



GUIDE FOR DEVELOPING EXAM QUESTIONS

Revised – March 2014

This guide was prepared to assist those work groups preparing module materials as they prepare exam questions. These exam questions will be used both, as aids to training delivery and as a measuring stick in any future certification effort. If the certification program is to have credibility, it is vital that the exam questions adequately evaluate that the student has achieved the learning objectives in each module.

As you write questions, please remember that the modules have set the bar at a basic level that does not go above the application level – the third level in Bloom's Taxonomy. Thus, we expect that the candidate will KNOW certain things, UNDERSTAND other things, and be able to APPLY the remainder. We are not looking for higher learning levels in Bloom's Taxonomy for basic inspectors and we will not be testing for analysis, integration, or evaluation.

A note on graphics: any of the question types may include a graphic in the form of a bmp, gif, or jpg file. Please avoid high-resolution graphics and shrink graphics to not more than 640 horizontal and/or 640 vertical pixels.

Testing for Knowledge – Operative verbs such as define, list, or name are used in the learning objectives for knowledge in a module. A question testing for knowledge is usually in the form of a true/false, multiple choice, or short answer. At this point, the Committee is asking that developers focus on multiple choice questions at this level, such as questions 1 and 2 below. With true/false questions, the candidate has a 50-50 chance of guessing the right answer. With short answer questions, there is difficulty in the computer grading, as any minor difference in punctuation, spelling, etc, and the computer marks the answer wrong. Please note that at this level the candidate need only demonstrate that he/she knows the information and not necessarily, that he/she understands it or can apply it.

- 1. Which of the following is used to designate a code requirement in NIST Handbook 44 dealing with equipment design and is particularly directed to the device manufacturer?** (Answer: B)
 - A. A tolerance**
 - B. A specification**
 - C. A user requirement**
 - D. A note**

2. Which of the following is a unit of measure of mass? (Answer: C)

- A. A bushel
- B. A meter
- C. A kilogram
- D. A volt

Testing for Understanding – Operative verbs such as discuss, describe, or classify are used in the learning competencies for understanding in a module. A question testing for understanding is usually a multiple choice question, such as questions 3 and 4 below. Understanding implies the ability to restate information in your own words or simply in different ways. Questions concerning understanding often ask the candidate to pick the best response in situations where more than one answer could be correct in some respect. For example, in Question 3, answer B could be a correct answer if the equipment was manufactured after the effective date. Answer C is a better answer since it is more specific and includes items brought into the state after the effective date. Please note, for understanding, the candidate needs to demonstrate that he/she knows and understands the information and not necessarily that he/she can apply it.

3. A nonretroactive requirement is best described by which of the following statements?
(Answer: C)

- A. A nonretroactive requirement is enforceable on all equipment up to the terminal date.
- B. A nonretroactive requirement is enforceable only on new equipment after the effective date.
- C. A nonretroactive requirement is enforceable on equipment manufactured after the effective date or brought into the state after the effective date.
- D. A nonretroactive requirement is enforceable on equipment with an NTEP Certificate granted after the effective date.

4. Which of the following best describes the difference between “d” and “e” in the Scales Code? (Answer: D)

- A. The value of “e” is always displayed while “d” may or may not be.
- B. The value of “d” is always smaller than or equal to “e”.
- C. The display of values for “d” must always be different in size or character from “e”.
- D. When “d” does not equal “e”, the tolerances are applied to the value of “e”.

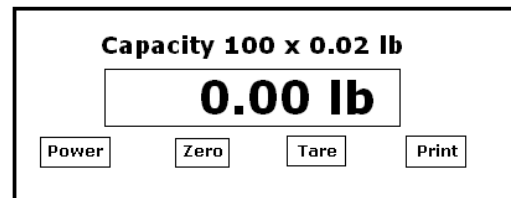
Testing for Application – Operative verbs such as illustrate, employ, apply, or demonstrate are used in the learning objectives for application in a module. A question testing for application should be either a multiple choice question or a “Yes/Citation” question, such as questions 5 and 6 below. Questions concerning application will usually require the candidate to perform multiple steps to reach the correct answer. In the field, an inspector will not be guided to the correct section of the handbook, but will have to find it based on their knowledge and experience working backwards from the

physical facts to the correct requirement. For example, the question may provide information about the situation and some test results. The candidate must then decide whether to apply maintenance or acceptance tolerances and then evaluate the test results against the appropriate tolerances for that test. In question 5 below, the candidate must see that the scale is subject to the non-retroactive requirement in Scales Code S.1.7.(b) and then correctly deduce that the only correct response is an overload error. The Yes/Citation question (question 6) also requires several steps but also requires the candidate to cite the specific section of the Handbook that is violated. This is critical as the citation would have to be indicated on any official stop-use order issued for the violation. Please note that the candidate needs to demonstrate that he/she knows, understands, and can apply the requirements.

