ITEA T&E PROFESSIONAL CERTIFICATION EXAMINATION
ITEM WRITING WEBINAR

GETTING THE RIGHT ANSWERS TO THE
ULTIMATE QUESTIONS

James Gaidry, CAE
ITEA Executive Director

October 18, 2012

GET CONNECTED to LEARN, SHARE, AND ADVANCE.
AGENDA

• Certified Test and Evaluation Certification Credential (CTEP)
  – Professional Certification versus “Certificate” Programs
  – CTEP credential requirements
• Item Writing Webinar Objectives
• Item Writing Basics
  – Question Construction
  – Response Construction
  – Pitfalls to Avoid
  – Punctuation and Capitalization
  – Types of Questions
• Getting Started
• Time to Write!
ITEA will begin offering in 2013 a professional certification credential that will provide significant benefits to T&E professionals, organizations, and their customers.

Over 500 T&E subject-matter experts (SMEs) have been involved in the development of this credential.

These SMEs—T&E executives, managers, supervisors, individual contributors, and technicians—have come from a diverse cross-section of the T&E profession, representing industry, government, academia, laboratories, ranges, weapon systems, information technology, transportation, electronic communications, consumer electronics, and more.
PURPOSE OF THE CTEP CREDENTIAL

- Recognize individuals who demonstrate:
  - **KNOWLEDGE, SKILLS, AND ABILITIES**: They meet the minimum level of competency in the requisite KSAs that have been identified by T&E subject-matter experts (SMEs).
  - **COMMITMENT** to maintain currency in the field.
  - **DEDICATION** to advancing the profession.

- Develop and promote common standards, principles, procedures, processes, and terms for the T&E profession.

- Support professional development and education to enhance the KSAs of T&E professionals.
Job/Task Analysis (JTA)

Identifies the job tasks (work duties, responsibilities, and functions) that is performed across the **broad spectrum of most T&E professionals most of the time** and their relative importance, difficulty, and frequency.
CTEP CREDENTIAL DEVELOPMENT

Job/Task Analysis (JTA)
Identifies the job tasks (work duties, responsibilities, and functions) that is performed across the broad spectrum of most T&E professionals most of the time and their relative importance, difficulty, and frequency.

Body of Knowledge (BOK)
Identifies the primary knowledge, skills, and abilities (KSAs) that would be required to competently perform the job tasks identified in the JTA.
CTEP CREDENTIAL DEVELOPMENT

Job/Task Analysis (JTA)
Identifies the job tasks (work duties, responsibilities, and functions) that is performed across the broad spectrum of most T&E professionals most of the time and their relative importance, difficulty, and frequency.

COMPLETE

Body of Knowledge (BOK)
Identifies the primary knowledge, skills, and abilities (KSAs) that would be required to competently perform the job tasks identified in the JTA.

COMPLETE

Table of Specifications (aka “Exam Blueprint”)
Developed based on the BOK and reviewed periodically to assure an accurate reflection of KSAs required for continued proficiency in the T&E career field.

Oct 2012
CTEP CREDENTIAL DEVELOPMENT

Job/Task Analysis (JTA)
Identifies the job tasks (work duties, responsibilities, and functions) that is performed across the broad spectrum of most T&E professionals most of the time and their relative importance, difficulty, and frequency.

Body of Knowledge (BOK)
Identifies the primary knowledge, skills, and abilities (KSAs) that would be required to competently perform the job tasks identified in the JTA.

Table of Specifications (aka “Exam Blueprint”)
Developed based on the BOK and reviewed periodically to assure an accurate reflection of KSAs required for continued proficiency in the T&E career field.

Certification Examination
A 200 question, 4-hour exam created from a Data Bank of questions that represents a valid, reliable, legally defensible, and fair measure of professional competence in the job performance areas of the “Exam Blueprint.”

GET CONNECTED to LEARN, SHARE, AND ADVANCE.
PROFESSIONAL CERTIFICATION VERSUS "CERTIFICATE" PROGRAMS

• A “professional certification credential” is quite different from the “certificate” programs that are currently available to test professionals.

• “Certificate” programs award a certificate of completion or achievement to individuals after they successfully complete a course of study or meet some minimum requirements.
PROFESSIONAL CERTIFICATION VERSUS "CERTIFICATE" PROGRAMS

In contrast a Professional Certification Credential:

- Is a time-limited recognition.
- Is awarded based on the candidate’s passing a competency exam.
  - Not related to the completion of any specific course or curriculum of courses.
  - Bestows upon an individual to right to use the credential’s designation in conjunction with their name (e.g. CSE, CPA, or CPM.
- Requires adherence to a Professional Code of Ethics.
- Requires periodic submission for re-certification to demonstrate continued currency in the profession.
  - Demonstration of full-time employment in the field.
  - Continuing education/professional development.
CTEP CREDENTIAL REQUIREMENTS
(TO BE VALIDATED)

• Exam eligibility*
  – At least 3/5 years of T&E experience.
  – Bachelor’s degree in a technical field or equivalent experience.

