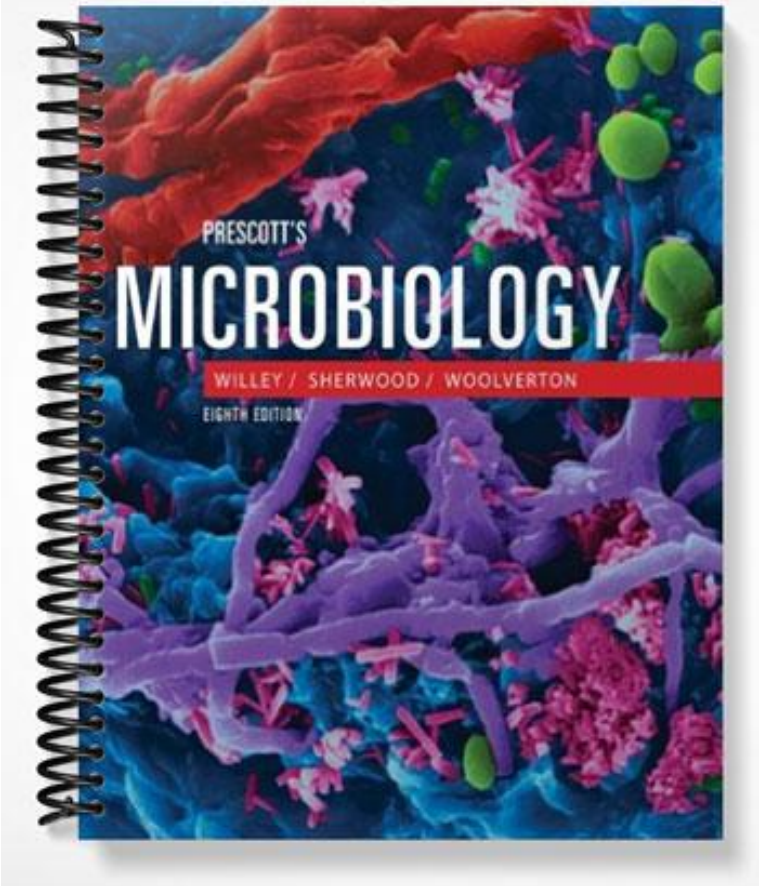
TEST BANK


PRESCOTT'S
MICROBIOLOGY
WILLEY / SHERWOOD / WOOLVERTON
EIGHTH EDITION

Chapter 02
Test Bank: The Study of Microbial Structure: Microscopy and Specimen Preparation

Fill in the Blank Questions

1. The _____ is the point at which a lens focuses parallel beams of light.
focal point

Bloom's Level: Understand
Section 2.01
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

2. The _____ is the distance between the center of a lens and the point at which it focuses parallel beams of light.
focal length

Bloom's Level: Understand
Section 2.01
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

True / False Questions

3. Light rays are refracted (bent) when they cross the interface between materials with different refractive indices.
TRUE

Bloom's Level: Understand
Section 2.01
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

Multiple Choice Questions

4. Which of these microscopes can be used to create high-resolution three-dimensional images of cells?
A. differential interference contrast
B. dark field
C. phase-contrast
D. confocal

Bloom's Level: Understand
Section 2.02
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

5. Confocal microscopes exhibit improved contrast and resolution by
A. illumination of a large area of the specimen.
B. blocking out stray light with an aperture located above the objective lens.
C. use of light at longer wavelengths.
D. use of ultraviolet light to illuminate the specimen.

Bloom's Level: Understand
Section 2.02
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

6. A 30× objective and a 20× ocular produce a total magnification of
A. 230×.
B. 320×.
C. 50×.
D. 600×.

Bloom's Level: Understand
Section 2.02
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

7. A 45× objective and a 10× ocular produce a total magnification of
A. 900×.
B. 55×.
C. 450×.
D. 145×.

Bloom's Level: Understand
Section 2.02
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

8. A microscope that exposes specimens to ultraviolet, violet, or blue light and forms an image with the light emitted at a different wavelength is called a _____ microscope.
A. phase-contrast
B. dark-field
C. scanning electron
D. fluorescence

Bloom's Level: Understand
Section 2.02
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

9. Immersion oil can be used to increase the resolution achieved with some microscope lenses because it increases the _____ between the specimen and the objective lens.
A. optical density
B. refractive index
C. optical density and refractive index
D. neither optical density nor refractive index

Bloom's Level: Understand
Section 2.02
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

True / False Questions

10. A substage condenser is used to focus light onto the specimen, which increases the resolution of a light microscope.
TRUE

Bloom's Level: Understand
Section 2.02
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

Fill in the Blank Questions

11. The _____ is the distance between the specimen and the objective lens when the specimen is in focus.
working distance

Bloom's Level: Understand
Section 2.02
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

12. The useful magnification of a light microscope is limited by the _____ of the light source being utilized.
wavelength

Section 2.02
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

13. The special dyes used in fluorescence microscopy that absorb light at one wavelength and emit light at a different wavelength are called _____.
fluorochromes

Bloom's Level: Understand
Section 2.02
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

