General Item Writing Guidelines for Multiple Choice Examinations

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OVERVIEW

- Multiple Choice Item Components
- Item Writing Rules
- Item Writing Clues
- Trick Questions
Multiple Choice Questions

Candidates are presented with four options to answer a question or complete a sentence.
Example:

Which is the current capital of California?
a. Vallejo
b. Benecia
c. San Jose
d. Sacramento
Anatomy of a Multiple Choice Question

A continuous load is a load where the maximum current is expected to continue for

a. 1 hour. ← Distractor
b. 3 hours. ← Key
c. 8 hours. ← Distractor
d. 24 hours. ← Distractor
Advantages

• Versatility (can assess a wide range of content)
• Candidates are familiar with the format
• Low chance score
• High reliability
• Good statistical power for analysis
• Objectively scored
• Machine Scored
Disadvantages

Multiple choice questions are difficult to write correctly.
The purpose of the stem is to ask a specific question or pose a specific problem.

The stem should stand on its own.

After reading the stem, candidates should understand the question that is being asked.

The stem should never consist solely of a word or phrase followed by a series of alternatives.
The Stem

Which city is the capital of California?

The capital of California is

The capital of California was moved to _____ in 1854.
Not Enough Information in the Stem

Sacramento is

a. located northwest of San Francisco.
b. the capital of California.
c. the home of the Golden State Warriors.
d. a Native American word meaning “golden land.”
Which vs. What

“What” implies an absolute answer, there are not degrees of correctness (such as “What is the volume of a cylinder?”)

“Which” is used as an abbreviation of “Which of the following.” (such as “Which cylinder will hold the most water?”). Use “Which” when all alternatives are expressed in similar units.
Qualifiers

Qualifiers are words that modify the alternatives and stems to either make them definitively or partially right or wrong.

- **Definitive qualifiers**: always, never, only, every, all, must
- **Partial qualifiers**: usually, generally, sometimes, typically
Using Qualifying Phrases in the Stem

It may be necessary to use terms such as “the minimum,” “the maximum,” “the highest,” or “the lowest” in the stem to ensure only one alternative is correct.

*Poor Example:*

Precipitation will turn into snow at

- a. 32° F.
- b. 35° F.
- c. 37° F.
- d. 40° F.

*Better Example:*

What is the highest temperature that precipitation will turn into snow?

- a. 32° F.
- b. 35° F.
- c. 37° F.
- d. 40° F.
Negative Qualifiers

- **Negative Words:** no, not, without, least, except

- **Negative phrases:** “All of the following except,” “Which statement is false”

- **Words that imply not doing something:** never, avoid, forget, reverse

- **Double negatives:**
  - two negative words (or phrases) in the stem
  - a negative word in the stem and another negative word in one or more of the alternatives
Negatively Worded Stems

- Negatively phrased stems confuse test takers who know the content
- Negatively worded items do not discriminate as well
- *Only* use a negative stem when there is no other way to write the item
- Try to limit the percentage of negatively worded items to 5% of the total test
The Alternatives

The alternatives represent the responses the candidates have to choose between. All of the alternatives should:

• Be expressed in similar units
• Be similar level of difficulty and detail
• Stand on their own (i.e. not refer to other alternatives)
Ordering of Alternatives

Numbers
• Ascending order
• Descending order

Words
• Alphabetical
• Like words together

BE CONSISTENT!
Undefined Alternatives

Undefined alternatives rely on other alternatives to provide information. Undefined alternatives include:

- All of the above
- None of the above
- A & C
- All but C

Undefined alternatives should never be used.
The Keyed Response

Correct Answer

Should be based upon
- Fact
- Verifiable source material
- General agreement among SMEs

Should be obvious only to those candidates who truly know the subject matter
The Distractors

- Incorrect responses

- Must appear to be plausible to the less-knowledgeable candidates.

- Must be definitely incorrect response options.

- Quality of the entire item is dependent on the plausibility of the distractors.

- Should never be so obviously incorrect that it will be avoided by all candidates.
Use of Definitive Determiners in the Distractors

**Poor Example:**
Which is the primary advantage of using forced ventilation in a fire structure?

a. reduces interior heat levels  
b. **never** requires additional training  
c. **always** reduces the risk of an injury  
d. **only** requires a few firefighters to operate

**Better Example:**
Which is the primary advantage of using forced ventilation in a fire structure?

a. reduces the risk of injury  
b. reduces interior heat levels  
c. requires additional training  
d. requires few firefighters to operate
Overlapping Alternatives

To properly cure, concrete should be poured when the external temperature is between

a. 10° – 20° Centigrade.
b. 15° – 20° Centigrade.
c. 20° – 30° Centigrade.
d. 23° – 28° Centigrade.

What is the maximum temperature at which concrete should be poured to ensure proper curing?

a. 20° Centigrade.
b. 25° Centigrade.
c. 30° Centigrade.
d. 35° Centigrade.
A patron walks into a bar in California on the day before his 21\textsuperscript{st} birthday. The bartender serves him a beer. Who has committed a crime?

a. The patron  
b. The bartender  
c. Both the patron and the bartender  
d. Neither the patron nor the bartender
Trick Questions

A trick question is any question in which the knowledge that is being assessed is not clearly apparent to the test taker.

Trick questions typically do not discriminate between good and poor candidates, as you are just as likely to trick the good candidates as well as the poor candidates.

Trick questions often lower the reliability of your exam.
Things to Avoid

• Item writing clues and errors:
  – Using “an” with distractors that start with a consonant

• Vocabulary:
  – Using similar words in the stem and the keyed response

• Undefined alternatives:
  – “All of the above,” None of the above,” “Both a and b,” or “All but c”
Other Considerations

- Alternatives that are too similar
- Alternatives that are exact opposites
- Distractors that differ from the key
Questions?
Thank You!

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