ISTQB Foundation Exam format and question writing guidelines

Version 2005 – 1

International Software Testing Qualification Board

Revision history

Version	Date	Remarks
ISTQB 2005	22/7/05	Approved for distribution
ISTQB 2005-1 Draft	1/9/05	Updated with change requests
ISTQB 2005-1 Release	2/10/05	Released

References:

http://www.aicpa.org/members/div/mcs/mulchoic.htm

Question writing guidelines by Taz Daughtrey

http://web.uct.ac.za/projects/cbe/mcqman/mcqappb.html

ISEB (information Systems Examination Board) Exam process

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1. Background

In April 2005 the ISTQB Foundation Syllabus working party delivered the first ISTQB Foundation Syllabus and distributed it for use on the 1st July 2005.

This paper presents the next steps required in the launch of the Syllabus as the basis of an internationally recognised examination scheme. It presents:

- The rules surrounding the format of exams
- The guidelines to be used when creating and reviewing multiple choice questions

This paper has been prepared by the ISTQB Foundation Exam Working Party (Geoff Thompson (Chair), Thomas Mueller and Vipul Kocher).

This document should be read in conjunction with the Examination Procedures being produced by the ISTQB Process Working Group. These procedures will define the controls surrounding exam question creation, as well as the rules and controls surrounding the exam question bank and how exams are to be produced.

2. Exam format

2.1. Exam components

All ISTQB Foundation exams will use the same format, which will consist of the following components:

- 40 multiple choice questions (4 answers per question)
- 1 hour exam (set and managed by authorised examination boards)
- Score more than 60% (25 or more) to pass
- Each exam, if produced manually, will be live for a maximum of 6 months, otherwise each new exam to be created automatically each time
- Exam questions, whilst still 'live' in the question bank, can be reused as required by Exam setters
- Weighting:
  - 50% of each exam will be K1 level questions (see section 3.2 for definition of levels), 30% of each exam will be K2 level questions and 20% will be K3 level questions (K levels described in section 3.2)
  - The exam questions will be split 'roughly' in line with the Syllabus timings
    - Chapter 1 – 18%
    - Chapter 2 – 16%
    - Chapter 3 – 7%
    - Chapter 4 – 29%
    - Chapter 5 – 21%
    - Chapter 6 – 9%
- K3 subjects can have K3, K2 and K1 questions written against them
- K2 subjects can have K2 and K1 questions written against them
- Exam question banks to contain on average 150 questions, all tagged to their syllabus section
- Questions can be retired at the discretion of the Exam Board from the 'live' question bank, however if a 'live' exam paper appears in the public domain all questions that it contains MUST be retired and should not appear in any future 'live' examinations
- Two practice papers are to be available at any time; either using retired questions from the question bank, or if there are not enough retired questions, new questions that meet the guidelines detailed in this document can be created especially for the paper, but they can then never be used in an actual exam.

2.2. Benefits of multiple choice exam

- Easy to mark
- Easy to distribute across different mediums (online, paper etc)
- Straight forward approach

- Easy to write and to maintain
- Good test of knowledge
- Easy to translate
- Easily adaptable for other languages
- Allows for an assessment of a wide range of learning objectives from factual to evaluative understanding
- Easily administered to large number of students
- Limits assessment bias caused by poor hand writing skills

2.3. Benefits of a single exam format for all countries

- The ISTQB qualification will be consistent from country to country
- Exam processes can be common to all countries
- Experience (e.g. with marking by machine) can be shared with other boards.
- Same format applies whether marked manually or by machine
- Exam questions, where shared between countries (i.e. non-ISEB), can more easily be translated and will be assessing the same thing in different languages
- Same format will be easier for ISTQB to monitor
- Different country's exams are less likely to be seen as easier than other's

2.4. Example exam make up

For a 40 question paper, the breakdown should be:

Chapter 1	7 questions
Chapter 2	6 questions
Chapter 3	3 questions
Chapter 4	12 questions
Chapter 5	8 questions
Chapter 6	4 questions

The K1/K2/K3 breakdown requires:

