



AMERICAN BOARD OF CRIMINALISTICS

*"Professional Competency Certification in Criminalistics"*

# SEIZED DRUG ANALYSIS EXAMINATION

Candidate Study Guide

American Board of Criminalistics

*Updated June 2024*

# American Board of Criminalistics

Seized Drug Analysis Examination

Candidate Study Guide

---

## Table of Contents

Introduction .....	3
Examination Outline .....	4
Science and Math .....	5
Process .....	5
Quality Assurance/Quality Control .....	5
Laboratory .....	6
Communication .....	6
Legal System .....	7
References .....	8
Example Questions .....	9
Example Questions Key .....	13

# American Board of Criminalistics

## Seized Drug Analysis Examination Candidate Study Guide

---

### Introduction

Congratulations on your decision to pursue certification!

This examination was created through the Developing a Curriculum (DACUM) process. Using a panel of Subject Matter Experts (SME), comprised of practitioners from a variety of types of laboratories (e.g., city/county, state, federal, private, etc.) across the country, a job analysis was completed to define the duties and tasks of a Seized Drug Analyst. As a result of this job analysis, the Seized Drug Analyst Job Description (08-1004S) was created for that position. The tasks and duties in the Job Description may include ones that are not performed specifically by your Forensic Science Service Provider but are part of the larger role of a Seized Drug Analyst.

The tasks were then verified by a survey filled out by the greater forensic science community.

The tasks listed in the job description were aligned to Knowledge-Skill (K-S) categories, and these categories were grouped into larger Domains (e.g., Science and Math, Quality Assurance/Quality Control, etc.) to create an Examination Blueprint. This blueprint was subsequently used to determine the number of questions in each of the larger domains.

The examination is structured around the knowledge and skills needed to perform tasks and duties of the job. The study guide was developed using the Job Description and the Examination Blueprint. All K-S categories are represented in the examination. Refer to the Examination Blueprint for a detailed breakdown of the Knowledge/Skills and Tasks used to create this examination.

References listed in this Study Guide were used to write examination questions; however, not all questions were written using these references.

For more information on the development of this examination, please refer to additional examination development documents on the ABC website.

# American Board of Criminalistics

Seized Drug Analysis Examination  
Candidate Study Guide

## Examination Outline

Domain	Knowledge-Skill	% of Exam
<b>Science and Math</b>		<b>23%</b>
	Chemistry	
	Statistics	
	Math	
<b>Process</b>		<b>23%</b>
	Organizational (e.g., time management/multitasking)	
	Critical Thinking (e.g., data interpretation, problem solving)	
<b>Quality Assurance/Quality Control</b>		<b>20%</b>
	Accreditation Standards	
	Quality Control (e.g., SWGDRUG, OSAC/ASTM <sup>1</sup> )	
<b>Laboratory</b>		<b>18%</b>
	Bench Chemistry Procedures	
	Instrumentation	
<b>Communication (e.g. public speaking, report writing)</b>		<b>9%</b>
<b>Legal System (e.g., court procedure, statutes)</b>		<b>7%</b>

# American Board of Criminalistics

## Seized Drug Analysis Examination Candidate Study Guide

---

### Science and Math

The Science and Math domain makes up 23% of the examination. The knowledge and skills needed to succeed in this domain are:

- Chemistry
  - Structural backbones
  - Chemical naming systems
  - General physiological drug classifications
  - Drug origins, physical states, and chemical interactions
- Statistics
  - Statistical sampling methods
  - Gaussian distribution statistics
  - Uncertainty of measurement
  - Basic population statistics
- Math
  - Weights and uncertainty calculations
  - Unit weight conversions
  - Solution preparation
  - Retention time differences

### Process

The Process domain makes up 23% of the examination. The knowledge and skills needed to succeed in this domain are:

- Organizational (e.g., time management/multitasking)
  - Organization of steps in liquid extractions
  - Handling of drug evidence within the laboratory
- Critical Thinking (e.g., data interpretation, problem solving)
  - Interpretation of qualitative GC, MS, FTIR, and FID data
  - Instrumental troubleshooting
  - Test result evaluation and interpretation
  - Chemical isolation of drugs from mixtures

### Quality Assurance/Quality Control

The Quality Assurance/Quality Control domain makes up 20% of the examination. The knowledge and skills needed to succeed in this domain are:

