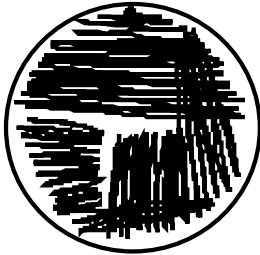


MIAMI DADE COLLEGE-WOLFSON CAMPUS  
MCB2010 - MICROBIOLOGY  
Dr. Edwin Ginés-Candelaria  
EXAM I REVIEW

Name \_\_\_\_\_

**Instructions:** READ each question **CAREFULLY** before answering. Then, **SELECT** the **BEST** answer and write it on the scantron sheet. Only answers that are written on the scantron sheet will be used for computation of your exam score. Please ensure that you select the appropriate choice before you transfer it to the scantron sheet. For True/False questions, please answer choice "A" if the statement is true, or choice "B" if it is false. Remember that **UNDERSTANDING** the instructions is an integral part of taking this examination. Each question is worth 4 points. There are 8 extra credit points in this exam. Work at a steady pace and you should have ample time to complete it. **BEST WISHES!**



Use the diagram of a streak plate shown above as reference to answer the following question(s).

1. T F A student in need to separate a mixed culture of bacteria decided to streak a plate with the mixed culture using the 3-phase technique shown above. After each phase streaked, he/she forgot to incinerate the inoculating loop in between phases and continued streaking the remaining phases of the streak plate. Upon overnight incubation, he/she obtained a confluent lawn on the plate.
2. The concept of a species as a group of interbreeding, or potentially interbreeding, populations reproductively isolated from other such groups is satisfactory for
  - A. higher organisms.
  - B. microorganisms.
  - C. both higher organisms and microorganisms.
  - D. neither higher organisms nor microorganisms.
  - E. all organisms.
3. The "Golden Age of Microbiology" was the time when
  - A. microorganisms were first used to make bread.
  - B. microorganisms were first use to make cheese.
  - C. most pathogenic bacteria were identified.
  - D. a vaccine against influenza was developed.
  - E. antibiotics became available.
4. The Archaea
  1. are microscopic.
  2. are comonly found in extreme environments.
  3. contain peptidoglycan.
  4. contain mitochondria.
  5. are most commonly found in soil.

A. 1, 2                      B. 2, 3                      C. 3, 4                      D. 4, 5                      E. 1, 5

5. Viruses

1. contain both protein and nucleic acid.
2. infect all domains of life.
3. can grow in the absence of living cells.
4. are generally the same size as prokaryotes.
5. always kill the cell they infect.

A. 1, 2                      B. 2, 3                      C. 3, 4                      D. 4, 5                      E. 1, 5

6. Anton van Leeuwenhoek could not have observed

A. roundworms      B. *Escherichia coli*      C. yeasts                      D. viruses                      E. all of these

7. Which of Koch's postulates requires modification for study of a human disease?

- A. The microbe is found in all cases of the disease but is absent from healthy individuals.
- B. The microbe is isolated from the disease host and grown in pure culture.
- C. When the microbe is introduced into a healthy, susceptible host, the same disease occurs.
- D. The same strain of microbe is obtained from the newly diseased organism. When cultured, the strain shows the same traits as before.
- E. no modification necessary, all of the above could be used for the study of a human disease.

8. A nanometer is \_\_\_\_\_ than a micrometer.

- A. 10 times larger
- B. 10 times smaller
- C. 1000 times larger
- D. 1000 times smaller
- E. 1000000 times smaller

9. A pencil is 7.0 inches long. What is its length in cm?

A. 17.8 cm                      B. 19 cm                      C. 20 cm                      D. 15 cm                      E. 25 cm

10. Which of the following is different between light microscopy and transmission electron microscopy?

A. magnification      B. resolution                      C. wavelengths                      D. all of these

11. Which one of the following is not part of the streak-plate method?

- A. Making 3 or 4 sets of streaks on a plate
- B. Diluting a mixed culture in molten agar
- C. Using a mixed culture
- D. Using a sterilized loop in between phases
- E. Using a continuous movement of the loop on the agar ensuring that streak lines are close together

12. If the pH indicator were left out of MacConkey's agar, the medium would be

- A. selective and differential
- B. differential
- C. chemically defined
- D. complex
- E. enrichment and differential

13. If the carbon source in a growth medium is beef extract, the medium must be an example of a/an \_\_\_\_\_ medium.

A. complex                      B. chemically defined                      C. enrichment                      D. selective                      E. differential

14. A \_\_\_\_\_ medium would involve the addition of the antibiotic methicillin to identify methicillin-resistant bacteria.

