Microbiology Fundamentals A Clinical Approach 2nd edition Cowan Test Bank

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Chapter 02
Tools of the Laboratory: Methods for the Culturing and Microscopic Analysis

Multiple Choice Questions

1. The Five I's of studying microorganisms include all of the following except
A. inoculation.
B. incubation.
C. infection.
D. isolation.
E. identification.

ASM Objective: 08.02 Use pure culture and selective techniques to enrich for and isolate microorganisms.
ASM Objective: 08.03 Use appropriate methods to identify microorganisms (media-based, molecular and serological).
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 01. Remember
Learning Outcome: 02.01 Explain what the Five I's are and what each step entails.
Section: 02.01
Topic: Culturing Microorganisms
Topic: Identifying Microorganisms

2. The term that refers to the purposeful addition of microorganisms into a laboratory nutrient medium is
A. isolation.
B. inoculation.
C. immunization.
D. infection.
E. contamination.

ASM Objective: 08.02 Use pure culture and selective techniques to enrich for and isolate microorganisms.
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 01. Remember
Learning Outcome: 02.01 Explain what the Five I's are and what each step entails.
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3. A pure culture contains
A. only one species of microorganism.
B. only bacteria.
C. a variety of microbes from one source.
D. a variety of species from the same genus.
E. None of the choices is correct.

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4. The correct microbiological term for the tiny sample of specimen that is put into a nutrient medium in order to produce a culture is the
A. colony.
B. inoculum.
C. streak.
D. loop.
E. None of the choices is correct.

ASM Objective: 08.02 Use pure culture and selective techniques to enrich for and isolate microorganisms.
ASM Topic: Module 08 Microbiology Skills
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Learning Outcome: 02.01 Explain what the Five I's are and what each step entails.
Section: 02.01
Topic: Culturing Microorganisms

5. Which of the following is essential for development of discrete, isolated colonies?
A. broth medium
B. differential medium
C. selective medium
D. solid medium
E. assay medium

ASM Objective: 08.02 Use pure culture and selective techniques to enrich for and isolate microorganisms.
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 01. Remember
Learning Outcome: 02.01 Explain what the Five I's are and what each step entails.
Learning Outcome: 02.02 Discuss three physical states of media and when each is used.
Section: 02.01
Topic: Culturing Microorganisms

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6. Which method often results in colonies developing down throughout the agar along with some colonies on the surface?
A. streak plate
B. spread plate
C. pour plate
D. All of the choices are correct.
E. None of the choices is correct.

ASM Objective: 08.02 Use pure culture and selective techniques to enrich for and isolate microorganisms.
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 01. Remember
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Section: 02.01
Topic: Culturing Microorganisms

7. What type of isolation technique is most effective for the majority of applications?
A. pour plate
B. streak plate
C. spread plate
D. loop dilution
E. culture plate

ASM Objective: 08.02 Use pure culture and selective techniques to enrich for and isolate microorganisms.
ASM Topic: Module 08 Microbiology Skills
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8.

Which of the following will result when 1% to 5% agar is added to nutrient broth, boiled, and cooled?

A. a pure culture
B. a mixed culture
C. a solid medium
D. a liquid medium
E. a contaminated medium

ASM Objective: 08.03 Use appropriate methods to identify microorganisms (media-based, molecular and serological).
ASM Topic: Module 08 Microbiology Skills
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Learning Outcome: 02.02 Discuss three physical states of media and when each is used.
Section: 02.01
Topic: Culturing Microorganisms

9. Agar is an important component of media because
A. bacteria require agar to grow.
B. agar inhibits mold growth.
C. agar provides a solid surface for bacterial growth.
D. agar prevents contamination.
E. All of the choices are correct.

ASM Objective: 08.03 Use appropriate methods to identify microorganisms (media-based, molecular and serological).
ASM Topic: Module 08 Microbiology Skills
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10. The three physical forms of laboratory media are
A. solid, liquid, and gas.
B. solid, semisolid, and liquid.
C. streak plate, pour plate, and broth.
D. aerobic, anaerobic, and micro aerobic.
E. None of the choices is correct.

ASM Objective: 08.03 Use appropriate methods to identify microorganisms (media-based, molecular and serological).
ASM Topic: Module 08 Microbiology Skills
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Learning Outcome: 02.02 Discuss three physical states of media and when each is used.
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11. Which of the following is not an inoculating tool?
A. petri dish
B. loop
C. needle
D. pipette
E. swab

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12.

Agar is a complex polysaccharide that comes from a(n)

A. green plant.
B. fungus.
C. mold.
D. algae.
E. euglena.

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ASM Topic: Module 08 Microbiology Skills
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13. Which of the following is not a benefit of agar as a solid medium?
A.

has flexibility

B. holds moisture
C. can be inoculated and poured at a temperature that is not harmful
D.

is solid at room temperature

E. is digested by most microbes

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14.

A nutrient medium that has all of its chemical components identified, and their precise concentrations known and reproducible, would be termed

A. complex.
B. reducing.
C. enriched.
D.

chemically defined.

