

TECHNOLOGIST AND INTERNATIONAL TECHNOLOGIST IN MICROBIOLOGY, M(ASCP) AND M(ASCPⁱ) SPECIALIST AND INTERNATIONAL SPECIALIST IN MICROBIOLOGY, SM(ASCP) AND SM(ASCPⁱ) EXAMINATION CONTENT GUIDELINE

EXAMINATION MODEL

The M(ASCP), M(ASCPⁱ), SM(ASCP), and SM(ASCPⁱ) certification examinations are composed of 100 examination questions given in a 2 hour 30 minute time frame. All examination questions are multiple-choice with one best answer. The certification examinations are administered using the format of computer adaptive testing (CAT).

With CAT, when a person answers a question correctly, the next test question has a slightly higher level of difficulty. The difficulty level of the questions presented to the examinee continues to increase until a question is answered incorrectly. Then a slightly easier question is presented. In this way, the test is tailored to the individual's ability level.

Each question in the test bank is calibrated for level of difficulty and is assigned a content area that matches with the subtest area of the content outline for a particular examination. The weight (value) given to each question is determined by the level of difficulty. Therefore, the examinee must answer enough difficult questions to achieve a score above the pass point in order to successfully pass the certification examination.

EXAMINATION SUBTESTS

The M(ASCP), M(ASCPⁱ), SM(ASCP), and SM(ASCPⁱ) certification examination questions encompass five different subtests within the area of Microbiology: Bacteria, Fungi, Parasites, Mycobacteria, Viruses and Other Organisms and Laboratory Operations. Each of these subtests comprises a specific percentage of the overall 100-question certification examination. The subtests for the M and SM examination are described in the following table:

| SUBTEST | DESCRIPTION | EXAM PERCENTAGES |
|---|---|---|
| BACTERIA (BACT) | Specimen preparation/processing, bacterial organism morphology, ID procedures, growth requirements, clinical infections, epidemiology, prevention and reporting | M: 35 – 40% SM: 30 – 35% |
| FUNGI AND ACTINOMYCETES (FUNG) | Specimen preparation/processing, fungal organism morphology, ID procedures, growth requirements, clinical infections, epidemiology, prevention and reporting | M & SM: 10 – 15% |
| PARASITES (PARA) | Specimen preparation/processing, parasitic organism morphology, ID procedures, growth requirements, clinical infections, epidemiology, prevention and reporting | M & SM: 10 – 15% |
| MYCOBACTERIA, VIRUSES AND OTHER ORGANISMS (OM) | Specimen preparation/processing, mycobacterial/viral organism morphology, ID procedures, growth requirements, clinical infections, epidemiology, prevention and reporting | M & SM: 10 – 15% |
| LABORATORY OPERATIONS (LO) | Media/Reagents/Stains, Instrumentation, Quality Assurance/Quality Control, Analytical Techniques, Safety, Infection Control, Management | M: 15 – 20% SM: 20 – 25% |

For a more specific overview of the five subtest areas on the M(ASCP), M(ASCPⁱ), SM(ASCP), and SM(ASCPⁱ) certification examinations, please refer to the **CONTENT OUTLINE** on pages 2 – 5.

TECHNOLOGIST AND INTERNATIONAL TECHNOLOGIST IN MICROBIOLOGY, M(ASCP) AND M(ASCPⁱ) SPECIALIST AND INTERNATIONAL SPECIALIST IN MICROBIOLOGY, SM(ASCP) AND SM(ASCPⁱ) EXAMINATION CONTENT OUTLINE

IMPORTANT: Examination questions, which are related to the subtest areas outlined below, may be both theoretical and procedural. Theoretical questions measure skills necessary to apply knowledge, calculate results, and correlate patient results to disease states. Procedural questions measure skills necessary to perform laboratory techniques, evaluate laboratory data, and follow quality assurance protocols. **Methodologies include biochemical, immunologic, serologic, and molecular testing required for identification and detection of microorganisms and antimicrobial susceptibility testing.**

