

HISTOTECHNICIAN, HT(ASCP) and HISTOTECHNOLOGIST, HTL(ASCP) EXAMINATION CONTENT GUIDELINE

This document should serve as a useful guide for examination preparation. The Board of Certification criterion-referenced examinations are constructed to measure the competencies described in the Certification Levels Definitions. These competency statements are specified into task definitions, linked to each of the content outlines, and measured by the test items.

It should be noted that, for the technician the Certification Levels Definitions refer to skills and abilities expected at career entry, not those that may be acquired with subsequent experience. Certification Levels are hierarchical and it is assumed that the technologist level encompasses knowledge and skills of the preceding technician level.

TECHNICIAN LEVEL

Knowledge

The technician has a working comprehension of the technical and procedural aspects of laboratory tests. The technician maintains awareness and complies with safety procedures and ethical standards of practice. The technician correlates laboratory tests to disease processes and understands basic physiology recognizing appropriate test selection and abnormal test results.

Technical Skills

- *Follows established procedures for collecting and processing biological specimens for analysis.*

The technician comprehends and follows procedural guidelines to perform laboratory tests including (1) specimen collection and processing; (2) instrument operation and troubleshooting; (3) result reporting and record documentation; (4) quality control monitoring; (5) computer applications and (6) safety requirements.

Problem Solving and Decision Making

- *Recognizes unexpected results and instrument malfunction and takes appropriate action.*

The technician recognizes the existence of procedural and technical problems and takes corrective action according to predetermined criteria or refers the problem to the appropriate supervisor. The technician prioritizes test requests to maintain standard patient care and maximal efficiency.

Communication

- *Provides laboratory information to authorized sources.*

The technician communicates specimen requirements, reference ranges, and test results, and prepares drafts of procedures for laboratory tests according to a standard format.

Teaching and Training Responsibilities

- *Demonstrates laboratory technical skills to other laboratory personnel.*

The technician trains new technicians and students and maintains technical competence.

TECHNOLOGIST LEVEL

Knowledge

The technologist has an understanding of the underlying scientific principles of laboratory testing as well as the technical, procedural, and problem solving aspects. The technologist has a general comprehension of the many factors that affect health and disease, and recognizes the importance of proper test selection, the numerous causes of discrepant test results (patient and laboratory), deviations of test results, and ethics including result confidentiality. The technologist correlates abnormal laboratory data with pathologic states, determines validity of test results, and need for additional tests. The technologist understands and enforces safety regulations, uses statistical methods and applies business and economic data in decision making. The technologist has an appreciation of the roles and interrelationships of paramedical and other health related fields and follows the ethical code of conduct for the profession.

Technical Skills

- *Participates in the evaluation of new techniques and procedures in the laboratory.*

The technologist is capable of performing and interpreting standard, complex, and specialized tests. The technologist has an understanding of quality assurance sufficient to implement and monitor quality control programs. The technologist is able to participate in the introduction, investigation and implementation of new procedures and in the evaluation of new instruments. The technologist evaluates computer-generated data and troubleshoots problems. The technologist understands and uses troubleshooting, validation, statistical, computer, and preventative maintenance techniques to insure proper laboratory operation.

Problem solving and Analytical Decision Making

- *Evaluates and solves problems related to collection and processing of biological specimens for analysis.*
- *Differentiates and resolves technical, instrument, physiologic causes of problems or unexpected test results.*

The technologist has the ability to exercise initiative and independent judgment in dealing with the broad scope of procedural and technical problems. The technologist is able to participate in, and may be delegated, the responsibility for decisions involving: quality control/quality assurance programs, instrument and methodology selection, preventive maintenance, safety procedures, reagent purchases, test selection/utilization, research procedures, and computer/statistical data.

Communication

- *Provides administrative and technical consulting services on laboratory testing.*

The technologist communicates technical information such as answering inquiries regarding test results, methodology, test specificity and sensitivity and specific factors that can influence test results to other health professionals and consumers. The technologist develops acceptable criteria, laboratory manuals, reports, guidelines, and research protocols.

Teaching and Training Responsibilities

- *Incorporates principles of educational methodology in the instruction of laboratory personnel, other health care professionals and consumers.*

The technologist provides instruction in theory, technical skills, safety protocols, and application of laboratory test procedures. The technologist provides continuing education for laboratory personnel and maintains technical competence. The technologist may participate in the evaluation of the effectiveness of educational programs.

Supervision and Management

- *Gives direction and guidance to technical support personnel.*

The technologist has an understanding of management theory, economic impact and management functions. The technologist participates in and takes responsibility for establishing technical and administrative procedures, quality control, quality assurance, standards of practice, safety and waste management procedures, information management and cost effective measures. The technologist supervises laboratory personnel.