- Accreditation Standards
  - ISO/IEC 17025 standards
  - Accreditation requirements (ANAB or A2LA)
  - Accreditation process
- Quality Control (SWGDRUG, OSAC/ASTM)

# American Board of Criminalistics

## Seized Drug Analysis Examination Candidate Study Guide

---

- SWGDRUG Recommendations and Supplemental Documents
  - Analytical schemes
  - Code of ethics
  - Sampling plans
- ASTM Standards
  - Analytical schemes
  - Analytical techniques
  - Clandestine laboratory recommendations

## Laboratory

The Laboratory domain makes up 18% of the examination. The knowledge and skills needed to succeed in this domain are:

- Bench Chemistry Procedures
  - Color test reactions and preparation
  - Drug solubility
  - Acid/base extractions
  - Wet chemistry techniques
- Instrumentation
  - GC/MS analysis, theory, maintenance, and evaluation
  - FTIR analysis, theory, maintenance, and evaluation
  - GC/FID analysis, theory, maintenance, and evaluation
  - Microscope use, theory, and maintenance
  - Balance use and maintenance

## Communication

The Communication domain and knowledge-skill category makes up 9% of the examination. The knowledge and skills needed to succeed in this domain are:

- Public Speaking
  - Courtroom decorum
  - Proper testimony procedures
- Report Writing
  - SWGDRUG report recommendations
  - ASTM reporting guidelines
  - ISO 17025:2017 reporting requirements
- Effective Forensic Science Communication
  - Chain of custody
  - Ethical guidelines

# American Board of Criminalistics

Seized Drug Analysis Examination

Candidate Study Guide

---

## Legal System

The Legal System domain and knowledge-skill category makes up 7% of the examination. The knowledge and skills needed to succeed in this domain are:

- Court Procedure
  - Rules of evidence
  - Chain of custody
  - Courtroom terms and definitions
- Statutes
  - United States Drug Scheduling
  - Acts related to drug scheduling
- United States Supreme Court Cases
  - Admissibility standard cases
  - Right of Confrontation cases
  - Due process cases

# American Board of Criminalistics

## Seized Drug Analysis Examination Candidate Study Guide

### References

General College Textbooks (or similar)	Edition	Author
<ul style="list-style-type: none"><li>Principles of Instrumental Analysis</li></ul>	7 <sup>th</sup> or higher	Skoog et al.

Forensic Science Books	Edition	Author
<ul style="list-style-type: none"><li>Forensic Chemistry</li></ul>	1 <sup>st</sup> or higher	Bell, S.
<ul style="list-style-type: none"><li>Clarke's Analysis of Drugs and Poisons</li></ul>	2 <sup>nd</sup> or higher	Moffat et al.
<ul style="list-style-type: none"><li>Fundamentals of forensic science</li></ul>	2 <sup>nd</sup> or higher	Houck, M. and Siegel, J.
<ul style="list-style-type: none"><li>The Use of Statistics in Forensic Science</li></ul>	1 <sup>st</sup> or higher	Aitken, C.; Stoney, D.
<ul style="list-style-type: none"><li>Handbook of Forensic Drug Analysis</li></ul>	1st	Smith, F.; Siegel, J.
<ul style="list-style-type: none"><li>Criminalistics: An introduction to forensic science</li></ul>	4 <sup>th</sup> or higher	Saferstein, R.
<ul style="list-style-type: none"><li>Forensic Science Handbook, Volume I</li></ul>	2 <sup>nd</sup>	Saferstein, R.; Hall, A.
<ul style="list-style-type: none"><li>Forensic Science Handbook, Volume II</li></ul>	2 <sup>nd</sup>	Saferstein, R.
<ul style="list-style-type: none"><li>Forensic Science Handbook, Volume III</li></ul>	2 <sup>nd</sup>	Saferstein, R.

