Exam

Name_____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) The appearance of gram-negative bacteria after addition of the mordant in the Gram stain. 1) _____
A) Purple B) Red C) Colorless D) Brown

Answer: A
Explanation: A)
B)
C)
D)

2) Which microscope takes advantage of differences in the refractive indexes of cell structures? 2) _____
A) Fluorescence microscope
B) Darkfield microscope
C) Compound light microscope
D) Electron microscope
E) Phase-contrast microscope

Answer: E
Explanation: A)
B)
C)
D)
E)

3) Which of the following is *NOT* correct? 3) _____
A) 1 µm = 10^3 nm
B) 1 nm = 10^{-9} m
C) 1 nm = 10^{-6} µm
D) 1 µm = 10^{-6} m
E) 1 µm = 10^{-3} mm

Answer: C
Explanation: A)
B)
C)
D)
E)

4) Which of the following microscopes uses visible light? 4) _____
A) DIC
B) Scanning acoustic microscope
C) Scanning electron microscope
D) Confocal microscope
E) Fluorescence microscope

Answer: A
Explanation: A)
B)
C)
D)
E)

5) Which microscope is used to observe a specimen that emits light when illuminated with an ultraviolet light? 5) _____
A) Fluorescence microscope
B) Darkfield microscope
C) Phase-contrast microscope
D) Compound light microscope
E) Electron microscope

Answer: A
Explanation: A)
B)
C)
D)
E)

6) The best use of a negative stain is 6) _____
A) To determine cell size.
B) To determine cell shape.
C) To see endospores.
D) To determine Gram reaction.
E) A and B

Answer: E
Explanation: A)
B)
C)
D)
E)

7) The purpose of the ocular lens is to 7) _____
A) Decrease the refractive index.
B) Decrease the light.
C) Increase the light.
D) Improve resolution.
E) Magnify the image from the objective lens.

Answer: E
Explanation: A)
B)
C)
D)
E)

8) Simple staining is often necessary to improve contrast in this microscope. 8) _____
A) Fluorescence microscope
B) Electron microscope
C) Compound light microscope
D) Darkfield microscope
E) Phase-contrast microscope

Answer: C
Explanation: A)
B)
C)
D)
E)

9) Which microscope is used to see internal structures of cells in a natural state? 9) _____
A) Phase-contrast microscope
B) Compound light microscope
C) Darkfield microscope
D) Fluorescence microscope
E) Electron microscope

Answer: A
Explanation: A)
B)
C)
D)
E)

10) Place the steps of the Gram stain in the correct order: 10) _____
1-Alcohol-acetone; 2-Crystal violet; 3-Safranin; 4-Iodine.
A) 1-3-2-4 B) 2-1-4-3 C) 1-2-3-4 D) 2-4-1-3 E) 4-3-2-1

Answer: D
Explanation: A)
B)
C)
D)
E)

11) This microscope produces an image of a light cell against a dark background; internal structures are *NOT* visible. 11) _____
A) Compound light microscope
B) Phase-contrast microscope
C) Darkfield microscope
D) Fluorescence microscope
E) Electron microscope

Answer: C
Explanation: A)
B)
C)
D)
E)

12) Assume you stain *Bacillus* by applying malachite green with heat and then counterstaining with safranin. Through the microscope, the green structures are 12) _____

A) Capsules.
B) Cell walls.
C) Flagella.
D) Endospores.
E) Can't tell.

Answer: D
Explanation: A)
B)
C)
D)
E)

13) Bacterial smears are fixed before staining to 13) _____

A) Kill the bacteria.
B) Affix the cells to the slide.
C) Make their walls permeable.
D) A and B.
E) Accept stain.

Answer: D
Explanation: A)
B)
C)
D)
E)

14) The appearance of gram-positive bacteria after adding the counterstain in the Gram stain. 14) _____

A) Purple B) Red C) Colorless D) Brown

Answer: A
Explanation: A)
B)
C)
D)

15) What is the total magnification of a chloroplast viewed with a 10x ocular lens and a 45x objective lens? 15) _____

A) 45x B) 10x C) 100x D) 450x E) 4.5x

Answer: D
Explanation: A)
B)
C)
D)
E)

16) Van Leeuwenhoek's microscope magnified up to 300x. This was a(n) 16) _____

A) Electron microscope.
B) Simple microscope.
C) Phase-contrast microscope.
D) Compound microscope.
E) Confocal microscope.

Answer: B
Explanation: A)
B)
C)
D)
E)

17) Place the following steps in the correct sequence: 17) _____
1-Staining; 2-Making a smear; 3-Fixing.