I. BACTERIA (Including Aerobes and Anaerobes)

(M: 35 – 40% ; SM: 30 – 35%)

A. Specimen Preparation

1. Source
2. Collection
3. Storage and transport
4. Acceptability

B. Specimen Processing

1. Direct examination
 - a. Microscopic examination
 - 1) stained
 - 2) unstained (e.g. wet prep)
 - 3) concentration methods (e.g. centrifugation)
 - b. Non-microscopic examination
 - 1) antigen/antibody detection
 - 2) toxin detection
 - 3) molecular techniques
 - 4) other
2. Culture/isolation
 - a. Media
 - b. Techniques
 - c. Incubation
 - 1) atmosphere
 - 2) duration
 - 3) temperature
3. Antimicrobial susceptibility testing (including resistance mechanism detection)
 - 1) technique/principles
 - 2) pharmacology/mode of action
 - 3) results

C. Organisms

1. Morphology

- a. Microscopic
 - b. Macroscopic
2. Identification procedures
 - a. Stains
 - b. Biochemicals
 - c. Immunologic/serologic tests
 - d. Growth inhibition
 - e. Molecular techniques
 - f. Other (e.g. chromogenic agar, intrinsic resistance patterns, MALDI-TOF)
 3. Growth requirements

D. Clinical Information

1. Infection
 - a. Etiology
 - b. Pathology/pathogenesis
 - c. Detection
 - d. Transmission
 - e. Immunologic/serologic characteristics
2. Epidemiology
3. Prevention
4. Reporting

II. FUNGI & ACTINOMYCETES (Including Yeast, Molds, Dimorphic Fungi, Dematiaceous Fungi, Dermatophytes, Actinomycetes)

(M: 10 – 15% ; SM: 10 –15%)

A. Specimen Preparation

1. Source
2. Collection
3. Storage and transport
4. Acceptability

B. Specimen Processing

1. Direct examination
 - a. Microscopic examination
 - 1) stained
 - 2) unstained
 - 3) concentration methods (e.g. centrifugation)
 - b. Non-microscopic examination
 - 1) antigen/antibody detection
 - 2) molecular techniques*
 - 3) other
 2. Culture/isolation
 - a. Media
 - b. Techniques
 - c. Incubation
 - 1) atmosphere
 - 2) duration
 - 3) temperature
- C. Organisms**
1. Morphology
 - a. Microscopic
 - b. Macroscopic
 2. Identification procedures
 - a. Stains
 - b. Biochemicals
 - c. Immunologic/serologic tests*
 - d. Growth inhibition
 - e. Molecular techniques*
 - f. Other (e.g. chromogenic agar, intrinsic resistance patterns)
 3. Growth requirements
- D. Clinical Information**
1. Infection
 - a. Etiology
 - b. Pathology/pathogenesis
 - c. Detection
 - d. Transmission
 - e. Immunologic/serologic characteristics
 2. Epidemiology
 3. Prevention
 4. Reporting

III. PARASITES (Including Protozoa-Intestinal, Atrial, Tissue, Blood; Helminths-Intestinal, Tissue, Blood; Arthropoda)
(M: 10 – 15% ; SM: 10 – 15%)

A. Specimen Preparation

1. Source
2. Collection
3. Storage and transport
4. Acceptability

B. Specimen Processing

1. Direct examination
 - a. Microscopic examination
 - 1) stained
 - 2) unstained
 - 3) concentration methods
 - b. Non-microscopic examination
 - 1) antigen/antibody detection
 - 2) molecular techniques
 - 3) other
2. Culture/isolation (e.g., Trichomonas, Strongyloides)
 - a. Media
 - b. Techniques
 - c. Incubation
 - 1) atmosphere
 - 2) duration
 - 3) temperature

C. Organisms

1. Morphology
 - a. Microscopic
 - b. Macroscopic
 - c. Life cycle and stages of development
2. Identification procedures
 - a. Stains
 - b. Immunologic/serologic tests
 - c. Molecular techniques
 - d. Other
3. Growth requirements

