

Microbiology / Active Lecture Questions

Chapter 3 – Observing Microorganisms Through a Microscope

1 Chapter 3 – Observing Microorganisms Through a Microscope

2 Assume you stain *Bacillus* by applying malachite green with heat and then counterstain with safranin. Through the microscope, the green structures are

- a. cell walls.
- b. capsules.
- c. endospores.
- d. flagella.
- e. impossible to identify.

3 Three-dimensional images of live cells can be produced with

- a. darkfield microscopy.
- b. fluorescence microscopy.
- c. scanning electron microscopy.
- d. two-photon microscopy.
- e. all of the above.

4 Carbol-fuchsin can be used as a simple stain and a negative stain.

As a simple stain, the pH is

- a. 2.
- b. higher than the negative stain.
- c. lower than the negative stain.
- d. the same as the negative stain.

5 Looking at the cell of a photosynthetic microorganism, you observe that the chloroplasts

are green in brightfield microscopy and red in fluorescence microscopy.

You conclude that

- a. chlorophyll is fluorescent.
- b. the magnification has distorted the image.
- c. you're not looking at the same structure in both microscopes.
- d. the stain masked the green color.
- e. none of the above

6 Which of the following is *not* a functionally analogous pair of stains?

- a. nigrosin and malachite green
- b. crystal violet and carbol-fuchsin
- c. safranin and methylene blue
- d. ethanol-acetone and acid-alcohol
- e. none of the above

Microbiology / Active Lecture Questions
Chapter 3 – Observing Microorganisms Through a Microscope

7 Which of the following pairs is mismatched?

- a. capsule—negative stain
- b. cell arrangement—simple stain
- c. cell size—negative stain
- d. Gram stain—bacterial identification
- e. none of the above

8 Assume you stain *Clostridium* by applying a basic stain, carbolfuchsin, with heat, decolorizing with acid-alcohol, and counterstaining with an acidic stain, nigrosin. Through the microscope, the endospores are 1 , and the cells are stained 2 .

- a. 1—red; 2—black
- b. 1—black; 2—colorless
- c. 1—colorless; 2—black
- d. 1—red; 2—colorless
- e. 1—black; 2—red

9 Assume that you are viewing a Gram-stained field of red cocci and blue bacilli through the microscope.

You can safely conclude that you have

- a. made a mistake in staining.
- b. two different species.
- c. old bacterial cells.
- d. young bacterial cells.
- e. none of the above

10 In 1996, scientists described a new tapeworm parasite that had killed at least one person. The initial examination of the patient's abdominal mass was most likely made using

- a. brightfield microscopy.
- b. darkfield microscopy.
- c. electron microscopy.
- d. phase-contrast microscopy.
- e. fluorescence microscopy.

11 Which of the following is *not* a modification of a compound light microscope?

- a. brightfield microscopy
- b. darkfield microscopy
- c. electron microscopy
- d. phase-contrast microscopy
- e. fluorescence microscopy

Microbiology / Active Lecture Questions

Chapter 3 – Observing Microorganisms Through a Microscope

12 Which microscope did Van Leeuwenhoek use to view “animalcules”?

- a. Phase-contrast microscope
- b. Compound light microscope
- c. Electron microscope
- d. Simple microscope

13 Brightfield illumination is produced by the

- a. Condenser
- b. Objective
- c. Lens
- d. Annular diaphragm

14 The ability of the lenses to distinguish fine detail and structure is called

- a. Illumination
- b. Magnification
- c. Refractive index
- d. Resolution

15 Which microscope would you choose to view the cellular contents of a microbe in its natural state?

- a. Compound light microscope
- b. Phase-contrast microscope
- c. Darkfield microscope
- d. Electron microscope

16 Which microscope achieves the highest magnification and the greatest resolution?

- a. Compound light microscope
- b. Phase-contrast microscope
- c. Darkfield microscope
- d. Electron microscope

17 What microscope should be used to view spirochetes such as *Treponema pallidum*?

- a. Compound light microscope
- b. Darkfield microscope
- c. Phase-contrast microscope
- d. Electron microscope

18 Objects smaller than about 0.2 micrometers, such as viruses, must be examined with

- a. A compound microscope
- b. An electron microscope
- c. A phase-contrast microscope
- d. A simple microscope

Microbiology / Active Lecture Questions
Chapter 3 – Observing Microorganisms Through a Microscope

19 Transmission electron microscopy

- a. Has a low resolution
- b. Is valuable for examining different layers of specimens
- c. Is valuable for examining one layer of specimens
- d. Examines thick sections of specimens

20 In a transmission electron microscope, objects are generally magnified

- a. 1000 to 100,000x
- b. 1000 to 10,000x
- c. 10,000 to 100,000x
- d. 10,000 to 1,000,000x

21 Which common and useful staining procedure classifies bacteria into two large groups?

- a. Acid-fast stain
- b. Negative stain
- c. Gram stain
- d. Methylene blue

22 The mordant in the Gram stain intensifies the stain by

- a. Removing the simple stain
- b. Making the bacterial cells larger
- c. Making the flagella visible
- d. Preventing the crystal violet from leaving the cells

23 Distortions of cell size and shape are minimized in

- a. Negative staining
- b. Gram staining
- c. Acid-fast staining
- d. Endospore staining

24 The best use of a negative stain is

- a. To determine cell size and shape
- b. To see the cell wall
- c. To determine a Gram reaction
- d. To see endospores

25 Capsules are stained with a(n):

- a. Negative stain
- b. Gram stain
- c. Schaeffer-Fulton stain
- d. Acid-fast stain

Microbiology / Active Lecture Questions

Chapter 3 – Observing Microorganisms Through a Microscope

26 What color are gram-negative bacteria at the completion of the Gram staining process?

- a. Red
- b. Purple
- c. Colorless
- d. Brown

27 Which of the following is not equal to 1m?

- a. 106 μ m
- b. 109nm
- c. 10dm
- d. .001km
- e. 100mi

28 What factors increase resolving power?

- a. Wavelength of light
- b. Fine adjustment
- c. Coarse adjustment
- d. diaphragm