" is out of scope line 12: the "hard-coded" value "0.15" should not be used	☐
d)	line 6: the variable "number" is undefined line 12: the variable "total" is redefined before it is used	☐

Question 20		K2	Score	1.0

Which of the following statements about data flow analysis is true?

Select exactly ONE option!

a)	Data flow analysis is a type of static analysis based on a representation of unique execution paths of a component or system.	☐
b)	If a variable is referenced before it is used a dr anomaly has occurred.	☐
c)	Data flow analysis can be used to identify error-prone areas of code that could lead to potential efficiency problems.	☐
d)	Data flow analysis should be used after a code review to rule out undetected control and data flow anomalies.	☐

Sample Exam Paper

Testing Foundations for Developers – SET A

A4Q
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Testing Foundations
for Developers

Question 21		K3	Score	1.0

Below you can see the pseudo-code for a program called TRICKY.

```
00    programme TRICKY
01    var1, var2, var3: integer
02    begin
03       read(var2)
04       read( var1 )
05        while var2 < 10 loop
06           var3 = var2 + var1
07           var2 = 4
08           var1 = var2 + 1
09           print ( var3 )
10           if var1 = 5 then
11              print ( var1 )
12           else
13              print ( var1+1 )
14           endif
15           var2 = var2 + 1
16       endloop
17       write ( " Wow – that was tricky!" )
18       write ( "But the answer is..." )
19       write ( var2+var1 )
20    end program TRICKY
```

How could the use of static analysis best improve the maintainability of the program?

Select exactly ONE option.

a)	Restructuring the code	☐
b)	Reducing coupling between programs	☐
c)	Increasing the number of comments	☐
d)	Improving the indentation of the code	☐

Question 22		K2	Score	1.0

Which of the following is a way to use call graphs to determine integration testing requirements?

Select exactly ONE option.

a)	Establishing the number of locations within the software from where a method or function is called.	☐
b)	Establishing the number of locations within the software from where a module or system is called.	☐
c)	Determining conditional and unconditional calls for performance analysis.	☐
d)	Detecting areas to be targeted for possible memory leaks.	☐

Question 23		K2	Score	1.0

Which of the following statements regarding call graphs is true?

Select exactly one option! (1 from 4)

a)	Call graphs allow the nesting depth of the individual components to be determined.	☐
b)	Call graphs can be used to design tests that call a specific module or system.	☐
c)	Call graphs can be used in component test planning to identify components to be integrated concurrently in an effective manner.	☐
d)	Call graphs allow identification of unexecuted data flows of the component in an integration.	☐

A4Q
Testing Foundations
for Developers

Questions on the topic
”Test Techniques”

Question 24		K1	Score	1.0

What is checklist-based testing?

Select exactly ONE option.

a)	A test technique in which tests are derived based on the tester's knowledge of past faults, or general knowledge of failures	☐
b)	A test technique based on an analysis of the specification of a component or system	☐
c)	An experience-based test technique whereby the experienced tester uses a list of items to be noted, checked, or remembered, or a set of rules or criteria against which a product must be verified	☐
d)	An approach to testing where the testers dynamically design and execute tests based on their knowledge, exploration of the test item and the results of previous tests	☐

Question 25		K1	Score	1.0

Which of the following provides the BEST description of exploratory testing?

Select exactly ONE option.

a)	A testing practice in which an in-depth investigation of the background of the test object is used to identify potential weaknesses that are examined by test cases	☐
b)	An approach to testing whereby the testers dynamically designs and execute tests based on their knowledge, exploration of the test item and the results of previous tests	☐
c)	An approach to test design in which test activities are planned as uninterrupted sessions of test analysis and design, often used in conjunction with checklist-based testing	☐
d)	Testing based on the tester's experience, knowledge and intuition	☐

Question 26		K1	Score	1.0

Which of the following statements is a correct definition for modified condition/decision testing?