14. In order to view a specimen with a total magnification of 400×, a _____ objective must be used if the ocular is 10×.
40×

Bloom's Level: Evaluate
Section 2.02
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

True / False Questions

15. Confocal microscopes, in combination with specialized computer software, can be used to create three-dimensional images of cell structures.
TRUE

Bloom's Level: Understand
Section 2.02
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

16. A light microscope with an objective lens numerical aperture of 0.65 is capable of allowing two objects 400 nm apart to be distinguished when using light with a wavelength of 420 nm.
TRUE

Section 2.02
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

17. Resolution decreases when the wavelength of the illuminating light decreases.
FALSE

Bloom's Level: Understand
Section 2.02
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

18. Immersion oil is used to prevent a specimen from drying out.
FALSE

Bloom's Level: Understand
Section 2.02
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

19. It is possible to build a light microscope capable of 10,000× magnification, but the image would not be sharp because resolution is independent of magnification.
TRUE

Bloom's Level: Evaluate
Section 2.02
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

20. Immersion oil increases the amount of light passing through a specimen and entering the objective lens.
TRUE

Bloom's Level: Understand
Section 2.02
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

Multiple Choice Questions

21. If the objective lenses of a microscope can be changed without losing focus on the specimen, they are said to be
A. equifocal.
B. totifocal.
C. parfocal.
D. optifocal.

Bloom's Level: Understand
Section 2.02
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

22. An instrument that magnifies slight differences in the refractive index of cell structures is called a (n) _____ microscope.
A. phase-contrast
B. electron
C. fluorescence
D. densitometric

Bloom's Level: Understand
Section 2.02
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

23. The instrument that produces a bright image of the specimen against a dark background is called a (n) _____ microscope.
A. phase-contrast
B. electron
C. bright-field
D. dark-field

Bloom's Level: Understand
Section 2.02
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

24. As the magnification of a series of objective lenses increases, the working distance
A. increases.
B. decreases.
C. stays the same.
D. cannot be predicted.

Bloom's Level: Evaluate
Section 2.02
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

25. Prior to staining, smears of microorganisms are heat-fixed in order to
A. allow eventual visualization of internal structures.
B. ensure removal of dust particles from the slide surface.
C. attach it firmly to the slide.
D. create small pores in cells that facilitates binding of stain to cell structures.

Section 2.03
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

26. Acid-fast organisms such as *Mycobacterium tuberculosis* contain _____ constructed from mycolic acids in their cell walls.
A. proteins
B. carbohydrates
C. lipids
D. peptidoglycan

Bloom's Level: Understand
Section 2.03
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

27. In the Gram-staining procedure, the primary stain is
A. iodine.
B. safranin.
C. crystal violet.
D. alcohol.

Bloom's Level: Remember
Section 2.03
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

28. In the Gram-staining procedure, the decolorizer is
A. iodine.
B. safranin.
C. crystal violet.
D. ethanol or acetone.

Bloom's Level: Remember
Bloom's Level: Understand
Section 2.03
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

29. In the Gram-staining procedure, the counterstain is
A. iodine.
B. safranin.
C. crystal violet.
D. alcohol.

Bloom's Level: Remember
Section 2.03
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

30. In the Gram-staining procedure, the mordant is
A. iodine.
B. safranin.
C. crystal violet.
D. alcohol.

Bloom's Level: Remember
Section 2.03
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

31. After the primary stain has been added but before the decolorizer has been used, gram-positive organisms are stained _____ and gram-negative organisms are stained _____.
A. purple; purple
B. purple; colorless
C. purple; pink
D. pink; pink

Bloom's Level: Evaluate
Section 2.03
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

32. After the decolorizer has been added, gram-positive organisms are stained _____ and gram-negative organisms are stained _____.
A. purple; purple
B. purple; colorless
C. purple; pink
D. pink; pink

Bloom's Level: Evaluate
Section 2.03
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

33. After the secondary stain has been added, gram-positive organisms are stained _____ and gram-negative organisms are stained _____.
A. purple; purple
B. purple; colorless
C. purple; pink
D. pink; pink

Bloom's Level: Evaluate
Section 2.03
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

34. If the decolorizer is left on too long in the Gram-staining procedure, gram-positive organisms will be stained _____ and gram-negative organisms will be stained _____.
A. purple; blue
B. purple; colorless
C. purple; pink
D. pink; pink

Bloom's Level: Evaluate
Section 2.03
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

35. If the decolorizer is not left on long enough in the Gram-staining procedure, gram-positive organisms will be stained _____ and gram-negative organisms will be stained _____.
A. purple; purple
B. purple; colorless
C. purple; pink
D. pink; pink

Bloom's Level: Evaluate
Section 2.03
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

36. Which of the following is considered to be a differential staining procedure?
A. Gram stain
B. Acid-fast stain
C. both Gram stain and Acid-fast stain
D. Leifson's flagella stain

Bloom's Level: Understand
Section 2.03
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

37. Basic dyes such as methylene blue bind to cellular molecules that are
A. hydrophobic.
B. negatively charged.
C. positively charged.
D. aromatic.