Guidance/Standards Documents	Edition	Author
<ul style="list-style-type: none"><li>Rules of Professional Conduct</li></ul>		ABC
<ul style="list-style-type: none"><li>SWGDRUG Guidelines</li></ul>	7 <sup>th</sup>	SWGDRUG
<ul style="list-style-type: none"><li>SWDRUG Supplemental Documents</li></ul>		
<ul style="list-style-type: none"><li>ANSI/ASTM Published Seized Drug Standards</li></ul>		ANSI/ASTM
<ul style="list-style-type: none"><li>United States Supreme Court Rulings</li></ul>		U.S. Supreme Court
<ul style="list-style-type: none"><li>ISO/IEC 17020: Conformity assessment: Requirements for the operation of various types of bodies performing inspection</li></ul>	2012	ISO/IEC
<ul style="list-style-type: none"><li>ISO/IEC 17025: General requirements for the competence of testing and calibration laboratories</li></ul>	2017	ISO/IEC
<ul style="list-style-type: none"><li>Relevant Accreditation Requirements</li></ul>		
NOTE: <b>either</b> of the below listed documents is sufficient; candidates do not need to review both		
<ul style="list-style-type: none"><li><ul style="list-style-type: none"><li>AR 3125 ISO/IEC 17025:2017 Forensic Science Testing &amp; Calibration Laboratories Accreditation Requirements</li></ul></li></ul>	2019	ANAB
<ul style="list-style-type: none"><li><ul style="list-style-type: none"><li>R221 – Specific Requirements – Forensic Examination Accreditation Program - Testing</li></ul></li></ul>	2020	A2LA



# American Board of Criminalistics

## Seized Drug Analysis Examination Candidate Study Guide

---

### Example Questions

Below are 10 questions that represent the structure of questions on the examination. The primary Knowledge-Skill (K-S) Category and Associated Job Task(s) are also included. Refer to the Introduction for additional information regarding K-S and Job Tasks.

#### **Knowledge-Skill: 6.2 – Bench Chemistry Procedures**

##### **Job Task: A3 – Prepare screening test reagents**

1. What is a color test reagent consisting of a mixture of aqueous ammonium vanadate and sulfuric acid?
  - A. Marquis
  - B. Mandelin's
  - C. Froede's
  - D. Mecke's

#### **Knowledge-Skill: 1.5 – Statistics**

##### **Job Tasks: B10 – Document sample quantity & I1 – Maintain uncertainty budgets**

2. The uncertainty of a drug weight has been determined to be 0.012 g with a 95% confidence level. What is the approximate uncertainty for a 99% confidence level?
  - A. 0.020 g
  - B. 0.018 g
  - C. 0.006 g
  - D. 0.024 g

#### **Knowledge-Skill: 2.1 – Accreditation Standards**

##### **Job Tasks: I6 – Perform laboratory audits, I5 – Participate in laboratory audits, & J3 – Perform validation studies**

3. AR 3125 requires that method validation shall do all the following EXCEPT:
  - A. establish the criteria for reporting a result.
  - B. be conducted according to a plan.
  - C. include all analysts.
  - D. identify limitations of the method.

# American Board of Criminalistics

## Seized Drug Analysis Examination Candidate Study Guide

---

### Knowledge-Skill: 6.3 – Instrumentation

#### Job Tasks: C6 – Perform qualitative FTIR analysis & C7 – Evaluate qualitative FTIR data

4. A transmission-IR spectrum will differ from an ATR-IR spectrum of cocaine in that the ATR spectrum will have:
- A. greater relative intensities for lower frequency absorptions.
  - B. similar intensities across all frequencies.
  - C. greater relative intensities for higher frequency absorptions.
  - D. greater intensities across all frequencies.

### Knowledge-Skill: 2.3 – Quality Control (e.g. SWGDRUG, OSAC/ASTM)

#### Job Task: B11 – Implement sampling plan & C1 – Select qualitative instrumental analysis

5. What is an example of a quality assurance measure for seized drug analysis recommended by ASTM E2329?
- A. analysis with at least two different solvents
  - B. analysis with at least one quantitation
  - C. analysis of a single portion at least twice
  - D. analysis of at least two separate portions

### Knowledge-Skill: 1.6 – Math

#### Job Task: B10 – Document sample quantity (e.g., weight, volume, count)

6. An analyst received 100 stamped bags containing heroin. The total gross weight is 45.20 g and the weight of one stamped bag is 0.05 g. Calculate the total estimated net weight of the population.
- A. 45.00 g
  - B. 38.00 g
  - C. 40.20 g
  - D. 47.00 g

# American Board of Criminalistics

Seized Drug Analysis Examination  
Candidate Study Guide

---

## **Knowledge-Skill: 4.1 – Communication (e.g., public speaking, report writing)**

### **Job Task: G2 – Provide judicial seized drug expert testimony**

7. During testimony, which of the following is LEAST helpful for explaining the use of an analytical technique in a case?
- A. describing the process of using a technique one step at a time
  - B. using analogies to simplify concepts
  - C. providing a brief description after first mentioning the term
  - D. using primarily technical language