Select exactly ONE option.

a)	A white-box test technique in which test cases are designed to exercise outcomes of atomic conditions that independently affect a decision outcome.	☐
b)	A white-box test technique in which test cases are designed to exercise outcome combinations of atomic conditions.	☐
c)	A white-box test technique in which test cases are designed to execute condition outcomes and decision outcomes.	☐
d)	A white-box test technique in which test cases are designed to execute decision outcomes.	☐

Question 27		K2	Score	1.0

Which of the following BEST matches the descriptions with the different categories of test techniques?

1. **Coverage is measured based on a selected structure of the test object**
2. **The processing within the test object is checked**
3. **Tests are based on defects' likelihood and their distribution**
4. **Deviations from the requirements are checked**
5. **User stories are used as the test basis**

Using notation for the following 4 options:

Black	**– Black-box test techniques**
White	**– White-box test techniques**
Experience	**– Experience-based test techniques**

Select exactly ONE option.

a)	Black – 4, 5; White – 1, 2; Experience – 3	☐
b)	Black – 3; White – 1, 2; Experience – 4, 5	☐
c)	Black – 4; White – 1, 2; Experience – 3, 5	☐
d)	Black – 1, 3, 5; White – 2; Experience – 4	☐

Sample Exam Paper

Testing Foundations for Developers – SET A

A4Q
TF4D
Testing Foundations
for Developers

Question 28		K3	Score	1.0

A daily radiation recorder for plants produces a sunshine score based on a combination of the number of hours a plant is exposed to the sun (below 3 hours, 3 to 6 hours or above 6 hours) and the average intensity of the sunshine (very low, low, medium, high).

Given the following test cases:

	Hours	Intensity	Score
T1	1.5	v. low	10
T2	7.0	medium	60
T3	0.5	v. low	10

What is the minimum number of additional test cases that are needed to ensure full coverage of ALL VALID INPUT equivalence partitions?

Select exactly ONE option.

a)	1	☐
b)	2	☐
c)	3	☐
d)	4	☐

Question 29		K3	Score	1.0

A smart home app measures the average temperature in the house over the previous week and provides feedback to the occupants on their environmental friendliness based on this temperature.

The feedback for different average temperature ranges (to the nearest °C) should be:

Up to 10°C	– Icy Cool!
11°C to 15°C	– Chilled Out!
16°C to 19°C	– Cool Man!
20°C to 22°C	– Too Warm!
Above 22°C	– Hot & Sweaty!

Using BVA (only Min- and Max values), which of the following sets of test inputs provides the highest level of boundary coverage?

Select exactly ONE option.

a)	0°C,	11°C,	20°C,	22°C,	23°C		☐
b)	9°C,	15°C,	19°C,	23°C,	100°C		☐
c)	10°C,	16°C,	19°C,	22°C,	23°C		☐
d)	14°C,	15°C,	18°C,	19°C,	21°C	22°C	☐

Sample Exam Paper

Testing Foundations for Developers – SET A

A4Q

TF4D

Testing Foundations
for Developers

Question 30			K3	Score	1.0

A company's employees are paid bonuses if they work more than a year in the company and achieve a target which is individually agreed before.

These facts can be shown in a decision table:

| Test-ID		T1	T2	T3	T4
Condition1	Employment for more than 1 year?	YES	NO	NO	YES
Condition2	Agreed target?	NO	NO	YES	YES
Condition3	Achieved target?	NO	NO	YES	YES
Action	Bonus payment	NO	NO	NO	YES

Which of the following test cases represents a situation that can happen in real life, and is missing in the above decision table?