K1	20 questions
K2	12 questions
K3	8 questions

One possible breakdown would be:

Chapter 1 4 questions at K1, 3 questions at K2 Total of 7 questions

Chapter 2 questions	4 questions at K1, 2 questions at K2	Total of 6
Chapter 3 questions	2 questions at K1, 1 question at K2	Total of 3
Chapter 4 questions	4 questions at K1, 2 questions at K2, 6 questions at K3	Total of 12
Chapter 5 questions	3 questions at K1, 3 questions at K2, 2 questions at K3	Total of 8
Chapter 6 questions	3 questions at K1, 1 question at K2	Total of 4

Totals

20 questions at K1
12 questions at K2
8 questions at K3

3. Question writing and review guidelines

3.1. Introduction

This section documents the guidelines to be used when creating and reviewing ISTQB Foundation exam questions. Its purpose is to provide question setters and reviewers with very clear rules to follow.

The guidance in this section is broken down into 4 sub sections:

- Mandatory process for ISTQB Examinations;
- Guidance on writing multiple choice questions;
- Guidance on reviewing multiple choice questions;
- Checklists for question setters/reviewers

The content of this section is termed guidance because there are no fixed solutions to some of the problems that are encountered in setting and reviewing questions. Nevertheless, question setters and reviewers are expected to follow the guidance in this document, and to treat all areas of the guidance as equally important.

These guidelines assume that each ISTQB Exam Board will be automating the generation of its Foundation exams each time an exam is required. For those that will be producing exams manually the guidelines still apply, but some discernment will be required when implementing them.

Exam questions must be written in US English and then translated into a native language. The rules regarding translation of questions will be defined in the Examination Process (being delivered by the Process Working Group), however it is worthy of stating here that the relevant National Board is responsible for 'good enough translations' within their home market.

3.2. Mandatory Process for ISTQB Examinations

The most important element to bear in mind for ISTQB examinations is that the syllabus recognises 3 different levels of knowledge and understanding:

K1: The candidate will recognise, remember and recall a term or concept.
Example: definition of 'failure' as non-delivery of service to an end user.

K2: The candidate can select the reasons or explanations for statements related to the topic. They can summarise, compare, classify and give examples for concepts of testing.
Examples: The reason why tests should be designed as early as possible is to find errors when they are cheaper to remove;

K3: The candidates can select the correct application of a concept or techniques and/or apply it to a given context.
Example: The candidate selects test cases from a given state transition diagram in order to cover all transitions.

Each section of the syllabus has an associated level of knowledge and understanding and will need questions of the same and lower levels written against it.

All questions for the ISTQB Foundation examination will be stored in a question bank. To facilitate effective management of this question bank, 2 mandatory process requirements will be imposed:

- All questions must be submitted using the Question template, a copy of which is attached.
- All questions must be written with the correct answer as the first answer listed (the actual position of the correct answer will be defined when the question is used).

3.3. Guidance on Writing Multiple Choice Questions

3.3.1. Basic concepts

A multiple-choice question consists of two parts:

The Stem - the main body of text provided as information in a scenario, or set of facts. The stem should ask a question rather than requiring the candidate to complete a sentence. Another term for the stem of a multiple-choice item is the fact pattern.

Response Options – Candidates are given a choice of options based on the information provided in the stem.

Key Option - The term used for the correct option; only one of the options should be correct or clearly best.

Distracters – The term used for the incorrect or clearly inferior options; as the name implies, distracters are designed to be plausible to a candidate who does not have the knowledge or skill required to identify the correct option.

Example:
Stem: Which statement regarding testing is correct?

a) Testing is planning, specifying and executing a program with the aim of finding defects (key)
b) Testing is the process of correcting defects identified in a developed program (distracter)
c) Testing is to localize, analyse and correct the direct defect cause (distracter)

d) Testing is independently reviewing a system against its requirements (distracter)

Each multiple-choice question is used to test a particular knowledge or skill identified in the examination syllabus. For example, the question above is intended to assess recall of the definitions of testing at the relevant cognitive level of understanding (K1).

