Examination Model

The American Society for Clinical Pathology Board of Certification (ASCP BOC) HT and HTL certification examinations are composed of 100 questions given in a 2-hour 30-minute time frame. All examination questions are multiple-choice with one best answer. The examinations are administered using the format of computer adaptive testing (CAT). More information is available on the ASCP BOC website.

The examination questions may be both theoretical and/or procedural. Theoretical questions measure skills necessary to apply knowledge, calculate results, and correlate reactions/patient results to histology. Procedural questions measure skills necessary to select/perform appropriate laboratory methods and follow quality assurance protocols.

Examination Content Areas

The examination questions encompass the following content areas within histotechnology. Each of these content areas comprises a specific percentage of the overall 100-question examination.

Content Area	Examination Percentage
Fixation	**15 – 25%**
Processing	**10 – 20%**
Embedding/Microtomy	**15 – 25%**
Staining	**30 – 40%**
Laboratory Operations	**10 – 15%**

For a more detailed overview of the HT and HTL examinations, refer to the content outline starting on page 2.

Examination Content Outline

- Regulatory questions on the examination are based on U.S. sources (e.g., AABB, FDA, CLIA, etc.).
- The examples provided in this content outline (as indicated by e.g.,) are not limited to those listed.

I. Fixation

15 – 25% of total examination

A. Tissues

1. Morphology/anatomy
2. Cell/component preservation
3. Proper cell/component demonstration
4. Pathology
5. Biochemistry principles/theories

B. Procedures

1. Light microscopy
2. Electron microscopy
3. Special stains
4. Frozen sections/tissues
5. Enzyme histochemistry
6. Immunofluorescence
7. Immunohistochemistry
8. Artifacts/precipitates/pigments
9. Quality control
10. Cytologic specimens
11. *In situ* hybridization (e.g., FISH, CISH)

C. Parameters

1. Size of specimen
2. Volume of specimen/fixative
3. Time of fixation
4. Temperature of specimen/fixative
5. Other (e.g., pH)

D. Reagents (refer to list on page 5)

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

E. Instrumentation (e.g., microwave)

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

II. Processing

10 – 20% of total examination

A. Tissues

1. Morphology/anatomy
2. Cell/component preservation

B. Procedures

1. Light microscopy
2. Frozen sections/tissues
3. Enzyme histochemistry
4. Decalcification
5. Immunohistochemistry
6. Immunofluorescence
7. Quality control
8. Cytologic specimens (e.g., cell blocks, touch preps)
9. *In situ* hybridization (e.g., FISH, CISH)
10. Special stains

C. Instrumentation (e.g., conventional tissue processor, microwave)

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

D. Reagents

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

III. Embedding/Microtomy

15 – 25% of total examination

A. Tissues

1. Morphology/anatomy
2. Cell/component demonstration

B. Procedures

1. Paraffin
2. Frozen section

3. Gelatin/adhesive
4. Quality control
5. Preparation for molecular testing (e.g., RNAase-free area, scrolls) **(HTL ONLY)**

C. Instrumentation (e.g., embedding center, microtome, flotation bath, paraffin dispenser, slide drying oven, cryostat)

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

IV. Staining

30 – 40% of total examination

A. Tissues

1. Morphology/anatomy
2. Cell/component demonstration
3. Pathology
4. 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. Enzyme histochemistry **(HTL ONLY)**
11. Immunohistochemistry/ immunofluorescense
    a. Terminology/definitions
    b. Staining theory **(HTL ONLY)**
    c. Antigen retrieval techniques **(HTL ONLY)**
    d. Selection of controls **(HTL ONLY)**
    e. Antibody preparation **(HTL ONLY)**
    f. Detection theory **(HTL ONLY)**
12. Quality control
13. Cytologic stains (e.g., Papanicolaou)
14. *In situ* hybridization (e.g., FISH, CISH) **(HTL ONLY)**