E. None of the choices is correct.

ASM Objective: 08.02 Use pure culture and selective techniques to enrich for and isolate microorganisms.
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 01. Remember
Learning Outcome: 02.04 Provide brief definitions for defined media and complex media.
Section: 02.01
Topic: Culturing Microorganisms

15. A nutrient medium that contains at least one ingredient that is NOT chemically definable would be termed
A. complex.
B. reducing.
C. enriched.
D. synthetic.
E. None of the choices is correct.

ASM Objective: 08.02 Use pure culture and selective techniques to enrich for and isolate microorganisms.
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 01. Remember
Learning Outcome: 02.04 Provide brief definitions for defined media and complex media.
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16. All of the following are examples of different types of microbiological media except
A. broth.
B. enriched.
C. agar.
D. petri dish.
E. selective.

ASM Objective: 08.03 Use appropriate methods to identify microorganisms (media-based, molecular and serological).
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 01. Remember
Learning Outcome: 02.02 Discuss three physical states of media and when each is used.
Learning Outcome: 02.03 Compare and contrast selective and differential media, and give an example of each.
Section: 02.01
Topic: Culturing Microorganisms

17. Which type of media would be the best choice when shipping a sample of bacteria to a laboratory to be tested from a satellite office site?
A. transport
B. EMB
C. blood
D. thioglycollate
E. general purpose

ASM Objective: 08.03 Use appropriate methods to identify microorganisms (media-based, molecular and serological).
ASM Objective: 08.05 Use appropriate microbiological and molecular lab equipment and methods.
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18. A microbiologist inoculates *Staphylococcus epidermidis* and *Escherichia coli* into a culture medium. Following incubation, only the *E. coli* grows in the culture. What is the most likely explanation?
A. The microbiologist used too much inoculum.
B. The culture is contaminated.
C. The incubation temperature was incorrect.
D. The culture medium must be selective.
E. The culture medium must be differential.

ASM Objective: 07.01b Ability to apply the process of science: Analyze and interpret results from a variety of microbiological methods and apply these methods to analogous situations.
ASM Objective: 08.02 Use pure culture and selective techniques to enrich for and isolate microorganisms.
ASM Topic: Module 07 Scientific Thinking
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 03. Apply
Learning Outcome: 02.01 Explain what the Five I's are and what each step entails.
Section: 02.01
Topic: Culturing Microorganisms

19. A common medium used for growing fastidious bacteria is
A. blood agar.
B. trypticase soy agar.
C. mannitol salt agar.
D. MacConkey medium.
E. a reducing medium.

ASM Objective: 03.03 The survival and growth of any microorganism in a given environment depends on its metabolic characteristics.
ASM Objective: 08.02 Use pure culture and selective techniques to enrich for and isolate microorganisms.
ASM Topic: Module 03 Metabolic Pathways
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 01. Remember
Learning Outcome: 02.04 Provide brief definitions for defined media and complex media.
Section: 02.01
Topic: Culturing Microorganisms
Topic: Microbial Growth and Nutrition

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20. A reducing medium contains
A. sugars that can be fermented.
B. extra oxygen.
C. hemoglobin, vitamins, or other growth factors.
D. substances that remove oxygen.
E. inhibiting agents.

ASM Objective: 08.03 Use appropriate methods to identify microorganisms (media-based, molecular and serological).
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 01. Remember
Learning Outcome: 02.03 Compare and contrast selective and differential media, and give an example of each.
Section: 02.01
Topic: Culturing Microorganisms

21. Which type of medium is able to distinguish different species or types of microorganisms based on an observable change in the colonies or in the medium?
A. differential
B. selective
C. enumeration
D. enriched
E. reducing

ASM Objective: 08.03 Use appropriate methods to identify microorganisms (media-based, molecular and serological).
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 01. Remember
Learning Outcome: 02.03 Compare and contrast selective and differential media, and give an example of each.
Section: 02.01
Topic: Culturing Microorganisms
Topic: Identifying Microorganisms

22. Differential media results in which of the following growth characteristics?
A. different color colonies
B. different media color post incubation
C. precipitates
D. gas bubbles
E. All of the choices are correct.

ASM Objective: 08.03 Use appropriate methods to identify microorganisms (media-based, molecular and serological).
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 02. Understand
Learning Outcome: 02.03 Compare and contrast selective and differential media, and give an example of each.
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23. A reducing media is used to culture
A. fastidious organisms.
B. aerobic organisms.
C. anaerobic organisms.
D. any pathogenic organisms.
E. None of the choices is correct.

ASM Objective: 03.03 The survival and growth of any microorganism in a given environment depends on its metabolic characteristics.
ASM Objective: 08.03 Use appropriate methods to identify microorganisms (media-based, molecular and serological).
ASM Topic: Module 03 Metabolic Pathways
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 02. Understand
Learning Outcome: 02.03 Compare and contrast selective and differential media, and give an example of each.
Section: 02.01
Topic: Culturing Microorganisms
Topic: Microbial Growth and Nutrition

24. For which bacterial genus does mannitol salt agar differentiate between species?
A. *Salmonella*
B. *Streptococcus*
C. *Neisseria*
D. *Staphylococcus*
E. *Escherichia*