## **Knowledge-Skill: 8.1 – Legal system (e.g., court procedure, statutes)**

### **Job Task: H7 – Review judicial rulings & G2 – Provide judicial seized drug expert testimony**

8. Which United States Supreme Court case held that a report containing the results of forensic analysis is considered "testimonial", rendering its author subject to the defendant's right of confrontation under the Sixth Amendment?
- A. *Giglio v. United States*
  - B. *Frye v. United States*
  - C. *Escobar v. Texas*
  - D. *Melendez-Diaz v. Massachusetts*

## **Knowledge-Skill: 5.1 – Organizational (e.g., time management, multitasking)**

### **Job Task: C2 – Prepare samples for qualitative GC/MS analysis**

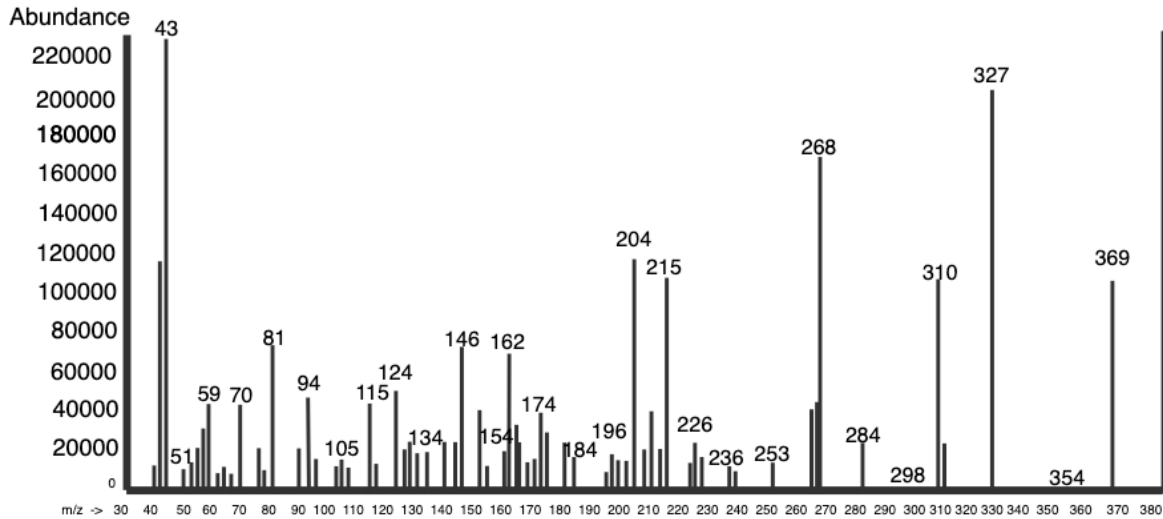
9. Which of these extraction procedures would allow for the identification of both psilocin and psilocybin in GC/MS analysis with the least interference from sugars?
- A. Grind dry mushroom material with methanol, filter particulates, add acetone and filter, and then add derivatizing agents.
  - B. Grind dry mushroom material with water, filter particulates, extract into chloroform, and then add derivatizing agents.
  - C. Grind dry mushroom material with acetone, filter particulates, add methanol and filter, and then add derivatizing agents.
  - D. Grind dry mushroom material with methanol while heating, filter particulates, add acetone and filter, and then add derivatizing agents.

# American Board of Criminalistics

Seized Drug Analysis Examination  
Candidate Study Guide

**Knowledge-Skill: 5.2 – Critical thinking (e.g., data interpretation, problem solving) & 1.2 – Chemistry**

**Job Task: C4 – Evaluate qualitative GC/MS Data**



10. What substance is displayed in the above mass spectrum?

- A. codeine
- B. heroin
- C. 6-monoacetylmorphine
- D. morphine

# American Board of Criminalistics

Seized Drug Analysis Examination  
Candidate Study Guide

---

## Example Questions Key

1. B
2. B
3. C
4. A
5. D
6. C
7. D
8. D
9. A
10. B

<sup>1</sup>ASTM E-30 is a member organization of the ABC. Any test questions derived from ASTM E-30 standards were developed by the ABC without the influence of the ASTM E-30 Executive Board or its membership.