Bloom's Level: Understand
Section 2.03
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

38. The Schaeffer-Fulton procedure is used to stain
A. flagella.
B. fat deposits.
C. endospores.
D. DNA of chromosomes.

Bloom's Level: Remember
Section 2.03
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

True / False Questions

39. Gram staining divides bacterial species into roughly two equal groups.
TRUE

Bloom's Level: Understand
Section 2.03
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

40. Negative staining facilitates the visualization of bacterial capsules which are intensely stained by the procedure.
FALSE

Bloom's Level: Understand
Section 2.03
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

41. Negative staining with India ink can be used to reveal the presence of capsules that surround bacterial cells.
TRUE

Bloom's Level: Understand
Section 2.03
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

42. Mordants increase the binding between a stain and specimen.
TRUE

Bloom's Level: Understand
Section 2.03
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

43. In order to stain flagella so that they may be readily observed by light microscopy, it is usually necessary to increase their thickness.
TRUE

Bloom's Level: Understand
Section 2.03
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

Fill in the Blank Questions

44. The procedure in which a single stain is used to visualize microorganisms is called _____ staining.
simple

Bloom's Level: Remember
Section 2.03
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

45. _____ is the process by which internal and external structures of cells and organisms are preserved and maintained in position.
Fixation

Bloom's Level: Remember
Section 2.03
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

46. Thin films of bacteria that have been air-dried onto a glass microscope slide are called _____.
smears

Bloom's Level: Remember
Section 2.03
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

47. A procedure that divides organisms into two or more groups depending on their individual reactions to the same staining procedure is referred to as _____ staining.
differential

Bloom's Level: Remember
Section 2.03
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

Multiple Choice Questions

48. The Gram-staining procedure is an example of:
A. simple staining
B. negative staining
C. differential staining
D. fluorescent staining

Bloom's Level: Understand
Section 2.03
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

True / False Questions

49. The Gram-staining procedure is widely used because it allows rapid identification of a microorganism with little additional testing.
FALSE

Bloom's Level: Evaluate
Section 2.03
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

Multiple Choice Questions

50. Regions of a specimen with higher electron density scatter _____ electrons and, therefore, appear _____ in the image projected onto the screen of a transmission electron microscope.
A. more; lighter
B. more; darker
C. fewer; darker
D. fewer; lighter

Bloom's Level: Evaluate
Section 2.04
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

True / False Questions

51. Because transmission electron microscopy uses electrons rather than light, it is not necessary to stain biological specimens before observing them.
FALSE

Bloom's Level: Evaluate
Section 2.04
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

52. Scanning electron microscopes bombard specimens with a stream of electrons; however, the specimen image is produce by electrons that are derived from atoms of the specimen itself rather than by the electrons used to bombard the specimen.
TRUE

Bloom's Level: Evaluate
Section 2.04
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

53. It was possible to view viruses only after the invention of the electron microscope because they are too small to be seen with a light microscope.
TRUE

Bloom's Level: Understand
Section 2.04
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

Fill in the Blank Questions

54. An electron microscope uses _____ lenses to focus beams of electrons onto a specimen.
magnetic

Bloom's Level: Understand
Section 2.04
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

Multiple Choice Questions

55. Scanning electron microscopy is most often used to reveal
A. surface structures.
B. internal structures.
C. both surface and internal structures simultaneously.
D. either surface or internal structures, but not simultaneously.

Bloom's Level: Evaluate
Section 2.04
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

56. Small internal cell structures are best visualized with a
A. light microscope.
B. dark-field microscope.
C. transmission electron microscope.
D. flagellar microscope.

Section 2.04
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

57. In transmission electron microscopy, spreading a specimen out in a thin film with uranyl acetate, which does not penetrate the specimen, is called
A. freeze-etching.
B. simple staining.
C. shadow staining.
D. negative staining.

Bloom's Level: Understand
Section 2.04
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

Fill in the Blank Questions

58. _____ breaks frozen specimens along lines of greatest weakness, often down the middle of lipid bilayer membranes so that they may be observed by transmission electron microscopy.
Freeze-etching

Bloom's Level: Understand
Section 2.04
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

59. The _____ microscope is capable of atomic resolution of specimens, even when they are immersed in water.
Scanning tunneling

Bloom's Level: Understand
Section 2.05
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

60. The designer of the first transmission electron microscope, _____, was awarded the 1986 Nobel Prize in physics.
Ernst Ruska

Bloom's Level: Remember
Section 2.05
Topic: History of Microbiology

Multiple Choice Questions

61. Atomic force microscopes use a scanning probe that maintains a fixed distance from the surface of the specimen. It is useful for specimens that
A. do not conduct electricity well.
B. have extremely uneven surfaces.
C. both do not conduct electricity well and have extremely uneven surfaces are correct.
D. neither do not conduct electricity well nor have extremely uneven surfaces is correct.

Bloom's Level: Evaluate
Section 2.05
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms

True / False Questions

62. Scanning tunneling electron microscopes create a three-dimensional image of specimens at atomic level resolution.
TRUE

Bloom's Level: Understand
Section 2.05
Topic: Tools and Methods of Culturing, Classifying, and Identifying Microorganisms