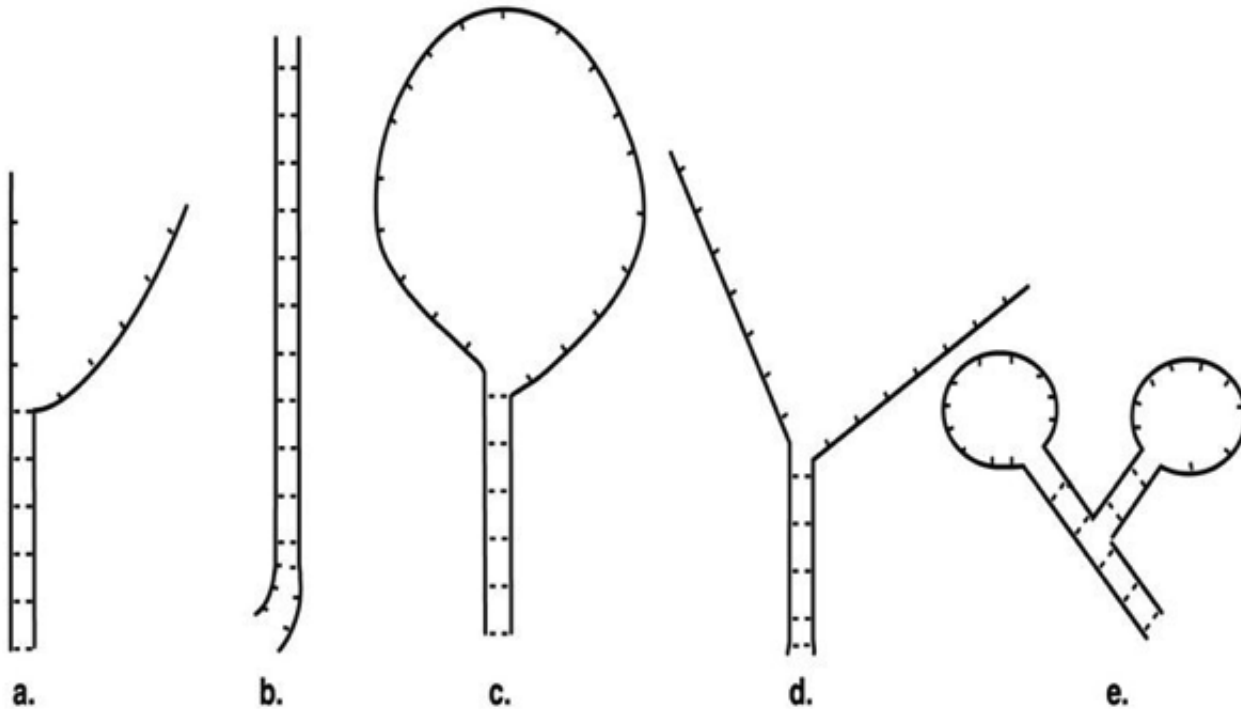
- A. differential
- B. selective
- C. selective and differential
- D. chemically defined
- E. complex

15. Which molecular technique is now used to identify a very specific strain of a disease-causing microbe?

- A. Centrifugation.
- B. Plate culture.
- C. Polymerase chain reaction (PCR) amplification of DNA.
- D. Gram stain

16. T F Western blotting uses antibodies to detect specific proteins in a mixture of proteins.

17. A nucleic acid hybridization experiment produced the following results.



Which figure shows the most closely related organisms?