THE EXAMINATION MODEL

The Board of Certification criterion-referenced examination model consists of three interrelated components:

COMPETENCY STATEMENTS describe the entry-level skills and tasks performed and measured on the examination.

CONTENT OUTLINE delineates general categories or subtest areas of the examination.

TAXONOMY levels describe the cognitive skills required to answer the question.

Level 1 – Recall: Ability to recall or recognize previously learned (memorized) knowledge ranging from specific facts to complete theories.

Level 2 – Interpretive Skills: Ability to utilize recalled knowledge to interpret or apply verbal, numeric, or visual data.

Level 3 – Problem Solving: Ability to utilize recalled knowledge and the interpretation/application of distinct criteria to resolve a problem or situation and/or make an appropriate decision.

EXAMINATION REPORTING MECHANISMS

After the examination has been administered and scored, a report is sent to the examinee. The Examinee Performance Report provides the scaled score on the total examination and pass/fail status for all candidates.

In addition, failing candidates receive scaled scores for each subtest. This information may help the examinee identify areas of strengths and weaknesses in order to develop a study plan for future examinations. A total score of 400 is required to pass the examination. The subtest percentages for the HT and HTL examinations are listed below.

SUBTESTS	HT and HTL
Fixation	10-25%
Processing/Embedding	10-14%
Microtomy	10-14%
Staining	40-50%
Laboratory Operations	10-15%

COMPETENCY STATEMENTS
HISTOTECHNICIAN

With regard to Laboratory Operations and the performance of basic, existing laboratory procedures involving Fixation, Processing/Embedding, Microtomy and Staining at career entry, the Histotechnician:

DEFINES OR IDENTIFIES PRINCIPLES OF

- methods
- terminology
- reactions and results
- sources of error
- anatomy, histology, physiology, biochemistry and pathology
- standard operating procedures of methods and instrumentation

SELECTS OR PREPARES APPROPRIATE

- methods
- procedural courses of action
- reagents
- instruments
- controls

CALCULATES RESULTS

CORRELATES REACTIONS OR RESULTS OF BASIC AND SPECIAL METHODS

- with histology to assess procedures

EVALUATES REACTIONS, RESULTS, METHODS TO

- verify results
 - check for common problems
 - check for potential sources of error
 - take predetermined corrective action
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COMPETENCY STATEMENTS
HISTOTECHNOLOGIST

With regard to Laboratory Operations and the performance of basic and special laboratory procedures involving Fixation, Processing/Embedding, Microtomy and Staining at career entry, the Histotechnologist:

DEFINES OR IDENTIFIES PRINCIPLES OF

- methods
- terminology
- reactions and results
- sources of error
- anatomy, histology, physiology, biochemistry and pathology
- standard operating procedures of methods and instrumentation
- management and education

SELECTS OR PREPARES APPROPRIATE

- methods
- procedural courses of action
- reagents
- instruments
- controls

CALCULATES RESULTS

CORRELATES REACTIONS OR RESULTS OF BASIC AND SPECIAL METHODS

- with anatomy, histology, physiology, biochemistry, or pathology to assess procedures

EVALUATES REACTIONS, RESULTS, METHODS TO

- assist in ascertaining disease states
- check for common and unusual problems
- take corrective action
- verify quality control
- assess validity
- assure laboratory safety
- check for potential sources of error

CONTENT OUTLINE

HISTOTECHNICIAN, HT (ASCP) and HISTOTECHNOLOGIST, HTL (ASCP)

Refer to the HT and HTL Competency Statements for the competencies tested in each subtest.