• Recertification requirements
  – Submit for recertification every 5 years.
  – Demonstration of continued employment in T&E.
  – Demonstration of relevant and sufficient continuing professional development/education to maintain currency in T&E.

* Eligibility to take the certification exam will be independent of any course of study, curriculum, or test book.
ITEM WRITING WEBINAR OBJECTIVES

- Provide training to T&E subject matter experts on how to develop good exam questions.
- Develop valid and reliable items for use in the T&E Professional Certification Examination.
- Generate 20 items per participant within the next four (4) weeks.
THE ANSWER IS...

42
START WITH THE ANSWER

42

The Answer to the Ultimate Question of Life, the Universe, and Everything.
(Per *The Hitchhiker’s Guide to the Galaxy*)
ITEM BASICS

• The knowledge needed to answer the question must be relevant to the profession.

• The item must test the concept at an appropriate level of difficulty.

• There must be one, and only one, correct answer.

• The wording must be clear and unambiguous.

• There must be a supporting reference.
4-PART MULTIPLE CHOICE ITEM STYLE

• Provides focus

• One correct answer and three or more distracters.

• Avoids extraneous responses

• Is easy to score

• Avoids subjectivity in scoring

• Gives candidates only 25% chance of guessing correctly
QUESTION CONSTRUCTION

- **Short and sweet** - Be written as short and uncomplicated as possible.

- **Just one thing** - Only assess a single piece of knowledge or skill per item.

- **Complete sentences** - Always be presented as a complete sentence in a question whenever possible.

- **Be well thought-out.**
QUESTION CONSTRUCTION (CONTINUED)

- Stick to the subject - Free of irrelevant material. Only supply enough information to answer the question.

- Plain English - clearly worded.

- Nothing grey - unambiguous.

- Shoot straight - Clearly define the problem. The examinee should know exactly what is being asked.
QUESTION CONSTRUCTION (CONTINUED)

• Ask don’t tell - Always ask a direct question and avoid any lecture or lengthy discussion in the question.

• Don’t bury the headline - Always contain the central idea and most of the content for the item. The central idea should not be in the options.

• Should / Would / Could

• Must / Can

• Always / All / Never
QUESTION CONSTRUCTION (CONTINUED)

• Accent the positive - Avoid negative phrasing.

• NOT / CANNOT / EXCEPT / NEVER

• Don’t use no double negatives - If a negative must be included in the stem, do not use a negative in the response options. This makes responding to the question very confusing for an examinee.
RESPONSE CONSTRUCTION

• Always correct, all the time - The correct answer(s) must be 100% correct, 100% of the time.

• Never correct iff you choose wisely - The distracters are clearly not the correct answer(s) when the best answer(s) is selected.

• Quality not quantity - Concentrate on quality not quantity of distracters. It is better to have fewer good distracters; it does matter how the distracters work for the quality of the test item.
RESPONSE CONSTRUCTION (CONTINUED)

- Stand alone - Responses should always be independent and mutually exclusive.

- If you don’t know where you are going, any road will get you there - All distracters must be plausible to someone who does NOT possess the skills being tested.

- Only one - There is only one correct answer for each multiple-choice item.

- Don’t know / All of the above / None of the above
UNACCEPTABLE ITEM STYLES OR CONTENT

- Fill-in-the-blank in the middle of a sentence
- “All of the above”
- “None of the above”
- “Both (A) and (C)”
- Trick questions or trivia
- Items being used anywhere else (study guides, online quizzes)
Item Stem = the statement which asks the question or must be completed, such as:

- “Which of the following publications contains proposed Federal rules and regulations?”
- “The publication which contains proposed Federal rules and regulations is the”
DETAIL ON MULTIPLE-CHOICE ITEM STYLE (CONTINUED)

- **Key** = the correct answer

- **Distractors** = plausible but incorrect answers (in this case, they must all be publications)

  - (A) Federal Register ✓
  - (B) Code of Federal Regulations
  - (C) United States Code
  - (D) GAO Federal Report
Which of the following common household items contains corrosive material?

- (A) alkaline batteries ✓
- (B) nail polish
- (C) paint thinner
- (D) super glue
PITFALLS TO AVOID

• Incomplete stems
  – “According to 40 CFR:”

• Non-specific stems
  – “Which of the following is important?”

• Unintended clues
  – A key word from the stem is repeated in one—and only one—option (the key)
PITFALLS TO AVOID (CONTINUED)

- One option that includes another

- Double negatives
  - “All of the following regulations exclude coverage of agricultural products except”

- The “sore thumb” key answer
  - It is much longer (or much shorter) or worded much more carefully than the other options
• **Apples and oranges**
  – E.g., 2 options are actions to be taken, one is a reference to a regulation, one is an amount of a substance
  – Most likely follows a faulty stem

• **Always/Never in an option**
  – Very hard to substantiate
Try to avoid the use of personal pronouns. Keep the questions as gender neutral as possible. If pronouns are necessary, use “he” or “she” in test items to give both genders “equal time.” Nevertheless, try to eliminate the use of pronouns completely.