5. You are inspecting a new price computing scale (30 x 0.01 lb) in a deli that was placed in service for the first time last week. It has an NTEP CC # 99-205. You place a 1 lb weight on the scale and press the tare key. You then place an additional 29.2 pounds of test weights on the scale. Which of the following is an acceptable indication for this test load? (Answer: A)

- A. Overload error**
- B. 29.24 lb**
- C. 29.18 lb**
- D. 29.16 lb**

6. You are inspecting the scale at right and find that it has no zero tracking. With the scale at zero as indicated, you add 0.1 d (0.002 lb) to the platform and the scale indicates a stable 0.02 lb. Does this conform with NIST Handbook 44? If yes answer yes. If no, enter the citation from the Scales Code.



(Answer: S.1.1.1. –The code requires the digital zero indication be maintained accurate within +/- ¼ d of true zero or the scale must have a center zero indicator. Since the scale has no center zero indicator, the addition of 0.1 d should not cause the indication of 0.02 lb.

Initially the Committee is looking to build a bank of exam questions that evaluate if the candidate has reached the learning objectives in each module and cover a range of difficulty. Any exam prepared will include a mix of questions at each appropriate level in Bloom's Taxonomy from the body of knowledge, and varying levels of difficulty from easy to challenging. In that way, the exam can be fair yet still differentiate those that really have mastered the discipline from those that have not.

After the questions are prepared and evaluated (see NCWM Guide to Evaluate Exam Questions), the Committee will then secure them for use in a certification exam program. The NCWM has hired a Certification Coordinator to work with Subject Matter

Experts (SMEs) to prepare and evaluate the questions, administer the certification exam and assist in the grading. Those experts will be charged with keeping the exams current and periodically adding new questions so the exam is not the same for candidates that fail to pass the first time. The group will look to set the bar so it is fair yet challenging.

A long journey begins with the first step. The Committee is counting on the SMEs to start generating a bank of exam questions (with an answer key) based on the objectives within the module(s) included in the exam. If a good assortment of questions is created, the goals for the certification program will be accomplished. There is plenty of room for creativity in this effort, including the use of graphics and photographs. SMEs writing questions may also wish to look at the Guide to Evaluating Exam Questions, which provides guidance for the evaluation of draft questions.

The Committee is asking that questions be created in Excel, using the test draft spreadsheet. This is very helpful, and allows the draft questions to be quickly uploaded to the Access Database. In the Excel spreadsheet, each question is entered in one row with separate tabs for each module included in the exam. If you are working from the Body of Knowledge, there is a column for the learning objective number. If you are unsure about the learning objective number, leave the column blank and it will be updated in the evaluation process.

If you do not feel comfortable using Excel, questions will be accepted in Word (.doc) format. Please keep questions related to a specific module together, and label the top of the page for each module accordingly. Also, use the following formats when writing the questions.

Multiple Choice

(Please don't type the A, B, C, D before the multiple choice answers. The paragraph marker in Word will serve to separate the 4 answers.)

3.1	(Objective number)
Which of the choices is a color in the red family?	(Question)
Azure	(MC answer A)
Emerald	(MC answer B)
Rust	(MC answer C)
Lemon	(MC answer D)
C	(Answer key)

Short Answer – simple

3.1

(Objective number)

With equivalent significance, how many grams are in 2.00 lb? (Question)

907

(Answer Key)

Short Answer – Yes/Citation

3.1

(Objective number)

You are inspecting an NTEP Certified portable scale with no level indicator. You estimate from your visual inspection that the scale is out-of-level but the scale tests within tolerances. Is this in compliance with the NIST Handbook 44? If yes, answer yes. If no, enter the citation from the Scales Code.

Yes

(Answer Key)

Thanks again for your willingness to contribute. If you have questions, please call or email the PDC Committee Chair listed on the NCWM website or Ross Andersen, the Certification Program Coordinator, at 518-869-7334 or at rjandersen12@gmail.com.