A) 3-2-1
B) 1-2-3
C) 2-3-1
D) The order doesn't matter
E) 1-3-2

Answer: C
Explanation: A)
B)
C)
D)
E)

18) The appearance of gram-negative bacteria after completing the Gram stain. 18) _____

A) Purple B) Red C) Colorless D) Brown

Answer: B
Explanation: A)
B)
C)
D)

19) What structure does light pass through after leaving the condenser in a compound light microscope? 19) _____

A) Objective lens B) Ocular lens C) Illuminator D) Specimen

Answer: D
Explanation: A)
B)
C)
D)

20) You suspect a 100-nm structure is present in a cell. Which of the following provides the lowest magnification that you can use to see this structure? 20) _____

A) Brightfield microscope
B) Transmission electron microscope
C) Darkfield microscope
D) Scanning electron microscope
E) Phase-contrast microscope

Answer: D
Explanation: A)
B)
C)
D)
E)

21) Which microscope uses two beams of light to produce a three-dimensional, color image? 21) _____

A) Electron microscope
B) Phase-contrast microscope
C) Fluorescence microscope
D) Darkfield microscope
E) DIC microscope

Answer: E
Explanation: A)
B)
C)
D)
E)

22) Which microscope achieves the highest magnification and greatest resolution? 22) _____

A) Compound light microscope
B) Phase-contrast microscope
C) Darkfield microscope
D) Fluorescence microscope
E) Electron microscope

Answer: E
Explanation: A)
B)
C)
D)
E)

23) In this microscope, the observer does *NOT* look at an image through a lens. 23) _____

A) Compound light microscope
B) Phase-contrast microscope
C) Darkfield microscope
D) Fluorescence microscope
E) Electron microscope

Answer: E
Explanation: A)
B)
C)
D)
E)

24) What Gram reaction do you expect from acid-fast bacteria? 24) _____

A) Gram-negative B) Gram-positive
C) Both gram-positive and gram-negative D) Can't tell

Answer: B
Explanation: A)
B)
C)
D)

25) Which of the following is *NOT* equal to 1 m? 25) _____

A) 10 dm B) 10^6 µm C) 0.001 km D) 10^9 nm E) 100 mm

Answer: E
Explanation: A)
B)
C)
D)
E)

26) The signal molecule produced in quorum sensing is 26) _____

A) An inducer.
B) A simple stain.
C) A counterstain.
D) An endospore.
E) Light.

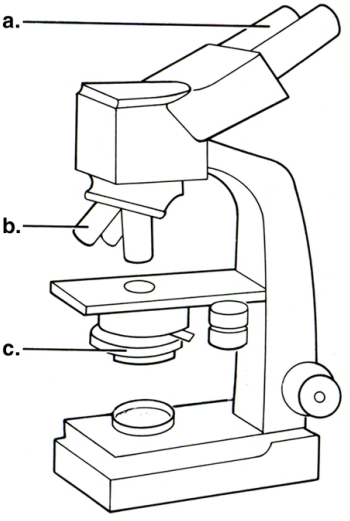
Answer: A
Explanation: A)
B)
C)
D)
E)

27) The counterstain in the Gram stain is 27) _____

A) A negative stain.
B) An acid dye.
C) A basic dye.
D) A mordant.
E) Necessary to determine the Gram reaction.

Answer: C
Explanation: A)
B)
C)
D)
E)

Figure 3.1



28) In Figure 3.1, line "b." points to the microscope's 28) _____
A) Ocular lens. B) Illuminator. C) Condenser. D) Objective lens.

Answer: D
Explanation: A)
B)
C)
D)

29) Which microscope can be used to visualize DNA or botulinum toxin? 29) _____
A) Phase-contrast microscope
B) Confocal microscope
C) Scanning electron microscope
D) Scanning tunneling microscope
E) Compound light microscope

Answer: D
Explanation: A)
B)
C)
D)
E)

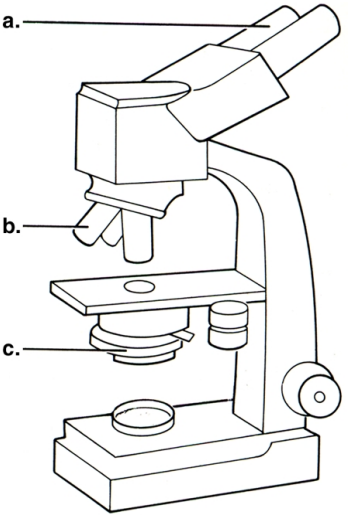
30) In which microscope does the image look like a negative stain? 30) _____
A) Scanning acoustic microscope
B) Darkfield microscope
C) Two-photon microscope
D) Fluorescence microscope
E) Phase-contrast microscope

Answer: B
Explanation: A)
B)
C)
D)
E)

31) The resolution of a microscope can be improved by changing the 31) _____
A) Wavelength of light.
B) Coarse adjustment.
C) Fine adjustment.
D) Diaphragm.
E) Condenser.

Answer: A
Explanation: A)
B)
C)
D)
E)

Figure 3.1



32) In Figure 3.1, line "c." points to the microscope's 32) _____
A) Ocular lens. B) Objective lens. C) Illuminator. D) Condenser.