Keep the purpose of the question clearly in mind. The intent is to objectively test factual knowledge; the questions must not therefore be designed to appear otherwise.

3.3.2. Distracter Difficulty

- Distracters should not attract well-prepared candidates who have the knowledge and skill being assessed.
- The appropriateness of each distracter should have a direct effect on the difficulty of the question.
- When plausible distracters are used, and the key option is clearly the correct or best answer, the distracters should attract only the less knowledgeable candidates.
- Take care to ensure that distracters are not too plausible to knowledgeable candidates, especially when highly technical material is being assessed.

If the distracters are closely related to the correct answer, or if they assess unusual exceptions to rules, knowledgeable candidates may be fooled even more frequently than those who guess.

3.3.3. Use of graphics or pictures

The use of graphics should be limited, but will be allowed in those cases where graphics (i.e. a picture) will significantly improve the question or the candidates' understanding of the questions. For the Foundation exam this is expected to be limited to the use of code fragments or diagrams representing code structure.

Graphics may contain references to points in the text, by using capital letters.

Graphics can only be used statically and may not contain hot spots, i.e. designated areas where a user may interact.

3.3.4. Types of multiple-choice questions

Within the multiple-choice format, questions can be presented in different ways. For example, the amount of information presented in a question's stem can be limited or extensive. Also, a question writer can include written code within the stem, specifically for example, when writing questions to test knowledge of white box techniques.

Following are examples of the type of multiple-choice items to be used in any ISTQB qualification. Correct answers should always be the first option.

Basic
The basic multiple-choice question has a short stem and a single correct response. A limited amount of information is presented in the stem, and a single set of response options is presented to the candidates. The following example of a basic multiple-choice question is targeted to assess knowledge of static testing at K1 cognitive level of application.

Example:
What does a tester do during "Static testing"?
a) Reviews requirements and compares them with the design
b) Runs the tests on the exact same setup each time
c) Executes test to check that all hardware has been set up correctly
d) Runs the same tests multiple times, and checks that the results are statistically meaningful

Roman Type
Another variation of the basic multiple-choice question is the Roman type. In this format, the candidate is presented with several statements; each proceeded by either a Roman Numeral or a letter of the alphabet. This differs from the multiple-choice questions already discussed in that the response options may require the candidate to know or derive several pieces of related information. The task for the candidate is to select the option that represents the correct combination of statements; as shown in the following example:

Which of the following answers reflect when Regression testing should normally be performed?
A. Every week
B. After the software has changed
C. On the same day each year
D. When the environment has changed
E. Before the code has been written

1) B & D are true, A, C & E are false
2) A & B are true, C, D & E are false
3) B, C & D are true, A & E are false
4) B is true, A, C, D & E are false

3.3.5. Exceptions to these guidelines
Although these guidelines apply in most situations, there may be specific examination objectives that warrant a departure from the guidelines. However, in such situations, departure from the guidelines should be justified.

3.3.6. General Guidelines

- All questions must be written in US English.
- Use good grammar, punctuation, and spelling.
- Write simply and clearly - measure candidates' knowledge of material, not vocabulary or "mind reading." Tricky or ambiguous questions create error, frustration, and compound biases related to language and disability.
- The questions should be designed to test the learning objectives of the syllabus, and not trivia or obscure knowledge associated with the subject matter. Questions should be recognized as being relevant to the goals of the syllabus.
- Use either the "correct answer" or "best answer" format, making sure there is only one 'correct' or 'best' answer.
- Avoid turns of phrase and figures of speech that could reasonably be construed as racist or sexist, or which may have a cultural bias.
- Avoid trick questions that mislead or deceive candidates into answering incorrectly.
- Emphasise key words that, if missed, could cause the candidate to select an incorrect option, (e.g. must or best or most) by CAPITALISING or **emboldening**.
- Keep questions independent of one another; do not cue the answer to one question with another. Independence maximizes breadth of coverage.
- Make all directions in the stem clear, using language that lets the candidate know exactly what is asked.
- In phrasing each question, minimize candidate reading time.
- Use vocabulary at a level appropriate to the qualification for which the candidate is being examined.
- Avoid complex multiple-choice formats unless dictated by the knowledge and skill requirements in the syllabus
- Minimize the difficulty of calculations.
- Avoid giving clues within the stem.
- Items should test one central idea or concept
- Good questions and therefore good exams take time to write - give yourself enough time to evaluate questions. After a day or two, revise, edit, and ask others to read them before submitting them.
- Questions must be based on the syllabus but should also be consistent with the 'real world'.
- The key option must not be specific to an individual's work context, but should apply generally to all work situations.