Acronyms and abbreviations should be defined (spelled out) with the acronym in parentheses. However, common acronym usages can be used if it is very fundamental to the job. For example, “ASCII” is a commonly known term, and spelling it out may confuse some.
TYPES OF QUESTIONS

- Get it
- Fix it
- Get creative
TYPES OF QUESTIONS
GET IT

• What best defines ....?

• What is (un)characteristic of ....?

• What is an example of ....?
TYPES OF QUESTIONS

FIX IT

- What is the nature of the problem?
- What is needed to solve the problem?
- What will occur from......?
- What is a solution?
- If this happens, what should be done?
- What is the most effective or efficient solution?
- Why is ... the most effective solution?
TYPES OF QUESTIONS
GET CREATIVE

- What is the most effective (appropriate) method for ....?
- What is better (or worse) ....?
- What is the most critical step in this procedure?
- What is (un)necessary in a procedure?
- What would happen if ....?
- Given .... what is the primary cause?
- On the basis of ..., what is the primary cause?
WHERE TO GET IDEAS FOR ITEMS

• Your experience on the job.
  – Problems you’ve encountered
  – New rules, processes, solutions

• Published tests – for ideas only; do NOT copy other items word-for-word.

**NOTE:** Items should be “generalized” to be applicable to the broad community of T&E professionals.
ITEM CONSTRUCTION FORM

Name: _________________________________________________________________
ITEA Member ID: ________________ E-mail: ________________________________
Task Statement #: ________________
(Refer to Appendix A - Test & Evaluation Professional Job Tasks)
Knowledge Statement #: __________
(Refer to Appendix B - Test & Evaluation Professional Body of Knowledge)
Testing Concept: ______________________________________________________________________
(One sentence describing what is being tested)

Stem: ______________________________________________________________________________
Options: ______________________________________________________________________________
  A. (Always make A the correct answer) ________________________________
  B. ________________________________
  C. ________________________________
  D. ________________________________
Key: A
Justification: __________________________________________________________________________
Reference(s): __________________________________________________________________________
(Provide references to enable independent review. Include the publication title, publication year, author and page.)
GETTING STARTED

• Look through Appendix A – T&E Professional Job Tasks.

• Select the task statement that best fits your “answer”
AREA 1: T&E SUPPORT FOR PROGRAM/SYSTEM REQUIREMENTS DEVELOPMENT

Task Statements:

1001 Review program/system design specifications/requirements.
1002 Identify critical operation issues.
1003 Review, analyze, and provide input to acquisition strategies (i.e. acquisition plans, system engineering plans).
GETTING STARTED (CONTINUED)

• Look through Appendix B – T&E Professional Body of Knowledge.

• Select a statement that represents the “knowledge” that is required to perform the job task you selected that best fits your “answer”
APPENDIX B - TEST & EVALUATION
PROFESSIONAL BODY OF KNOWLEDGE

KNOWLEDGE STATEMENTS

0001 Knowledge of Acquisition Design: Milestone Reviews and Phases
0002 Knowledge of Agile Testing
0003 Knowledge of Automated Testing
0004 Knowledge of Capabilities Assessment
0005 Knowledge of Commercial Off-the-shelf (COTS) Testing
0006 Knowledge of Common human factors considerations
0007 Knowledge of Common T&E contractual elements and terms
GETTING STARTED (CONTINUED)

Formulate a sentence which covers the concept, such as:

“Alkaline batteries contain corrosive material.”
GETTING STARTED (CONTINUED)

Turn the statement around into a question or a completion:

“Which of the following common household items contains corrosive material?”

OR

“A very common household item that contains corrosive material is”
More about the stem

– It should be worded clearly and tightly so that it defines the question.

– It must contain all the information necessary to allow the candidate to determine the correct response.

– It should not contain extraneous or irrelevant information.
Choose distractors

- Distractors must be plausible but incorrect. (In this example, the distractors must NOT contain corrosives.)

- If you have said “common household items” in the stem, each distractor must also be a common household item.

- Present the options in parallel form.

- Make sure the options all flow with correct grammar from the stem.
REFERENCE MATERIALS

Reference materials (textbooks, handbooks, etc.) should be:

- Publicly available.
- No more than five (5) years old.
TIME TO WRITE!

• Use an ITEA Item Construction form.
  – [www.itea.org](http://www.itea.org) search “Item Writing” for MS Word and PDF forms

• Contact me if you have any questions

James Gaidry, CAE
ITEA Executive Director
jgaidry@itea.org
703-631-6220, x204