ASM Objective: 08.03 Use appropriate methods to identify microorganisms (media-based, molecular and serological).
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 02. Understand
Learning Outcome: 02.03 Compare and contrast selective and differential media, and give an example of each.
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Topic: Identifying Microorganisms

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25. A microbiologist must culture a patient's feces for intestinal pathogens. Which of the following would likely be present in selective media for analyzing this fecal specimen?
A. NaCl
B. sheep red blood cells
C. bile salts
D. thioglycollic acid
E. peptone

ASM Objective: 08.02 Use pure culture and selective techniques to enrich for and isolate microorganisms.
ASM Objective: 08.03 Use appropriate methods to identify microorganisms (media-based, molecular and serological).
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 02. Understand
Learning Outcome: 02.03 Compare and contrast selective and differential media, and give an example of each.
Section: 02.01
Topic: Culturing Microorganisms
Topic: Identifying Microorganisms

26. Bacteria that require special growth factors and complex nutrients are termed
A. aerobic.
B. anaerobic.
C. fastidious.
D. microaerophilic.
E. autotrophic.

ASM Objective: 03.03 The survival and growth of any microorganism in a given environment depends on its metabolic characteristics.
ASM Topic: Module 03 Metabolic Pathways
Bloom's Level: 01. Remember
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27. A microbiologist inoculates *Staphylococcus aureus* into a culture medium. Following incubation, both *Staphylococcus aureus* and *Staphylococcus epidermidis* are determined to be growing in this culture. What is the most likely explanation?
A. The microbiologist used too much inoculum.
B. The culture is contaminated.
C. The incubation temperature was incorrect.
D. The culture medium must be selective.
E. The culture medium must be differential.

ASM Objective: 07.01b Ability to apply the process of science: Analyze and interpret results from a variety of microbiological methods and apply these methods to analogous situations.
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ASM Topic: Module 07 Scientific Thinking
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 03. Apply
Learning Outcome: 02.01 Explain what the Five I's are and what each step entails.
Section: 02.01
Topic: Culturing Microorganisms

28. Newly inoculated cultures must be _____ at a specific temperature to encourage growth.
A. streaked
B. poured
C. incubated
D. contaminated
E. All of the choices are correct.

ASM Objective: 03.03 The survival and growth of any microorganism in a given environment depends on its metabolic characteristics.
ASM Objective: 03.04 The growth of microorganisms can be controlled by physical, chemical, mechanical, or biological means.
ASM Objective: 08.05 Use appropriate microbiological and molecular lab equipment and methods.
ASM Topic: Module 03 Metabolic Pathways
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 01. Remember
Section: 02.01
Topic: Culturing Microorganisms
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29.

A rod-shaped bacterium is measured as 0.3 micrometers (μm) in length using an ocular micrometer. Your instructor wants you to report the length in millimeters (mm) to test your understanding of metric conversions. What is the length of the organism in millimeters?

A.

300 mm

B.

0.0003 mm

C.

0.03 mm

D.

3 mm

ASM Objective: 07.02 Ability to use quantitative reasoning: Use mathematical reasoning and graphing skills to solve problems in microbiology.
ASM Topic: Module 07 Scientific Thinking
Bloom's Level: 02. Understand
Learning Outcome: 02.05 Convert among the different units of the metric system.
Section: 02.02
Topic: Microscopy

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30.

An enveloped virus measures 0.02 micrometers (μm) in diameter. What is the diameter of this virus in nanometers (nm)?

A.

2 nm

B.

20 nm

C.

0.00002 nm

D.

0.2 nm

ASM Objective: 07.02 Ability to use quantitative reasoning: Use mathematical reasoning and graphing skills to solve problems in microbiology.
ASM Topic: Module 07 Scientific Thinking
Bloom's Level: 02. Understand
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Section: 02.02
Topic: Microscopy

31. The _____ of the microscope holds and allows selection of the objective lenses.
A. stage
B. condenser
C. objective
D. ocular
E. nosepiece

ASM Objective: 08.01 Properly prepare and view specimens for examination using microscopy (bright field and, if possible, phase contrast).
ASM Objective: 08.05 Use appropriate microbiological and molecular lab equipment and methods.
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 01. Remember
Learning Outcome: 02.07 Differentiate between the principles of light microscopy and the principles of electron microscopy.
Section: 02.02
Topic: Microscopy

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32.

Which of the following magnifies the specimen to produce its real image?

A. condenser
B. objective lens
C. ocular lens
D. body
E. nosepiece

ASM Objective: 08.01 Properly prepare and view specimens for examination using microscopy (bright field and, if possible, phase contrast).
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ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 01. Remember
Learning Outcome: 02.07 Differentiate between the principles of light microscopy and the principles of electron microscopy.
Section: 02.02
Topic: Microscopy

33.

Which of the following magnifies the specimen to produce its virtual image?