- I. **FIXATION (10-25%)**
 - A. **Tissues**
 1. Morphology/anatomy
 2. Cell/component preservation
 3. Pathology*
 4. Biochemistry principles/theories*
 - B. **Procedures**
 1. Light microscopy
 2. Electron microscopy
 3. Special stains
 4. Frozen sections/tissues
 5. Enzyme histochemistry
 6. Immunohistochemistry
 7. Artifacts/precipitates/pigments
 8. Quality control
 9. Cytologic specimens
 - C. **Parameters**
 1. Size of specimen
 2. Volume of specimen/fixative
 3. Time of fixation
 4. Temperature of specimen/fixative
 5. Other
 - D. **Reagents**
 1. Types/components
 2. Properties/functions/actions
 3. Quality control
 4. Chemistry principles/theories*
 - E. **Instrumentation** (e.g., microwave)
 1. Components
 2. Use
 3. Maintenance
 4. Troubleshooting
 5. Quality control
- II. **PROCESSING/EMBEDDING (10-14%)**
 - A. **Tissues**
 1. Morphology/anatomy
 2. Cell/component preservation
 - B. **Procedures**
 1. Light microscopy
 2. Frozen sections/tissues
 3. Enzyme histochemistry
 4. Calcified/decalcified tissue
 5. Immunohistochemistry
 6. Quality control
 7. Cytologic specimens
 - C. **Instrumentation**
 1. Components
 2. Use
 3. Maintenance
 4. Troubleshooting
 5. Quality control
 - D. **Reagents**
 1. Types/components
 2. Properties/function/action
 3. Quality control
 4. Chemistry principles/theories*
- III. **MICROTOMY (10-14%)**
 - A. **Tissues**
 1. Morphology/anatomy
 2. Cell/component demonstration
 - B. **Procedures**
 1. Paraffin
 2. Frozen section
 3. Agar/gelatin
 4. Quality control
 5. Plastic/resin*
 - C. **Instrumentation**
 1. Components
 2. Use
 3. Maintenance
 4. Troubleshooting
 5. Quality control

IV. STAINING (40-50%)

A. Tissues

1. Morphology/anatomy
2. Cell/component demonstration
3. Function
4. Pathology*
5. Biochemistry principles/theories*

B. Procedures

1. Nucleus/cytoplasm (e.g., H&E)
2. Bone marrow
3. Carbohydrates
4. Connective/supporting tissue
5. Lipids
6. Microorganisms
7. Nerve
8. Pigments/minerals/granules
9. Tissues/cells/components
(e.g., fibrin, mast cells)
10. Enzymes*
11. Immunohistochemistry
(e.g., basic staining theory, retrieval techniques, selection of controls*, antibody preparation*)
12. Quality Control
13. Cytological stains
(e.g., Papanicolaou)

C. Instrumentation

1. Components
2. Use
3. Maintenance
4. Troubleshooting
5. Quality control

D. Reagents/Dyes

1. Types/components
2. Properties/functions/actions
3. Quality control
4. Chemistry principles/theories*

E. Mounting Procedures

1. Media
2. Coverslip
3. Refractive index*

V. LABORATORY OPERATIONS (10-15%)

A. Safety

1. Storage
2. Disposal
3. Hazards
4. Regulations
5. Procedures
6. Quality control

B. Laboratory Mathematics

1. Metric system
2. Percent solutions/dilutions
3. Molar solutions

C. Ancillary Equipment/Instruments

(e.g., microwave, computers, pH meter, solvent recovery)

1. Components
2. Use
3. Maintenance
4. Troubleshooting
5. Quality control

D. Management*

1. Theories*
2. Procedures*

E. Education*

1. Theories*
2. Procedures*

F. Regulations*

1. Federal government*
2. Accrediting agencies*

*HTL Examination Only

All Board of Certification examinations use conventional units for results and references ranges.

END OF CONTENT GUIDELINE

HT/HTL Summary of Stains for ASCP Computer Examinations

Based on the results of a recent survey, the HT and HTL examinations have been updated to reflect current practices. The following list is not all-inclusive, but contains the majority of the stains that may be included on the computer examination.

STAINS

Acid Fast Bacilli - Carbol Fuchsin (Kinyoun, ZN, Fite)
Alcian Blue/AB/PAS
Aldehyde Fuchsin
Auramine - Rhodamine
Bielschowsky
Colloidal Iron
Congo Red
Crystal Violet
Diff Quik™
Giemsa
Gram Stain
Grocott/Gomori Methenamine Silver (GMS)
Fontana Masson (Melanin)
 Melanin Bleach
Hall/Fouchet Blue
Hematoxylin/Eosin (H&E)
Immunohistochemical Stains*
Iron-Prussian Blue
Leder
Luxol Fast Blue (LFB/Cresyl Echt Violet)
Mucicarmine
Oil Red O
Papanicolaou
PAS-Digestion (PASD)
PAS- Hematoxylin (PASH)
Periodic Acid Methenamine Silver (PAM)
Periodic Acid Schiff (PAS)
Phosphotungstic Acid Hematoxylin (PTAH)
Reticulin/Reticulum
Spirochete (Steiner, Warthin-Starry)
Toluidine Blue
Trichrome (Gomori/Masson)
Verhoeff Van Gieson (VVG)
Von Kossa
Wright Stain

* In addition, the HT examination will now include questions about basic immunology principles, including antigen retrieval and immunohistochemistry staining theory. The HTL examination will continue to include questions about immunohistochemistry quality control, along with more detailed questions about principles, antigen retrieval and immunostaining procedures.