3.3.7. Question Types

As a rule of thumb, K1 questions work well with the basic format, K2 and K3 with the Roman format. However, one question type should not be used exclusively so some attempt should be made to write, for example, K2 questions in basic format.

3.3.8. Stem Construction Guidelines

- Write the directions in the stem clearly, using language that lets candidates know exactly what is being asked.
- The stem should present the problem, including qualifying statements
- Phrase the stem as a question rather than a statement e.g. 'A tester during "Static testing" does…' should be 'What does a tester do during "Static testing"?'
- Avoid "window dressing" (extraneous material) in the stem unless dictated by the skill being assessed.
- Avoid cuing through the use of faulty grammatical construction.
- Avoid negative phrasing in the question portion of the stem e.g. which of the following is **not** true?

3.3.9. Response Option Construction Guidelines

- Make sure there is only one "correct" or "best" option and always place as 1st option.
- Try to keep option length consistent.
- Keep all options in a question uniform in content.
- Avoid specific determiners, such as 'all', 'none' 'always', and 'never'.
- Avoid using 'all of the above' or 'none of the above' as options.

3.3.10. Distracter Construction Guidelines

- Use distracters that are plausible but clearly incorrect.
- Only 3 distracters should be used, together with the key option.
- Incorporate common candidate errors in distracters whenever possible.
- Avoid humorous options.
- Avoid negative wording (especially double negatives).
- Do not use "all of the above" or "none of the above".
- Avoid irrelevant cues to the correct answer (length, grammar).

3.4. Guidance on Reviewing Multiple Choice Questions

All ISTQB Foundation Exam questions will be reviewed before use.

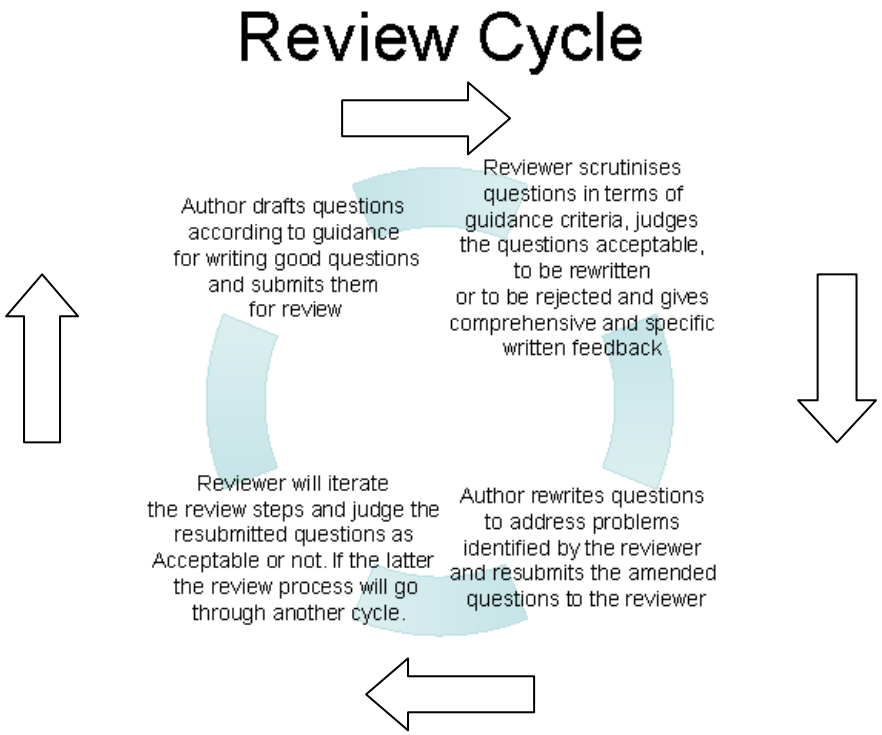
Reviewing examination questions should be seen as an iterative process rather than a one off exercise. Most often, however, it will be completed in two stages, and sometimes in just one. A general approach to reviewing questions is presented here though some tailoring will be required depending on the type of exam question and your own personal style and approach to making judgments and evaluations.