A. objective lens
B. ocular lens
C. condenser
D. body
E. iris diaphragm

ASM Objective: 08.01 Properly prepare and view specimens for examination using microscopy (bright field and, if possible, phase contrast).
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ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 01. Remember
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34. Which of the following controls the amount of light entering the specimen?
A. objective lens
B. ocular lens
C. condenser
D. body
E. iris diaphragm

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Section: 02.02
Topic: Microscopy

35. If a microbiologist is studying a specimen at a total magnification of 950x, what is the magnifying power of the objective lens if the ocular lens is 10x?
A. 100x
B. 950x
C. 85x
D. 850x
E. 95x

ASM Objective: 08.01 Properly prepare and view specimens for examination using microscopy (bright field and, if possible, phase contrast).
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ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 02. Understand
Learning Outcome: 02.06 List and describe the three elements of good microscopy.
Learning Outcome: 02.07 Differentiate between the principles of light microscopy and the principles of electron microscopy.
Section: 02.02
Topic: Microscopy

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36. Magnification is achieved in a compound microscope through the initial magnification of the specimen by the _____ lens. This image is then projected to the _____ lens that will further magnify the specimen to form a virtual image received by the eye.
A. ocular, objective
B. scanning, objective
C. objective, ocular
D. ocular, oil
E. None of the choices is correct.

ASM Objective: 08.01 Properly prepare and view specimens for examination using microscopy (bright field and, if possible, phase contrast).
ASM Objective: 08.05 Use appropriate microbiological and molecular lab equipment and methods.
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 01. Remember
Learning Outcome: 02.07 Differentiate between the principles of light microscopy and the principles of electron microscopy.
Section: 02.02
Topic: Microscopy

37. Which of the following characteristics refers to the microscope's ability to show two separate entities as separate and distinct?
A. resolving power
B. magnification
C. refraction
D. All of the choices are correct.
E. None of the choices is correct.

ASM Objective: 08.01 Properly prepare and view specimens for examination using microscopy (bright field and, if possible, phase contrast).
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ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 01. Remember
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38.

All of the following are diameters of cells that would be resolved in a microscope with a 0.2 µm limit of resolution except

A. 0.2 µm.
B. 0.2 mm.
C. 0.1 µm.
D. 0.3 µm.
E. 2.0 µm.

ASM Objective: 08.01 Properly prepare and view specimens for examination using microscopy (bright field and, if possible, phase contrast).
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ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 02. Understand
Learning Outcome: 02.06 List and describe the three elements of good microscopy.
Section: 02.02
Topic: Microscopy

39. The type of microscope in which you would see brightly illuminated specimens against a black background is

A.

bright field.

B.

dark field.

C.

phase contrast.

D. fluorescence.
E. electron.

ASM Objective: 08.01 Properly prepare and view specimens for examination using microscopy (bright field and, if possible, phase contrast).
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40.

Which type of microscope shows cells against a bright background but also differentiates intracellular structures of unstained cells based on their varying densities?

A.

bright field

B.

dark field

C.

phase contrast

D. differential interference
E. electron

ASM Objective: 08.01 Properly prepare and view specimens for examination using microscopy (bright field and, if possible, phase contrast).
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41. Which type of microscope is the most widely used and shows cells against a bright background?

A.

bright field

B.

dark field

C.

phase contrast

D. fluorescence

E. electron

ASM Objective: 08.01 Properly prepare and view specimens for examination using microscopy (bright field and, if possible, phase contrast).
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42.

All of the following pertain to the fluorescence microscope except it

A. uses electrons to produce a specimen image.
B.

is a type of compound microscope.

C.

requires the use of dyes like acridine and fluorescein.

D. is commonly used to diagnose certain infections.
E. requires an ultraviolet radiation source.

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43.

A confocal scanning microscope

A.

uses visible light to form a specimen image.

B. shows three-dimensional cell images from the cell surface to the middle of the cell.
C. produces specimen images on electron micrographs.
D.

uses dyes that emit visible light when bombarded by electrons.

E. requires specimens to be stained.

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44. Which type of microscope does not use light in forming the specimen image?
A.

bright field

B.

dark field

C.

phase contrast

D. fluorescence
E. electron

ASM Objective: 08.01 Properly prepare and view specimens for examination using microscopy (bright field and, if possible, phase contrast).
ASM Objective: 08.05 Use appropriate microbiological and molecular lab equipment and methods.
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 01. Remember
Learning Outcome: 02.07 Differentiate between the principles of light microscopy and the principles of electron microscopy.
Section: 02.02
Topic: Microscopy

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45. Which type of microscope achieves the greatest resolution and highest magnification?
A.

bright field

B.

dark field

C.

phase contrast

D. fluorescence
E. electron

ASM Objective: 08.01 Properly prepare and view specimens for examination using microscopy (bright field and, if possible, phase contrast).
ASM Objective: 08.05 Use appropriate microbiological and molecular lab equipment and methods.
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 01. Remember
Learning Outcome: 02.07 Differentiate between the principles of light microscopy and the principles of electron microscopy.
Section: 02.02
Topic: Microscopy

46. Which type of microscope bombards a whole, metal-coated specimen with electrons moving back and forth over it?
A. fluorescence
B. differential interference contrast
C. scanning electron
D. transmission electron
E.

phase contrast

ASM Objective: 08.01 Properly prepare and view specimens for examination using microscopy (bright field and, if possible, phase contrast).
ASM Objective: 08.05 Use appropriate microbiological and molecular lab equipment and methods.
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 01. Remember
Learning Outcome: 02.07 Differentiate between the principles of light microscopy and the principles of electron microscopy.
Section: 02.02
Topic: Microscopy

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47. The specimen preparation that is best for viewing cell motility is
A. hanging drop.
B. fixed stained smear.
C. Gram stain.
D. negative stain.
E. flagellar stain.

