# Item Writing Training Manual
# Certification Psychometrics

**PSI Services LLC**
**Psionline.com**

# Introduction

## Purpose of the Manual

The purpose of this manual is to provide supplemental information that supports the item writing training conducted by PSI Cert Psych. The contents within this manual are intended for the creation of multiple-choice items suitable for credentialing exams.

By following the instructions in this manual, item writers of professional associations will increase their proficiency in writing effective items for credentialing examinations. The item examples used in the following instructional sections make use of general knowledge in order to facilitate understanding of the general principles offered throughout this manual. The skills needed for writing quality items are similar across content disciplines.

## Overview of Item Writing

The cornerstone of any credentialing examination is the individual item. Tasks and knowledge required for work or practice should be identified on the basis of a job analysis and are the justification for the content outline used for the examination. All items should be linked directly to the exam content outline.

The multiple-choice item is most frequently used and appropriate for all types of examinations (e.g., credentialing, training assessment, employment, classroom-based, and college entrance). The most commonly used type of test item in certification and licensure (credentialing) examinations is the conventional multiple-choice item with one correct response and three incorrect responses. Although many other alternative item formats exist (e.g., multiple choice multiple response, true-false, 3-option multiple choice, discrete option multiple choice, hot spot, drag-and-drop), their use may not be appropriate for all testing programs.
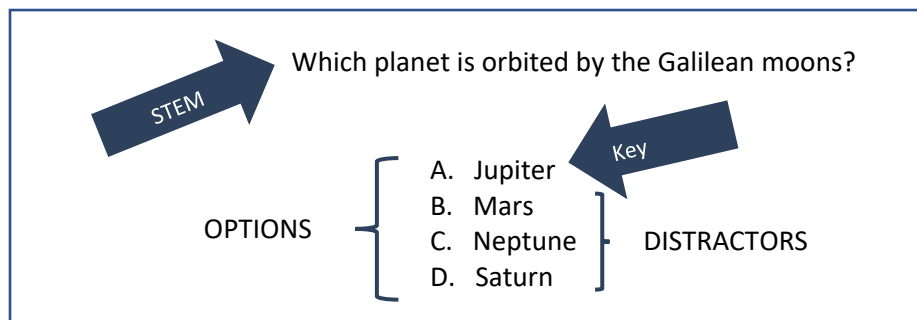
This guide is designed to familiarize item writers with the overall process and the best practices of writing a multiple-choice item that can be used for examinations developed by PSI Services (PSI). It is not a comprehensive discussion of examination development.

# Anatomy of a Multiple-Choice Item

## Item Anatomy

The single-response multiple-choice item type consists of a stem, followed by a series of possible answers or completions, called options. An understanding of the following key terms is important to establish uniformity:

**Item -** An item is a single scorable element of an exam and it encompasses all of the text presented to examinees. In multiple-choice testing, it is customary to speak of test items rather than questions, because items may be presented in formats other than a question and the emphasis is on scoring.

**Stem -** The stem is the portion of an item that issues a prompt – usually in the form of a question, but addition information such as tables or graphics may also be included. The stem of the item should clearly present the central problem or idea.

**Options -** Options are the possible responses to the stem. Options are further delineated as distractors, which are the incorrect response, and the key, which is the one correct response.

Which planet is orbited by the Galilean moons?

STEM

Key

OPTIONS

A. Jupiter
B. Mars
C. Neptune
D. Saturn

DISTRACTORS

## Formats for Stem

The two formats of the stem are as follows. Use whichever format is most clear, concise, and direct.

| Question and Response | Complete the Sentence |
|---|---|
| Which planet is orbited by the Galilean moons? | The orbits of the Galilean moons center on |
| A. Jupiter<br>B. Mars<br>C. Neptune<br>D. Saturn | A. Jupiter.<br>B. Mars.<br>C. Neptune.<br>D. Saturn. |

# Characteristics of Well-Constructed Items

**An item should:**
- be categorized to a section of the Exam Content Outline.
- assess something that is relevant and important to the job.
- describe realistic and practical situations.
- not use language verbatim from a reference.
- include the most current information available.
- avoid jargon and overly conversational language.
- describe individuals in an objective manner.
- avoid terms that may perpetuate stereotypes.
- avoid pronouns and instead use a title or description.
- include word and phrases that are universally-understood.
- include technical terms but avoid regional or cultural terms.