Select exactly ONE option.

a)	Condition1 = YES, Condition2 = NO, Condition3 = YES, Action= NO	☐
b)	Condition1 = YES, Condition2 = YES, Condition3 = NO, Action= YES	☐
c)	Condition1 = NO, Condition2 = NO, Condition3 = YES, Action= NO	☐
d)	Condition1 = NO, Condition2 = YES, Condition3 = NO, Action= NO	☐

Question 31		K3	Score	1.0

Given the following state model of a battery charger software:
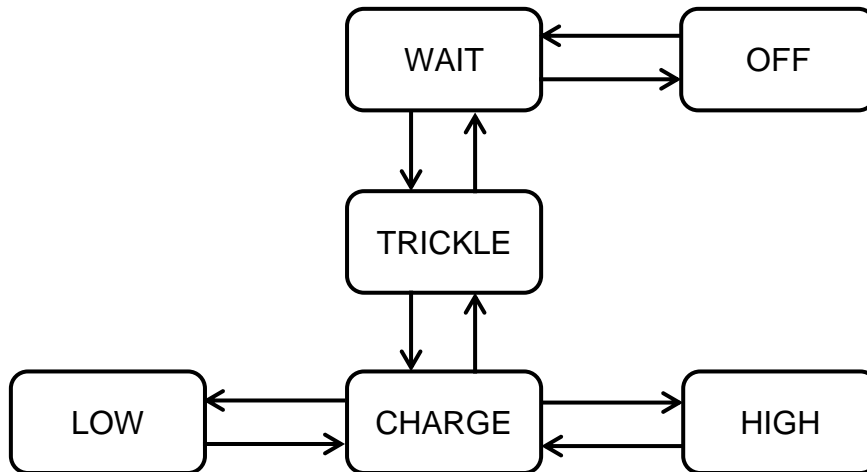
Which of the following sequences of transitions provides the highest level of transition coverage for the model?

Select exactly ONE option.

a)	OFF → WAIT → OFF → WAIT → TRICKLE →CHARGE → HIGH → CHARGE → LOW	☐
b)	WAIT → TRICKLE → WAIT → OFF → WAIT → TRICKLE → CHARGE → LOW → CHARGE	☐
c)	HIGH → CHARGE → LOW → CHARGE → TRICKLE → WAIT → TRICKLE → WAIT → TRICKLE	☐
d)	WAIT → TRICKLE → CHARGE → HIGH → CHARGE → TRICKLE → WAIT → OFF → WAIT	☐

Question 32		K2	Score	1.0

Which of the following statements BEST describes how test cases are derived from a use case?

Select exactly ONE option.

a)	Test cases are created to exercise defined basic, exceptional and error behaviors performed by the system under test in collaboration with actors	☐
b)	Test cases are derived by identifying the components included in the use case and creating integration tests that exercise the interactions of these components	☐
c)	Test cases are generated by analyzing the interactions of the actors with the system to ensure the user interfaces are easy to use	☐
d)	Test cases are derived to exercise each of the decision points in the business process flows of the use case, to achieve 100% decision coverage of these flows	☐

Question 33		K2	Score	1.0

Which of the following descriptions of statement coverage is CORRECT?

Select exactly ONE option.

a)	Statement coverage is a measure of the number of lines of source code exercised by tests	☐
b)	Statement coverage is a measure of the proportion of executable statements in the source code exercised by tests	☐
c)	Statement coverage is a measure of the percentage of lines of source code (without comments) exercised by tests	☐
d)	Statement coverage is a measure of the number of executable statements in the source code exercised by tests	☐

Question 34		K2	Score	1.0

Which one of the following is the description of statement coverage?

Select exactly ONE option.

a)	It is a metric, which is the percentage of test cases that have been executed	☐
b)	It is a metric, which is the percentage of statements in the source code that have been executed	☐
c)	It is a metric, which is the number of statements in the source code that have been executed by test cases that are passed	☐
d)	It is a metric, that gives a true/false confirmation if all statements are covered or not	☐

Question 35		K2	Score	1.0

The following statement refers to decision coverage:

"When the code contains only a single 'if' statement and no loops or CASE statements, and its execution is not nested within the test, any single test case we run will result in 50% decision coverage."

Which of the following statement is correct?

