

Quick guide to writing NBME-Style Multiple Choice Questions

The complete guide from the National Board of Medical Examiners can be found at <http://www.nbme.org/publications/item-writing-manual.html>. Below is our distillation of relevant parts of their manual, plus a few other tips we've learned along the way.

1. Choose an important topic.

This will happen automatically if your questions link directly to your learning objectives, as they should.

2. Try to write your stem as if it were a question on a short answer written test.

This means that you should be able to cover up the choices, read the stem, and write down a short answer. This usually requires that the stem is long and the choices short. Because several or all of the answers might be possible and the goal is to select the best one, end the stem with “the **most likely**...” such as “the most likely adverse effect of this drug is:” This prevents most student arguments about questions.

3. Make your choices homogeneous.

The choices should be similar in length, grammar and syntax, and theme. You should be able to order your choices from least to most true along a single thematic dimension, with the correct answer being that which you would have written down as a short answer according to rule 2 above. **Put your choices in alphabetical or numeric order.**

A practical corollary to Rules 2 and 3 is that the question stem and answer choices cannot contain phrases such as:

“none of the above”

“all of the above”

“A, B and C above are true”

“All of the following below are true EXCEPT...” “Which of the following is NOT true”

4. Avoid cueing to the correct answer.

One should not be able to choose the correct answer by: a) matching words in the stem to answer choices, b) eliminating answer choices with grammatical or spelling errors, c) avoiding extremes (never, always, only) in distracters, d) choosing the longest or most technically precise answer, e) counting the number of common elements within the answer choices. This sometimes means that the number of answer choices for a given question should be 4 or 6 or 9, etc.

5. Assess for higher level thinking rather than recalling a single fact.

Having the stem first describe a clinical or experimental situation and then asking for a diagnosis or result or interpretation can often accomplish this. See the materials on Bloom's taxonomy below for more information.

6. Questions should **NEVER** be tricky or deceptive; they should be easy for experts in the field.

They should be challenging because of #5 above, not because an obscure fact or a trick is involved.

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For illustration, here is an example from the NBME manual that violates several of the rules above:

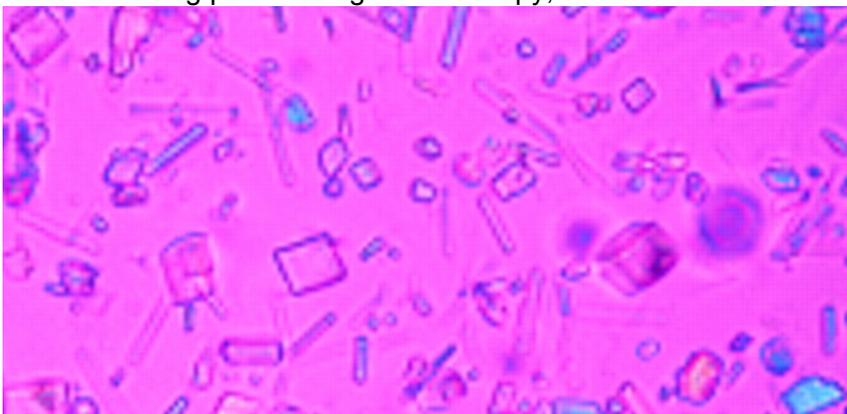
1. Which of the following is true about pseudogout?
 - a. it occurs frequently in women.
 - b. it is seldom associated with acute pain in a joint.
 - *c. it may be associated with a finding of chondrocalcinosis.
 - d. it is clearly hereditary in most cases.
 - e. it responds well to treatment with allopurinol.

What's wrong with it?

- First, it violates rule 2; there isn't a clear question in the stem, you must read the stem along with each choice, making this a multiple True/False question. While 'C' is true, a case could be made for 'A' since it occurs as frequently in women as in men.
- Second, the choices don't fall along a single dimension: you're asked to compare apples and oranges, or in this case, gender, location, pathology, genetics, and pharmacology.

To repair this question we've rewritten the stem, focusing it and the choices on one theme.

1. A 72-year-old man presents complaining of the sudden onset of knee pain that began a week ago. He describes the pain as sharp and severe and located in the joint. The knee is swollen, warm to the touch, and the skin over it is red. Joint fluid is aspirated, examined using polarized light microscopy, and shows the following:



What is the most likely diagnosis for the patient's knee pain?

- a. gout
- b. osteoarthritis
- *c. pseudogout
- d. rheumatoid arthritis
- e. traumatic effusion

Bloom's Taxonomy Levels in the knowledge domain

Levels of difficulty that discriminate among test takers.

| | | | | | |
|--------------------|----------------------|--------------------|------------------|-------------------|-------------------|
| Knowledge | Comprehension | Application | Analysis | Synthesis | Evaluation |
| Remembering | Understanding | Applying | Analyzing | Evaluating | Creating |
| lowest | → | | | | highest |

I. Knowledge (Remembering) Questions

1. Can the student recall or remember the information?
2. Can the student exhibit memory of previously learned materials by recalling facts, terms, basic concepts and answers?
3. Can the student identify or list variables found in patient history, vital signs, and/or clinical test results.
4. Does the student know which physiological problem each named disease represents (e.g., Graves' disease, hyperthyroidism)?
5. Can the student identify what is being measured by a diagnostic technique?

II. Comprehension (Understanding) Questions

1. Can the student explain ideas or concepts?
2. Can the student demonstrate understanding of facts and ideas by organizing, comparing, interpreting, giving descriptions, and stating main ideas?
3. Can the student define each variable?
4. Can the student define the presenting signs and symptoms of each disease?
5. Does the student understand what the results of a diagnostic technique indicate?

III. Application (Applying) Questions

1. Can the student solve problems for a novel situation by applying acquired knowledge, facts, techniques and rules in a different way?
2. Given a set of clinical variables, can the student identify the relevant variables and make a diagnosis?
3. Can the student identify the expected results you would obtain from a given diagnostic technique or state which technique could be used to solve a novel problem?

IV. Analysis (Analyzing) Questions

1. Can the student distinguish between the different parts?
2. Can the student make inferences and find evidence to support generalizations?
3. Given a set of clinical variables and a diagnosis, can the student determine which other possible diseases (differential diagnoses) need to be ruled out?
4. Can the student interpret the raw data obtained from a diagnostic technique, including the interpretation of controls and how to normalize data?

V. Synthesis (Evaluating) Questions

1. Can the student justify a stand or decision?
2. Can the student compile information together in a different way by combining elements in a new pattern or proposing alternative solutions?
3. Given a set of clinical variables and a diagnosis, can the student determine the next clinical test that needs to be performed to confirm the diagnosis?
4. Can the student design or identify an experiment using a given diagnostic technique to test a hypothesis?

VI. Evaluation (Creating) Questions

1. Can the student present and defend opinions by making judgments about information, validity of ideas or quality of work based on a set of criteria?
2. Given a set of clinical variables and a diagnosis, can the student evaluate the evidence supporting the diagnosis and provide the patient with a second opinion?
3. Can the student assess relative merit of using two different approaches to address a particular hypothesis?

In general, it is difficult to assess for competence in the knowledge domain above level III (application) or IV (analysis) using multiple-choice questions. This is why we need to be using multiple forms of assessment!

Lastly, all assessment questions should be directly mapped to one or more learning objectives.