- A. a
- B. b
- C. c
- D. d
- E. e

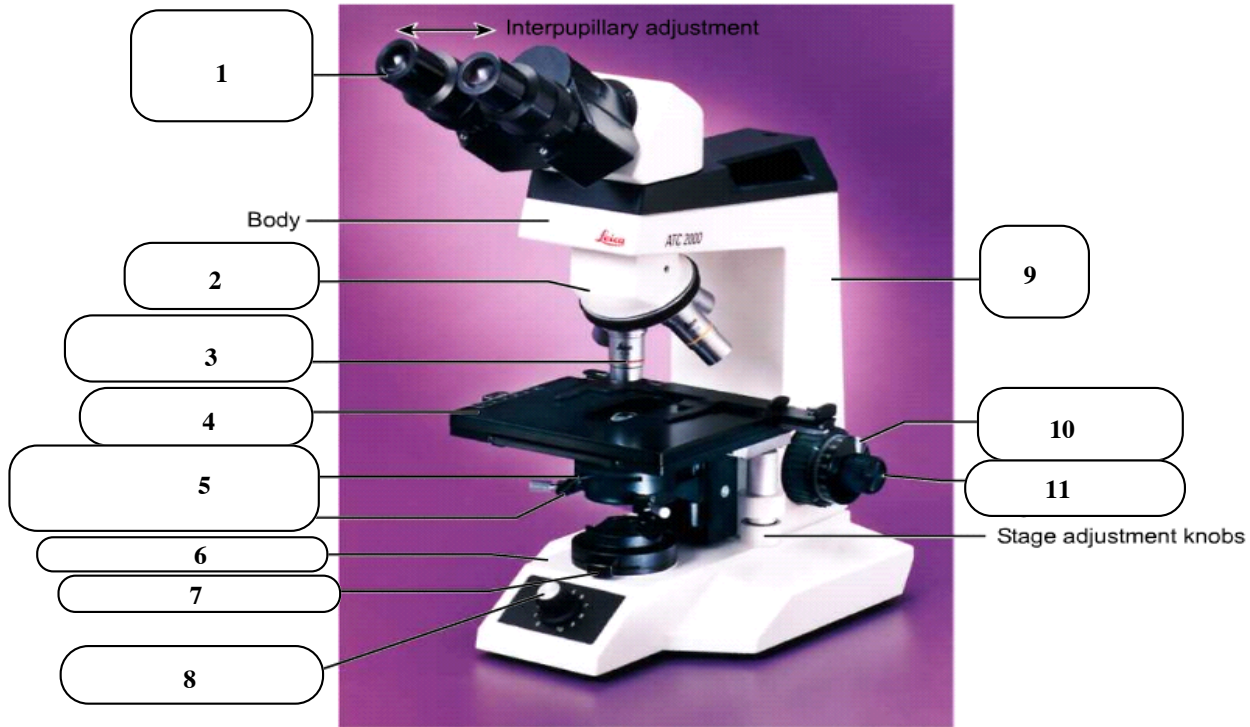
18. Which of the following is the least effective in determining the relatedness and evolution of two bacteria?

- A. DNA hybridization
- B. protein profile
- C. cell morphology
- D. studying the 16S rRNA
- E. phage typing

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

20. Resolving power of a microscope is described as the ability of the microscope to

- A. see structures at various depths in a tissue
- B. magnify an object without distortion
- C. separate the colors of the organism's organelles
- D. separate clearly two objects that are very close together
- E. none of the above are correct



Use the figure of the microscope shown above to answer the following question(s).

21. Control the amount of light that enters the objective lens.
  - A. 1
  - B. 2
  - C. 6
  - D. 4
  - E. 5
22. T F Capsules produced by bacteria are best outlined with positive stains.
23. Serological testing is based on the fact that
  - A. all bacteria have the same antigens.
  - B. antibodies react specifically with an antigen.
  - C. the human body makes antibodies against bacteria.
  - D. antibodies cause the formation of antigens.
  - E. bacteria clump together when mixed with any antibodies.
24. PCR can be used to identify an unknown bacterium because
  - A. the primer is specific.
  - B. DNA polymerase will replicate DNA.
  - C. DNA can be electrophoresed.
  - D. all cells have DNA.
  - E. all cells have RNA.
25. The way to express 1300 in scientific notation is
  - A.  $1.3 \times 10^3$
  - B.  $13 \times 10^2$
  - C.  $130 \times 10^1$
  - D.  $13 \times 10^3$
  - E. none of the above
26. What is the resolution (in  $\mu\text{m}$ ) of a cell viewed with an objective of numerical aperture 0.2; when the wavelength of the light source is 200 nm?
  - A. 0.5  $\mu\text{m}$
  - B. 0.25  $\mu\text{m}$
  - C. 0.1  $\mu\text{m}$
  - D. 500 nm
  - E. 0.25  $\mu\text{m}$
27. Would you be able to see a cell of diameter 0.15  $\mu\text{m}$  with the microscope of the previous question?
  - A. No, because the smallest visible cell has a diameter of 0.01  $\mu\text{m}$ .
  - B. Yes, because the smallest visible cell has a diameter of 0.2  $\mu\text{m}$ .
  - C. No, because the smallest visible cell is less than the limit of resolution of the previous microscope .
  - D. Yes, because the cell is large enough to be distinguished by the above microscope
  - E. none of the above choices is correct.