General Approach

- Do a first read through of all the questions submitted to you for review. Get a first impression but avoid making any notes or comments at this stage.
- Next look at each question in detail and note your immediate observations.

- Take each question in turn and refer it to the syllabus being examined.
    - Is the language clear and unambiguous?
    - Does it fall within the scope of the syllabus in terms of its breadth and depth as well as content?
    - Does it conform to the guidelines for writing good multiple choice questions?
- Write clear comments about any problems with the question under any of these criteria and any others you deem appropriate. Note any misspellings or grammatical errors.
- Clearly state whether the question in its present form is a) acceptable, b) should be rejected or c) requires rewriting.
- If the question is to be rejected you should justify you decision in terms of the criteria above. Rejected questions are ones deemed not to be worth rewriting because they flout too many criteria, in particular relevance to the part of the syllabus being examined.
- If a question meets all of the criteria in this document it should not be rejected solely due to poor quality translation, in this case English speaking reviewers should assist in improving the translation quality.
- Questions which are judged to need further work will generally fall into three categories:
    1. Minor changes, e.g., slight rephrasing, misspelling or grammatical problems;
    2. Significant changes, e.g., more than one answer is correct and should be substituted, the problem or situation presented is ambiguous and needs clarification;
    3. Major changes, e.g., the part of the syllabus being examined by the question are identifiable but the knowledge required is too obscure or too specialised for the level of the examination.
- If there are any other observations to be made about the questions in general write these in an overall summary.
- The overall aim of the review is to give the author of the question as much constructive feedback as possible. The author should be able to take your feedback and use it in a straightforward and easy way to correct the problems identified with their first draft of the question. Once the author has amended or rewritten the questions to address the issues identified by the reviewer, the questions should be resubmitted to the reviewer.
- The reviewer should iterate the steps set out above. In most cases, all or most of the questions will be judged acceptable at the end of this second review. Those failing the acceptance test are likely to fall into the 'minor changes' necessary category and can be amended by the author without needing the final draft to be resubmitted to the reviewer.

3.4.1. Review Cycle



This cycle should be used whenever an exam question is reviewed, at National or International level of the ISTQB.

Question reviewers should use discretion as to how many times a question makes its way around this cycle, as a rule of thumb any more than three times would suggest that the question will probably never be good enough to be included in an exam.

3.4.2. Typical Review Comments

- Stem is ambiguous, could mean ' ' or ' '.
- More than one correct answer - A and C.
- "All of the above" is not an appropriate distracter for this question (elaborate)
- Key option (correct answer) is much longer than distracters, drawing attention to it. Make distracters a similar length or shorten the correct answer.
- Not difficult enough for this level of exam. Need to rewrite with aim to elicit a deeper knowledge of topic area (elaborate).

3.4.3. Writing & Reviewing Exam Questions Checklist

The checklist below records the key points to keep in mind when writing and reviewing exam questions.

Writing	Reviewing
Refer to the guidelines for the construction of good multiple choice questions	Refer to the guidelines to help evaluate general construction
Check that the question is relevant to the syllabus being examined and pitched at the appropriate level	Refer to the syllabus to assess relevance and level of difficulty
Do a first draft of a few questions, leave them for a couple of days and then edit and redraft before submitting them for review	Check for ambiguity of language, spelling and grammar
Record which part(s) of the syllabus the question refers to	Check for more than one correct answer
	Give clear, precise and meaningful written feedback
	Judge the questions to be acceptable, requiring rewriting or to be rejected, justifying your assessment