ASM Objective: 08.01 Properly prepare and view specimens for examination using microscopy (bright field and, if possible, phase contrast).
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 01. Remember
Learning Outcome: 02.07 Differentiate between the principles of light microscopy and the principles of electron microscopy.
Section: 02.02
Topic: Preparing Microscopy Specimens

48. The purpose of staining cells on a microscope slide is to
A. kill them.
B. secure them to the slide.
C. enlarge the cells.
D. add contrast in order to see them better.
E. see motility.

ASM Objective: 08.01 Properly prepare and view specimens for examination using microscopy (bright field and, if possible, phase contrast).
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 02. Understand
Learning Outcome: 02.06 List and describe the three elements of good microscopy.
Learning Outcome: 02.07 Differentiate between the principles of light microscopy and the principles of electron microscopy.
Section: 02.02
Topic: Microscopy
Topic: Preparing Microscopy Specimens

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49. What do the Gram stain, acid-fast stain, and endospore stain have in common?

A.

They are used on a wet mount of the specimen.

B.

They use heat to force the dye into cell structures.

C.

The outcome is based on cell differences.

D.

They use a negative stain technique.

E.

They are simple stains.

ASM Objective: 08.01 Properly prepare and view specimens for examination using microscopy (bright field and, if possible, phase contrast).
ASM Objective: 08.03 Use appropriate methods to identify microorganisms (media-based, molecular and serological).
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 02. Understand
Learning Outcome: 02.08 Give examples of a simple, differential, and special stains.
Section: 02.02
Topic: Preparing Microscopy Specimens

50. Basic dyes are

A. attracted to the negatively charged acidic substances of bacterial cells.
B. anionic.
C. used in negative staining.
D. repelled by cells.
E. dyes such as India ink and nigrosin.

ASM Objective: 08.01 Properly prepare and view specimens for examination using microscopy (bright field and, if possible, phase contrast).
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 01. Remember
Learning Outcome: 02.08 Give examples of a simple, differential, and special stains.
Section: 02.02
Topic: Preparing Microscopy Specimens

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51. A microbiologist makes a fixed smear of bacterial cells and stains them with Loeffler's methylene blue. All the cells appear blue under the oil lens. This is an example of
A. negative staining.
B. using an acidic dye.
C. simple staining.
D. using the acid-fast stain.
E. capsule staining.

ASM Objective: 08.01 Properly prepare and view specimens for examination using microscopy (bright field and, if possible, phase contrast).
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 03. Apply
Learning Outcome: 02.08 Give examples of a simple, differential, and special stains.
Section: 02.02
Topic: Preparing Microscopy Specimens

52.

The Gram staining procedure is best described as a(n) __ staining technique.

A.

acid-fast or Ziehl-Neelson

B. differential
C. capsule
D. Schaefer-Fulton
E. simple

ASM Objective: 08.01 Properly prepare and view specimens for examination using microscopy (bright field and, if possible, phase contrast).
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 01. Remember
Learning Outcome: 02.08 Give examples of a simple, differential, and special stains.
Section: 02.02
Topic: Preparing Microscopy Specimens

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True / False Questions

53. The procedures for culturing a microorganism require the use of a microscope.
FALSE

ASM Objective: 08.01 Properly prepare and view specimens for examination using microscopy (bright field and, if possible, phase contrast).
ASM Objective: 08.02 Use pure culture and selective techniques to enrich for and isolate microorganisms.
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 02. Understand
Learning Outcome: 02.01 Explain what the Five I's are and what each step entails.
Section: 02.01
Topic: Culturing Microorganisms

54. Some microbes are not capable of growing on artificial media.
TRUE

ASM Objective: 03.01 Bacteria and Archaea exhibit extensive, and often unique, metabolic diversity (e.g., nitrogen fixation, methane production, anoxygenic photosynthesis).
ASM Objective: 03.03 The survival and growth of any microorganism in a given environment depends on its metabolic characteristics.
ASM Objective: 03.04 The growth of microorganisms can be controlled by physical, chemical, mechanical, or biological means.
ASM Objective: 08.02 Use pure culture and selective techniques to enrich for and isolate microorganisms.
ASM Topic: Module 03 Metabolic Pathways
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 01. Remember
Learning Outcome: 02.01 Explain what the Five I's are and what each step entails.
Section: 02.01
Topic: Culturing Microorganisms
Topic: Microbial Growth and Nutrition

55. A selective medium contains one or more substances that inhibit growth of certain microbes in order to facilitate the growth of other microbes.
TRUE

ASM Objective: 03.04 The growth of microorganisms can be controlled by physical, chemical, mechanical, or biological means.
ASM Objective: 08.02 Use pure culture and selective techniques to enrich for and isolate microorganisms.
ASM Objective: 08.03 Use appropriate methods to identify microorganisms (media-based, molecular and serological).
ASM Topic: Module 03 Metabolic Pathways
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 01. Remember
Learning Outcome: 02.03 Compare and contrast selective and differential media, and give an example of each.
Section: 02.01
Topic: Culturing Microorganisms