**The stem should:**
- solicit a single response.
- contain all necessary information to answer the question.
- be concise.
- not be negatively-worded.
- not include a clue word that makes the key obvious.

**The options should:**
- answer what is asked in the stem.
- conform grammatically to the stem.
- be realistic and genuine concepts or terms.
- avoid repeating or overlapping content across options.
- be consistent with other options in terms of length and detail.
- not contain "*all of the above*" or "*none of the above*".
- exclude qualifying words or extraneous details.

**The key should:**
- be the only correct answer.
- not be subject to opinion.
- be supported by an authoritative reference.
- represent what is correct in actual practice.

**The distractors should:**
- be defensibly incorrect.
- not be partially correct.
- not be incredibly obvious.
- be plausible to those who don't know the correct answer.
- reflect misconceptions and errors.

# Cognitive Level

Identifying the cognitive level of an item will require consideration of the type of thinking required of a typical examinee responding to the item.

PSI uses either a two-level or three-level classification system to identify the level of thinking required to respond to an item. The models used are based on Bloom's taxonomy[1].

- The two-level system includes: Recall and Application.

- The three-level system includes Recall and further subdivides Application-level items into: Application and Analysis.

The two-level system is typically preferred because the distinctions among levels 2 and 3 are often too granular for accurate and consistent classification. Further, the primary goal in classifying items to cognitive levels is to minimize or control the number of items classified to the first level such that the exam content is not overly rudimentary.

## Level 1 – Recall

Recall items primarily test the recognition or recall of information. Such items require predominantly an effort of memory. They include the recall of specific facts, concepts, principles, processes, procedures, or theories. To simplify, such an item will ordinarily be asking: "What is X?"

### Example:

What is the most populous city in the United States?

    A.    Los Angeles
    B.    Chicago
    C.    Houston
    D.    New York

[1] Bloom, B. S.; Engelhart, M. D.; Furst, E. J.; Hill, W. H.; Krathwohl, D. R. (1956). Taxonomy of educational objectives: The classification of educational goals. Handbook I: Cognitive domain. New York: David McKay Company.

## Level 2 – Application

Application items primarily test the interpretation or evaluation of information. These items require the application of known or presented information to solve or address situations, problems, and scenarios. Items could require examinees to make judgments concerning the effectiveness, appropriateness, or best course of action for a particular situation. Items at this level will ordinarily be asking: "Given the following information about Y, what is X?"

### Example:

Which diagnosis is most appropriate for a 28-year-old individual who exhibits anhedonia, difficulty making decisions, and a recent change in sleeping habits?

A.    Generalized Anxiety Disorder
B.    Major Depressive Disorder
C.    Dissociative Identity Disorder
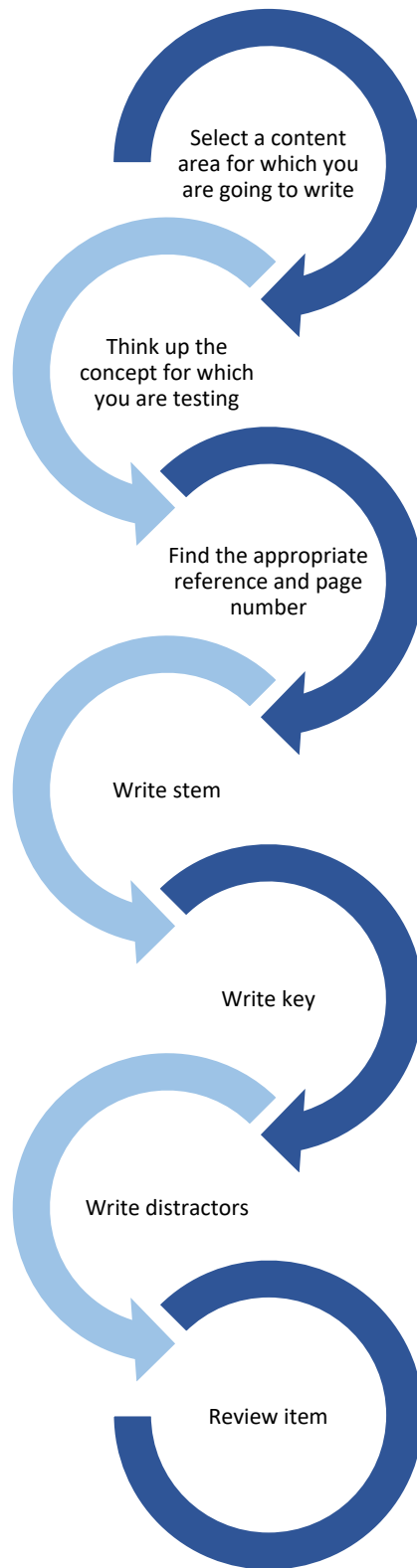D.    Brief Psychotic Disorder