D. Clinical Information

1. Infection
 - a. Etiology
 - b. Pathology/pathogenesis
 - c. Detection
 - d. Transmission
 - e. Immunologic/serologic characteristics
2. Epidemiology
3. Prevention
4. Reporting

IV. MYCOBACTERIA, VIRUSES & OTHER ORGANISMS (Including Chlamydia, Mycoplasma, Rickettsia, Spirochetes, Ureaplasma)

(M: 10 – 15% ; SM: 10 – 15%)

A. Specimen Preparation

1. Source
2. Collection
3. Storage and transport
4. Acceptability

B. Specimen Processing

1. Direct examination
 - a. Microscopic examination
 - 1) stained
 - 2) unstained
 - 3) concentration methods (e.g. centrifugation)
 - b. Non-microscopic examination
 - 1) antigen/antibody detection
 - 2) molecular techniques
 - 3) other
2. Culture/isolation
 - a. Media
 - b. Techniques
 - c. Incubation
 - 1) atmosphere
 - 2) duration
 - 3) temperature
 - d. *Mycobacterium* susceptibility testing*
 - 1) technique/principles*
 - 2) pharmacology/mode of action*
 - 3) results*

C. Organisms

1. Morphology
 - a. Microscopic
 - b. Macroscopic
2. Identification procedures
 - a. Stains
 - b. Biochemicals
 - c. Immunologic/serologic tests
 - d. Growth inhibition
 - e. Cell culture* (i.e., Chlamydia, viruses)
 - f. Molecular techniques
 - g. Other
3. Growth requirements

D. Clinical Information

1. Infection

- a. Etiology
 - b. Pathology/pathogenesis
 - c. Detection
 - d. Transmission
 - e. Immunologic/serologic characteristics
2. Epidemiology
 3. Prevention
 4. Reporting

V. LABORATORY OPERATIONS (Technologist in Microbiology Only) (M: 15 – 20%)

A. Media/Reagents/Stains

1. Principles
2. Preparation
3. Sterilization/decontamination

B. Equipment/Instrumentation

1. Principles/component parts
2. Operational procedures
3. Maintenance

C. Quality Assurance/Improvement

1. Principles
2. Procedures
3. Quality control testing
4. Proficiency testing
5. Troubleshooting
6. Method comparison and/or development

D. Analytical Procedures

1. Immunologic/serologic
2. Chromatographic
3. Molecular/nucleic acid
4. Biochemical
5. Enzymatic
6. Antimicrobial
7. Other

E. Safety and Infection Control

1. Regulations
2. Hazards
3. Procedures
4. Storage
5. Decontamination/disposal
6. Principles

F. Education

G. Management

V. LABORATORY OPERATIONS
(Specialist in Microbiology Only)
(SM: 20 – 25%)

A. — F. Same as the Technologist in Microbiology

G. Management/Laboratory Administration

1. Planning
 - a. Policy development/goals and objectives
 - b. Financial
 - 1) budget development
 - 2) cost analysis
 - 3) equipment and purchasing
 - c. Applied research and/or development
2. Organizing
 - a. Personnel management
 - b. Work flow-scheduling and time management
 - c. Computer operations
 - d. Intradepartmental relations
 - e. Interdepartmental relations
 - f. Hospital/community relations
 - g. Record keeping
3. Staffing
 - a. Policies
 - b. Selection
 - c. Training
 - d. Performance evaluation
 - e. In-service education
 - f. Counseling
 - g. Competency testing
4. Directing
 - a. Communication (internal and external)
 - b. Productivity
 - c. Leadership
 - d. Motivation
5. Controlling
 - a. Laboratory accreditation standards
 - 1) federal government
 - 2) voluntary accrediting standards
 - b. Inventory
 - c. Purchasing
 - d. Cost effectiveness

***SM(ASCP) ONLY**

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

END OF CONTENT GUIDELINE