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56. One colony typically develops from the growth of several parent bacterial cells.
FALSE

ASM Objective: 08.04 Estimate the number of microorganisms in a sample (using, for example, direct count, viable plate count, and spectrophotometric methods).
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 01. Remember
Learning Outcome: 02.01 Explain what the Five I's are and what each step entails.
Section: 02.01
Topic: Culturing Microorganisms

57. Mixed cultures are also referred to as contaminated cultures.
FALSE

ASM Objective: 08.02 Use pure culture and selective techniques to enrich for and isolate microorganisms.
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 01. Remember
Learning Outcome: 02.01 Explain what the Five I's are and what each step entails.
Section: 02.01
Topic: Culturing Microorganisms

58. Bacterial cultures are easily identified from their microscopic appearance.
FALSE

ASM Objective: 08.03 Use appropriate methods to identify microorganisms (media-based, molecular and serological).
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 02. Understand
Learning Outcome: 02.01 Explain what the Five I's are and what each step entails.
Section: 02.01
Topic: Identifying Microorganisms

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59.

Normal incubation temperatures range from 30°C to 60°C.

FALSE

ASM Objective: 03.04 The growth of microorganisms can be controlled by physical, chemical, mechanical, or biological means.
ASM Topic: Module 03 Metabolic Pathways
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 01. Remember
Learning Outcome: 02.01 Explain what the Five I's are and what each step entails.
Section: 02.01
Topic: Culturing Microorganisms
Topic: Microbial Growth and Nutrition

60.

The bending of light rays as they pass from one medium to another is called refraction.

TRUE

ASM Objective: 08.01 Properly prepare and view specimens for examination using microscopy (bright field and, if possible, phase contrast).
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 01. Remember
Learning Outcome: 02.07 Differentiate between the principles of light microscopy and the principles of electron microscopy.
Section: 02.02
Topic: Microscopy

61. The real image is the reverse of the actual specimen.
FALSE

ASM Objective: 08.01 Properly prepare and view specimens for examination using microscopy (bright field and, if possible, phase contrast).
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 01. Remember
Learning Outcome: 02.07 Differentiate between the principles of light microscopy and the principles of electron microscopy.
Section: 02.02
Topic: Microscopy

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62. A differential interference contrast microscope uses dyes to give colored three-dimensional images.
FALSE

ASM Objective: 08.01 Properly prepare and view specimens for examination using microscopy (bright field and, if possible, phase contrast).
ASM Objective: 08.05 Use appropriate microbiological and molecular lab equipment and methods.
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 01. Remember
Learning Outcome: 02.07 Differentiate between the principles of light microscopy and the principles of electron microscopy.
Section: 02.02
Topic: Microscopy

63. Fixed smears of specimens are required in order to perform the Gram stain and endospore stain on the specimens.
TRUE

ASM Objective: 08.01 Properly prepare and view specimens for examination using microscopy (bright field and, if possible, phase contrast).
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 01. Remember
Learning Outcome: 02.08 Give examples of a simple, differential, and special stains.
Section: 02.02
Topic: Preparing Microscopy Specimens

64.

At the end of the Gram stain, gram-positive bacteria will be seen as red/pink cells.

FALSE

ASM Objective: 08.01 Properly prepare and view specimens for examination using microscopy (bright field and, if possible, phase contrast).
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 01. Remember
Learning Outcome: 02.08 Give examples of a simple, differential, and special stains.
Section: 02.02
Topic: Preparing Microscopy Specimens

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Multiple Choice Questions

NCLEX Prep - Test Bank Question: Please read the clinical scenario, and then answer the questions that follow to become familiar with the traditional NCLEX question format.

You begin your shift at the inner city outreach clinic when a young woman enters crying. She is 19 years old and 28 weeks pregnant with her second child. Her complaint is that she woke this morning leaking clear to milky-colored fluid vaginally. Her first child was born 6 weeks early due to premature rupture of membranes and she is worried this is happening again. You reassure the patient, and explain that a vaginal speculum exam will be performed and specimens will be taken for examination. Once obtaining the proper specimens, you label them appropriately, and send the wet mount and culturette to the laboratory for processing.

ASM Objective: 03.03 The survival and growth of any microorganism in a given environment depends on its metabolic characteristics.
ASM Objective: 08.01 Properly prepare and view specimens for examination using microscopy (bright field and, if possible, phase contrast).
ASM Topic: Module 03 Metabolic Pathways
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 03. Apply
Learning Outcome: 02.01 Explain what the Five I's are and what each step entails.
Learning Outcome: 02.07 Differentiate between the principles of light microscopy and the principles of electron microscopy.
Learning Outcome: 02.08 Give examples of a simple, differential, and special stains.
Section: 02.01
Section: 02.02
Topic: Culturing Microorganisms
Topic: Identifying Microorganisms
Topic: Microscopy
Topic: Preparing Microscopy Specimens

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65.

You understand that a microscopic view is needed to visualize microbes that fall within the 1–10 µm micrometer size range but also to detect characteristic ferning of amniotic fluid. Which type of microscope will be used by the laboratory technicians to make these observations of the patient sample?