## Level 3 – Analysis

Analysis items primarily test the ability to analyze information. As with application items, these items require the application of known or presented information but with an emphasis on the inter-relationships of multiple sources of data. Items at this level will ordinarily be asking: "Given the following information about Y and what is already known about Z, what is X?"

### Example:

Which color in the spectrum of visible light appears most similar to ionizing radiation when shown on a spectroscope?

A.    Blue
B.    Red
C.    Violet
D.    Yellow

# The Item Writing Process

Select a content area for which you are going to write

Think up the concept for which you are testing

Find the appropriate reference and page number

Write stem

Write key

Write distractors

Review item

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# Examples of Item Writing Pitfalls

**Clue in Stem**

**Two Errors**

Which arithmetic operation is used to divide a cost into several equal parts?
- A. Division (KEY)
- B. Multiplication
- C. Donuts
- D. Calculus

**Throw-away Options**

**Corrected**

Which arithmetic operation is used to determine each individual's equal financial contribution?
- A. Division (KEY)
- B. Multiplication
- C. Derivatives
- D. Subtraction

**Unfocused Stem**

**Two Errors**

Water erosion can
- A. result in flooding.
- B. kill root systems of plants.
- C. occur during heavy rainfall.
- D. result from water flow. (KEY)

**Multiple Correct Options**

**Corrected**

Water erosion can be controlled on steep slopes by
- A. installing retaining walls. (KEY)
- B. trimming of trees.
- C. adding mulch.
- D. Implementing zero tillage.

**Key Is Obvious Due To Length**

**Two Errors**

Why are scrolled strips used to produce circular ends?
- A. Their shape results in minimal waste after the ends are punched (KEY)
- B. Faster
- C. Inexpensive
- D. Easy to cut

**Distractors Don't Answer Question**

**Corrected**

Why are scrolled strips used to produce circular ends?
- A. They can be easily fed into a punching press
- B. They are less expensive than rectangular strips
- C. They are lighter and more resilient than rectangular strips
- D. They are shaped to result in minimal waste (KEY)

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**Two Errors**

A nurse needs to collect information for a patient record. What data must the nurse collect as part of a patient record?
- A. Vital signs and weight (KEY)
- B. Vital signs and activity level
- C. Vital signs and radiographs
- D. Vital signs and appetite level

*Unnecessary Text in Stem*

*Repeated Phrase In Options*

**Corrected**

Which data must a nurse collect as part of a patient record?
- A. Weight (KEY)
- B. Activity level
- C. Radiographs
- D. Appetite level

*Text Designed To Teach*

**Two Errors**

One way to determine a patient's heart rate is to listen with a stethoscope. What is another method that you could use?
- A. Computerized tomography
- B. Air displacement plethysmography
- C. Positron emission tomography
- D. Sonography (KEY)

*Conversational Language*

**Corrected**

Which is an appropriate method to determine a patient's heart rate?
- A. Computerized tomography
- B. Air displacement plethysmography
- C. Positron emission tomography
- D. Sonography (KEY)

*Ambiguous Term*

**Two Errors**

What is the acceptable amount of distance between exercise machines?
- A. Under 5 feet
- B. Between 2 and 4 feet (KEY)
- C. Between 3 and 5 feet
- D. Over 1 foot

*Overlapping Options*

**Corrected**

What is the minimum amount of distance required between exercise machines?
- A. 1 foot
- B. 2 feet (KEY)
- C. 4 feet
- D. 5 feet