

## TIPS FOR WRITTEN TESTS WITH CLOSED QUESTIONS

A customary closed test question or MC question consists of:

- the stem (question) or a stem (sentence with necessary information) + a question or a case study + one or more questions about the case. A case study may include a piece of text, a formula, a drawing, a video, etc.
- answer options: the key (right answer) + distractors

Most common question types:

- correct/incorrect question (statement question)
- multiple-choice question / one-of-multiple-options question (question + answer options a, b, c, etc.; between 2 and 5 answer options, with one of them being the correct or best answer)
- multiple-choice insertion question (a sentence is provided with one or more words missing from it, usually at the end; the answer options list the possible words to be inserted)
- more-than-one-option question (more than one answer is correct)
- ordering question (the options have to be put in the right order)
- matching question (two sets of answer options have to be matched into the right pairs; the sets of options may not be of equal length)
- matrix question (a collection of data is provided, and the student has to answer which characteristics do or do not apply to it)

**Tip:** a test specification matrix will help you make sure that questions are in line with the learning objectives (a suitable number of questions per each learning objective based on their importance and weighting factor). It provides a framework to ensure that you will be able to create an equivalent test the next time around.

### **Number of questions**

The number of questions is determined by:

- the number of questions required to ensure reliability;
- the purpose of the exam; if it counts towards the final mark, its reliability is of greater import;
- is there one single final exam, or are there multiple partial exams (that contain a sufficient number of questions overall);
- the available time;
- the make-up of the exam; only MC questions or open-ended questions as well (in which case a smaller number of MC questions would suffice), or a combination of several types of MC questions.

<b>Overview of answer time (globally speaking) and number of questions required to ensure reliability</b>		
<b>Type of MC question</b>	<b>Answer time *</b>	<b>Minimum number of questions required to ensure reliability</b>
Correct / Incorrect or 2 options	approx. 50 secs	80
3 options	approx. 60 secs	60
4 options	approx. 75 secs	40
Short case study	approx. 120 secs	
Long case study (1/4 page)	approx. 5 mins	

*\*The answer time also depends on the question's degree of difficulty (for example, studying a schematic takes a lot of time) and the actions required (such as when a calculation has to be completed first).*

### **Important focus points when creating questions and possible answers**

- Give clear instructions, particularly for more unusual types of questions.
- Be comprehensive, but make sure that questions and answers are brief, so that little time is lost while reading. The perfect question can be answered without having to read the answer options and does not contain any unnecessary or trivial information.
- Divide longer questions up into a stem with the information (or case study) and a separate question. Any text that reoccurs in each of the answer options should instead be included in the stem.
- Make sure that the question and the answers (and the answers in relation to one another) differ as little as possible in terms of language use and jargon. Make sure that students cannot simply guess the correct answer based on the jargon in that answer option.
- For one-of-multiple-options questions: make sure that only 1 of the answer options is unambiguously correct (for 'choose the correct answer' questions) or unambiguously the best answer (for 'choose the best or most fitting answer' questions).
- Make sure that the questions are not dependent on one another.
- Choose logical distractors, based on common or expected errors in reasoning. Do not create nonsensical distractors; instead, leave these out entirely.
- Do not include trick questions or questions that cause unnecessary confusion.
- Underline negations and/or put them in bold text (i.e. 'What should you **not** do in case of a fire?').
- Choose a specific system for ordering the answer options; for example, always list the options in alphabetical order, or in case of numbers, from smallest to largest. Unless, of course, using such a system would make the correct answer easier to guess.
- If you include any statements, opinions, quotations, conclusions etc., make sure to specify who said it, which theory or source makes that claim, etc.
- Be wary of descriptions or answer options that may be interpreted in more than one way or may be hard to interpret; for questions regarding measurements, weights, distances, etc., always include the exact measuring unit.
- Answer options ought to revolve around the same concept or school of thought. If the answer options contain multiple concepts, the question ought to be restructured into separate correct/incorrect questions for each component.

### **For both questions and answer options, avoid:**

- Vague wording (such as 'maybe', 'almost always', 'roughly', etc.) or absolute wording (such as 'always', 'never', 'definitely').
- Grammar or spelling errors, unnecessarily difficult terminology or jargon (unless it is well known to the students). Avoid complex sentence structures. Take into account non-native speakers.

### **For questions, avoid:**

- Multiple questions/problems in the stem.
- Negative phrasing of the stem (unless there is a good reason for doing so).
- Modal words like 'may' in the question, such as 'Medicine X may be suitable treatment for disease Y'.

### **For answer options, avoid:**

- Overlap in the answer options; they must always exclude one another. *So not: 'A prime number is [a] larger than 1; [b] divisible by 1; [c] divisible by itself; [d] larger than 1, divisible by 1 and divisible by itself', with only answer [d] marked as the correct answer.*
- Using 'all of the above'/'none of the above' as answer options.
- Negations in the answer options which, when paired with the question, would result in double negatives.

- Answers containing literal text from the book (students would then choose based on recognisability).
- Answer options that do not line up with the question grammatically, or instances in which only the correct answer lines up with the question grammatically, thus giving away the right or wrong answer.
- A considerable difference in answer option lengths (particularly if that difference provides clues as to which is the correct answer).
- Hints in the answer options that suggest that they are correct or incorrect: for example, a term that is in the question only features in the correct answer option.

### **Be careful with:**

#### *Yes-no or correct-incorrect questions, especially a great many of them*

If you are using a lot of correct-incorrect-type questions, make sure that for about half of them, the right answer is 'incorrect'. Creating good correct-incorrect questions can be difficult, because our focus when learning material tends to be on what is correct and not on what is incorrect. Because of this, questions of this type may end up feeling very contrived. Moreover, the incorrect option has to really be unambiguously incorrect, which is not always the case. Another disadvantage is that the incorrect options may become lodged in the student's memory if they are not given feedback. This question format is valid in some cases, but still requires extra care.

#### *Double statement questions*

These are questions that follow this format: Statement A... Statement B... Answer options: (a) A is correct, B is incorrect. (b) B is correct, A is incorrect. (c) Neither are correct. (d) Both are correct. These types of questions require very careful parsing and a great deal of mental effort. Each individual statement has to be examined individually, and errors are easily made. If a student knows whether A is correct, but not whether B is, they will be forced to guess, and in doing so, they might answer the question incorrectly, in spite of knowing part of the right answer, and vice versa. One precondition is that the statements must refer to the same theme or concept. In some instances, double statement questions may be valid. However, it is usually a good idea to decide exactly what you want the students to demonstrate and then choose a different question format accordingly.