A. electron microscope
B. light microscope
C. confocal microscope
D. fluorescent microscope

ASM Objective: 08.01 Properly prepare and view specimens for examination using microscopy (bright field and, if possible, phase contrast).
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 03. Apply
Learning Outcome: 02.01 Explain what the Five I's are and what each step entails.
Learning Outcome: 02.07 Differentiate between the principles of light microscopy and the principles of electron microscopy.
Section: 02.01
Section: 02.02
Topic: Identifying Microorganisms
Topic: Microscopy

66. When utilizing a light microscope, the specimen on the glass slide must be in proper position to ensure illumination of the specimen for visualization. This is done by placing the glass slide
A. between the condenser lens and the objective lens.
B. directly on top of the light source.
C. between the ocular lens and the objective lens.
D. between the light source and the condenser lens.

ASM Objective: 08.01 Properly prepare and view specimens for examination using microscopy (bright field and, if possible, phase contrast).
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 03. Apply
Learning Outcome: 02.07 Differentiate between the principles of light microscopy and the principles of electron microscopy.
Section: 02.02
Topic: Microscopy

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67.

No ferning of the vaginal fluid is detected, and you reassure your patient that her membranes have not ruptured. You explain that the laboratory technicians will use which five basic techniques (in order) to manipulate, grow, examine, and characterize any microorganisms present in the collected specimens?

A.

isolation, incubation, inspection, identification, and inoculation

B.

inspection, identification, isolation, incubation, and inoculation

C. identification, isolation, incubation, inspection, and inoculation
D. inoculation, incubation, isolation, inspection, and identification

ASM Objective: 08.01 Properly prepare and view specimens for examination using microscopy (bright field and, if possible, phase contrast).
ASM Objective: 08.02 Use pure culture and selective techniques to enrich for and isolate microorganisms.
ASM Objective: 08.03 Use appropriate methods to identify microorganisms (media-based, molecular and serological).
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 03. Apply
Learning Outcome: 02.01 Explain what the Five I's are and what each step entails.
Section: 02.01
Section: 02.02
Topic: Culturing Microorganisms
Topic: Identifying Microorganisms
Topic: Microscopy

68. The patient asks how microbes from her body can be grown in the lab. You explain that specimens are introduced to nutrient medium and that any growth of the microbe that appears after incubating the specimen is called the
A. colony.
B. culture.
C. microorganism.
D. infectious agent.

ASM Objective: 03.03 The survival and growth of any microorganism in a given environment depends on its metabolic characteristics.
ASM Objective: 08.01 Properly prepare and view specimens for examination using microscopy (bright field and, if possible, phase contrast).
ASM Topic: Module 03 Metabolic Pathways
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 03. Apply
Learning Outcome: 02.01 Explain what the Five I's are and what each step entails.
Section: 02.01
Topic: Culturing Microorganisms

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69. Gram stain results from the patient specimen indicate a bacterial infection. From your microbiology course, you remember that this staining procedure involves
A. forcing a dye into resistant bodies with heat to distinguish between spores and cells.
B. timed, sequential applications of crystal violet dye, iodine, an alcohol rinse, and a contrasting counterstain to the sample.
C. application of the dye, carbol fuchsin, followed by an acid alcohol rinse.
D. application of India ink to detect the presence of bacterial capsules.

ASM Objective: 08.01 Properly prepare and view specimens for examination using microscopy (bright field and, if possible, phase contrast).
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 03. Apply
Learning Outcome: 02.08 Give examples of a simple, differential, and special stains.
Section: 02.01
Section: 02.02
Topic: Preparing Microscopy Specimens

NCLEX Prep - Test Bank Question: Please read the clinical scenario, and then answer the questions that follow to become familiar with the traditional NCLEX question format.

Ms. Hungh, a Burmese immigrant, enters your clinic with her interpreter complaining of fatigue, weight loss, persistent cough, and rust-colored sputum. The interpreter explains that Ms. Hungh has had this cough for many months in her home country and, now that she is in America, is seeking assistance for her condition.

ASM Objective: 08.01 Properly prepare and view specimens for examination using microscopy (bright field and, if possible, phase contrast).
ASM Objective: 08.03 Use appropriate methods to identify microorganisms (media-based, molecular and serological).
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 03. Apply
Learning Outcome: 02.01 Explain what the Five I's are and what each step entails.
Learning Outcome: 02.03 Compare and contrast selective and differential media, and give an example of each.
Learning Outcome: 02.08 Give examples of a simple, differential, and special stains.
Section: 02.01
Section: 02.02
Topic: Culturing Microorganisms
Topic: Identifying Microorganisms
Topic: Preparing Microscopy Specimens

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70. A sputum sample is ordered for microbial analysis in order to rule out the diagnosis of tuberculosis. Suspecting *Mycobacterium tuberculosis* may be the pathogen, you know that the laboratory technicians will perform which stain on the sample?
A. endospore stain
B. negative stain
C. flagellar stain
D. acid-fast stain