Select exactly ONE option.

a)	The statement is true. Any single test case provides 100% statement coverage and therefore 50% decision coverage	☐
b)	The statement is true. Any single test case would cause the outcome of the "if" statement to be either true or false	☐
c)	The statement is false. A single test case can only guarantee 25% decision coverage in this case	☐
d)	The statement is false. The statement is too broad. It may be correct or not, depending on the tested software	☐

Question 36		K2	Score	1.0

Which of the following descriptions of decision coverage is CORRECT?

Select exactly ONE option.

a)	Decision coverage is a measure of the percentage of possible paths through the source code exercised by tests	☐
b)	Decision coverage is a measure of the percentage of business flows through the component exercised by tests	☐
c)	Decision coverage is a measure of the 'if' statements in the code that are exercised with both the true and false outcomes	☐
d)	Decision coverage is a measure of the proportion of decision outcomes in the source code exercised by tests	☐

Question 37		K2	Score	1.0

Which statement about the relationship between statement coverage and decision coverage is true?

Select exactly ONE option.

a)	100% decision coverage also guarantees 100% statement coverage	☐
b)	100% statement coverage also guarantees 100% decision coverage	☐
c)	50% decision coverage also guarantees 50% statement coverage	☐
d)	Decision coverage can never reach 100%	☐

Sample Exam Paper

Testing Foundations for Developers – SET A

A4Q
TF4D
Testing Foundations
for Developers

Question 38		K3	Score	1.0

Consider the simplified logic of a tea-making machine:

```
Switch on machine
IF sufficient water THEN
        Boil water
        Add tea
        Show message "milk?"
        IF milk = yes THEN
                Show message "low fat?"
                IF low fat = yes THEN
                        Add low fat milk
                ELSE
                        Add normal milk
                ENDIF
        ENDIF
        Show message "sugar?"
        IF sugar = yes THEN
                Add sugar
        ENDIF
        Stir
        Wait 3 minutes
        Show message "please take your tea"
    ELSE
        Show message "please fill up water"
    ENDIF
```

How many test cases would you design to achieve 100% statement coverage for the tea-making machine?

Select exactly ONE option.

a)	3	☐
b)	2	☐
c)	5	☐
d)	6	☐

Question 39		K3	Score	1.0

The simplified logic of a program has been specified as follows:

```
Statement P
IF A THEN
        IF B THEN
                Statement Q
        ELSE
                Statement R
        ENDIF
ELSE
        Statement S
        IF C THEN
                Statement T
        ELSE
                Statement U
        ENDIF
ENDIF
Statement V
```

How many test cases would you design to achieve 100% decision coverage?

Select exactly ONE option.

a)	2	☐
b)	3	☐
c)	4	☐
d)	5	☐

Question 40		K3	Score	1.0

You are testing a photo-enforcement system for traffic control in an intersection. It has been determined that a photo should be taken if the signal light is red (RED) or the car is speeding (SPEED) and if the front wheels of the car are over the line marking the beginning of the intersection (WHEELS).

Consider these sets of test values:

1. RED + SPEED + WHEELS
2. RED + SPEED + not WHEELS
3. RED + not SPEED + WHEELS
4. RED + not SPEED + not WHEELS
5. not RED + SPEED + WHEELS
6. not RED + SPEED + not WHEELS
7. not RED + not SPEED + WHEELS
8. not RED + not SPEED + not WHEELS

Assume the logic in the code is as follows:

```
IF ((RED OR SPEED) AND WHEELS) THEN
        TAKE THE PHOTO
ELSE
        DO NOT TAKE THE PHOTO
```

Given this information, which sets of values provides the minimum tests to achieve 100% modified condition/decision coverage?

Select exactly ONE option.

a)	1, 3 and 8.	☐
b)	2 and 8.	☐
c)	3, 4, 5 and 7.	☐
d)	1, 5, 7 and 8.	☐

Space for your notes:

(are neither read nor valuated during correction)

Space for your notes:

(are neither read nor valuated during correction)

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