C. Instrumentation (e.g., automated stainer, microwave)

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

D. Reagents/Dyes (refer to list on pages 5-6)

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

E. Mounting Procedures

1. Media preparation and selection
2. Coverslipping (e.g., manual, automated)
3. Refractive index **(HTL ONLY)**

V. Laboratory Operations

10 – 15% of total examination

A. Laboratory Safety Regulations (e.g., OSHA, NFPA)

1. Chemical safety practices
    a. Safety data sheet (SDS)
    b. Labeling, storage, and disposal
    c. Spill response
    d. Health hazards
    e. Personal protective equipment (PPE)
    f. Eyewash stations and showers
    g. Exposure monitoring (e.g., xylene, formaldehyde, TWA, STEL, PEL)
2. Fire safety practices (e.g., response protocol, classes of fire, fire safety equipment)
3. Ergonomics
4. Infection control
    a. Transmission
    b. Standard Precautions
    c. Signs and labels
    d. Disinfection and decontamination
    e. Hand hygiene

B. Laboratory Mathematics
1. Unit conversions
2. Percent solutions/dilutions
3. Molar solutions

C. Ancillary Equipment/Instruments (e.g., microscope, computer, pH meter, whole slide imager, pipette, balance, reagent recycler)
1. Components
2. Use
3. Maintenance
4. Troubleshooting
5. Quality control

D. Basic Management Principles (e.g., hiring, discipline, job descriptions, evaluations, scheduling) (HTL ONLY)
1. Theories
2. Procedures

E. Basic Education Principles (e.g., learning objectives, teaching methods, performance evaluations) (HTL ONLY)
1. Theories
2. Procedures

F. Laboratory Regulations (e.g., CLIA, OSHA, TJC, CAP, CLSI, FDA)
1. Quality assurance
2. Validation and/or development of new tests, control tissue, and instrumentation
3. Proficiency testing and competency assessment
4. Patient confidentiality (HIPAA)
5. Inventory maintenance and ordering
6. Policy/procedure writing, review, and revision

Summary of Fixatives/Transport Media

The following list is not all-inclusive but does contain most fixatives and transport media that may be encountered on the HT and HTL examinations:

- Acetone
- Alcohol
- Bouin
- Carnoy
- Formalin (10% NBF, alcoholic formalin, zinc formalin)
- Glutaraldehyde
- Michel medium
- Zamboni

Summary of Stains

The following list is not all-inclusive but does contain most stains that may be encountered on the HT and HTL examinations:

- Alcian blue
- Alcian blue-PAS
- Alcian yellow
- Bielschowsky
- Bile stain (Hall)
- Carbol-fuchsin (Kinyoun, Ziehl-Neelsen, Fite, auramine-rhodamine)
- Colloidal iron
- Congo red
- Crystal violet
- Enzyme histochemistry***** (ATPase, cytochrome oxidase, succinic dehydrogenase, NADH, esterase, acid phosphatase)

  *******The HT and HTL examinations both include questions about fixation and processing for enzyme histochemistry. Staining questions on enzyme histochemistry are included on the HTL examination only.*
- Fontana-Masson
- Giemsa
- Gram
- Grocott/Gomori methenamine-silver (GMS)
- Melanin bleach
- Hematoxylin & eosin (H&E)

- Immunohistochemical stains**

  ***The HT examination includes immunohistochemical questions about basic language terminology definitions, fixation, and processing. The HTL examination includes immunohistochemical questions on all these topics in addition to staining principles, control selection, antigen retrieval, and detection theory.*
- Immunofluorescence
- *In situ* hybridization (FISH, CISH)*

  **The HT and HTL examinations both include questions about fixation and processing for in situ hybridization. Staining questions on in situ hybridization are included on the HTL examination only.*
- Luxol fast blue (LFB/cresyl echt violet)
- Movat pentachrome
- Mucicarmine
- Oil red O
- Papanicolaou
- PAS-digestion (PASD)
- PAS-hematoxylin (PASH)
- Periodic acid-methenamine silver (PAMS) / Jones
- Periodic acid-Schiff (PAS)
- Prussian blue (iron)
- Reticulin/reticulum
- Rhodanine
- Romanowsky
- Spirochete (Steiner, Warthin-Starry)
- Toluidine blue
- Trichrome (Gomori, Masson)
- Verhoeff-van Gieson (VVG)
- von Kossa

END OF CONTENT GUIDELINE