ASM Objective: 08.01 Properly prepare and view specimens for examination using microscopy (bright field and, if possible, phase contrast).
ASM Objective: 08.03 Use appropriate methods to identify microorganisms (media-based, molecular and serological).
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 03. Apply
Learning Outcome: 02.08 Give examples of a simple, differential, and special stains.
Section: 02.02
Topic: Identifying Microorganisms
Topic: Preparing Microscopy Specimens

71. Ms. Hungh's acid-fast stain results returned inconclusive for the presence of AFBs (acid-fast bacilli). Therefore, culturing of the sputum is performed in order to isolate microbial growth for further analysis. Which medium would be utilized to select for the growth of *Mycobacterium* species if present in the sample?
A. blood agar
B. Lowenstein-Jensen
C. MacConkey agar
D. Sabouraud's agar

ASM Objective: 08.02 Use pure culture and selective techniques to enrich for and isolate microorganisms.
ASM Objective: 08.03 Use appropriate methods to identify microorganisms (media-based, molecular and serological).
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 03. Apply
Learning Outcome: 02.03 Compare and contrast selective and differential media, and give an example of each.
Section: 02.01
Topic: Culturing Microorganisms

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72. Culturing of the sputum resulted in the growth of distinct colonies on the medium, and the technician informs you that further isolation by subculturing is now needed. You understand that this is accomplished by taking a bit of growth from an isolated colony and inoculating a separate medium, resulting in the production of a
A. diagnosis.
B. pure culture.
C. broth.
D. mixed culture.

ASM Objective: 08.02 Use pure culture and selective techniques to enrich for and isolate microorganisms.
ASM Objective: 08.03 Use appropriate methods to identify microorganisms (media-based, molecular and serological).
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 03. Apply
Learning Outcome: 02.01 Explain what the Five I's are and what each step entails.
Section: 02.01
Topic: Culturing Microorganisms

NCLEX Prep - Test Bank Question: Please read the clinical scenario, and then answer the questions that follow to become familiar with the traditional NCLEX question format.

Mr. Nowak is a homeless patient who presented to your clinic today with an injury to his left arm. He injured it on an old piece of scrap metal. His wound is red, hot, and tender with purulent drainage. You swab the site and send it to the laboratory for microbial analysis.

ASM Objective: 03.01 Bacteria and Archaea exhibit extensive, and often unique, metabolic diversity (e.g., nitrogen fixation, methane production, anoxygenic photosynthesis).
ASM Objective: 08.02 Use pure culture and selective techniques to enrich for and isolate microorganisms.
ASM Objective: 08.03 Use appropriate methods to identify microorganisms (media-based, molecular and serological).
ASM Objective: 08.06 Practice safe microbiology, using appropriate protective and emergency procedures.
ASM Topic: Module 03 Metabolic Pathways
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 03. Apply
Learning Outcome: 02.01 Explain what the Five I's are and what each step entails.
Learning Outcome: 02.03 Compare and contrast selective and differential media, and give an example of each.
Learning Outcome: 02.04 Provide brief definitions for defined media and complex media.
Section: 02.01
Topic: Culturing Microorganisms
Topic: Identifying Microorganisms

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73. Mr. Nowak's lab results return positive for *Staphylococcus*. You understand that the culture most likely required growth on a complex medium, consisting of
A. an exact chemical formula.
B. a simple pure compound.
C.

at least one ingredient that is not chemically defined.

D. chemical inhibitors.

ASM Objective: 08.02 Use pure culture and selective techniques to enrich for and isolate microorganisms.
ASM Objective: 08.03 Use appropriate methods to identify microorganisms (media-based, molecular and serological).
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 03. Apply
Learning Outcome: 02.04 Provide brief definitions for defined media and complex media.
Section: 02.01
Topic: Culturing Microorganisms

74. Although microscopic analysis revealed the presence of grapelike clusters of gram-positive cocci, you know that the species identification of the organism will require biochemical testing. Biochemical tests aid in microbial identification by providing information on
A. cell morphology.
B. asexual reproduction.
C. cellular metabolism.
D. DNA sequences.

ASM Objective: 03.01 Bacteria and Archaea exhibit extensive, and often unique, metabolic diversity (e.g., nitrogen fixation, methane production, anoxygenic photosynthesis).
ASM Objective: 08.03 Use appropriate methods to identify microorganisms (media-based, molecular and serological).
ASM Topic: Module 03 Metabolic Pathways
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 03. Apply
Learning Outcome: 02.03 Compare and contrast selective and differential media, and give an example of each.
Section: 02.01
Topic: Culturing Microorganisms
Topic: Identifying Microorganisms

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75. Cultures and specimens pose a potential employee and public health hazard, and require proper handling and disposal via specific medical waste policies. Some facilities, such as the ATCC, are regulated to maintain living catalogs of specimens for research and educational purposes. Such collections are referred to as

A. live microbes.
B. stock cultures.
C. dangerous microbes.
D. bacteriological reserve.

ASM Objective: 08.03 Use appropriate methods to identify microorganisms (media-based, molecular and serological).
ASM Objective: 08.06 Practice safe microbiology, using appropriate protective and emergency procedures.
ASM Topic: Module 08 Microbiology Skills
Bloom's Level: 03. Apply
Learning Outcome: 02.01 Explain what the Five I's are and what each step entails.
Section: 02.01
Topic: Culturing Microorganisms

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