Answer: D
Explanation: A)
B)
C)
D)

33) Which of the following pairs is mismatched? 33) _____
A) Scanning tunneling microscope — allows visualization of atoms
B) Fluorescence microscope — uses a fluorescent light
C) Scanning electron microscope — produces a three-dimensional image
D) Darkfield microscope — uses visible light
E) Confocal microscope — produces a three-dimensional image

Answer: B
Explanation: A)
B)
C)
D)
E)

34) Which microscope is used to see intracellular detail in a living cell? 34) _____
A) Two-photon microscope
B) Transmission electron microscope
C) Fluorescence microscope
D) Brightfield microscope
E) Atomic force microscope

Answer: A
Explanation: A)
B)
C)
D)
E)

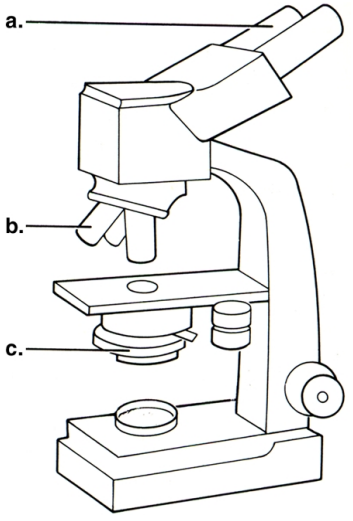
35) Which microscope is most useful for visualizing a biofilm? 35) _____
A) Phase-contrast microscope
B) Transmission electron microscope
C) Atomic force microscope
D) Compound light microscope
E) Scanning acoustic microscope

Answer: E
Explanation: A)
B)
C)
D)
E)

36) Which microscope is used to see detail of a 300-nm virus? 36) _____
A) Fluorescence microscope
B) Electron microscope
C) Phase-contrast microscope
D) Darkfield microscope
E) DIC microscope

Answer: B
Explanation: A)
B)
C)
D)
E)

Figure 3.1



37) In Figure 3.1, line "a." points to the microscope's 37) _____
A) Illuminator. B) Condenser. C) Objective lens. D) Ocular lens.

Answer: D
Explanation: A)
B)
C)
D)

38) The purpose of a mordant in the Gram stain is 38) _____
A) To make the bacterial cells larger.
B) To prevent the crystal violet from leaving the cells.
C) To make gram-negative cells visible.
D) To make the flagella visible.
E) To remove the simple stain.

Answer: B
Explanation: A)
B)
C)
D)
E)

39) Which of the following pairs is mismatched? 39) _____
A) Crystal violet — basic dye
B) Safranin — acid dye
C) Alcohol-acetone — decolorizer
D) Iodine — mordant
E) Carbolfuchsin — basic dye

Answer: B
Explanation: A)
B)
C)
D)
E)

40) The appearance of gram-negative bacteria after addition of the decolorizing agent in the Gram stain. 40) _____

A) Purple B) Red C) Colorless D) Brown

Answer: C

Explanation: A)
B)
C)
D)

41) Which of the following pairs is mismatched? 41) _____

A) Acid-alcohol — decolorizer
B) Gram-negative bacteria — negative stain
C) Crystal violet — simple stain
D) Iodine — mordant
E) Alcohol-acetone — decolorizer

Answer: B

Explanation: A)
B)
C)
D)
E)

42) Cells are differentiated after which step in the Gram stain? 42) _____

A) Alcohol-acetone B) Safranin
C) Iodine D) Crystal violet

Answer: A

Explanation: A)
B)
C)
D)

43) You find colorless areas in cells in a Gram-stained smear. What should you do next? 43) _____

A) An acid-fast stain
B) A simple stain
C) A capsule stain
D) A flagella stain
E) An endospore stain

Answer: E

Explanation: A)
B)
C)
D)
E)

44) The appearance of gram-positive bacteria after addition of the first dye in the Gram stain. 44) _____

A) Purple B) Red C) Colorless D) Brown

Answer: A

Explanation: A)
B)
C)
D)

45) The counterstain in the acid-fast stain is 45) _____

A) A basic dye.
B) A negative stain.
C) A mordant.
D) An acid dye.
E) Necessary to determine acid-fast cells.

Answer: A

Explanation: A)
B)
C)
D)
E)

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

46) In 1884, Hans Christian Gram described a method of staining bacterial cells while not staining surrounding animal tissues. However, he thought that the staining method he developed was faulty because not all bacteria stained. In a letter to the editor of the journal in which Gram published his findings, write your response to Gram's concern.

Answer:

47) In 1877, Robert Koch thought preparing permanently stained slides would be valuable. Why was his assessment correct?

Answer:

Answer Key
Testname: C3

1) A
2) E
3) C
4) A
5) A
6) E
7) E
8) C
9) A
10) D
11) C
12) D
13) D
14) A
15) D
16) B
17) C
18) B
19) D
20) D
21) E
22) E
23) E
24) B
25) E
26) A
27) C
28) D
29) D
30) B
31) A
32) D
33) B
34) A
35) E
36) B
37) D
38) B
39) B
40) C
41) B
42) A
43) E
44) A
45) A
46)
47)