

MICROBIOLOGY EXAM #1

Name _____

28 September 1999

Multiple Choice & True/False (2 pts each): Unless directed to do so, chose the ONE most appropriate answer from the choices given.

1. Why was it not advisable to heat-fix slides during the negative staining procedure?
 - a. The heat prevents the capsules from adhering to the slide
 - b. Most bacteria seen with negative staining do not need to be stuck to the slide
 - c. Many bacteria are fragile and can not withstand heat fixing
 - d. Heat fixing would disintegrate the capsule of most bacteria
 - e. All of the above are reasonable reasons

2. The mesosome is a structure found within some bacteria whose position can be described as:
 - a. Contiguous with the cell wall and cell membrane
 - b. Contiguous with the cell wall
 - c. Contiguous with the membrane
 - d. Terminal
 - c. Subterminal

3. Which microscope is likely to give you an image produced by parallel light waves
 - a. An infra-red microscope
 - b. A microscope with a Spectroscopic condenser
 - c. A transmission electron microscope
 - d. A scanning electron microscope
 - e. A microscope with polarizing lenses
 - f. Answers c and d are correct

4. Which of the following is most true (circle only one):
 - a. Fastidious microbes require complex media
 - b. Fastidious microbes require chemically defined media
 - c. Non-fastidious microbes require complex media
 - d. Non-fastidious microbes require chemically-defined media

5. Which of the following is NOT required when caring for a microscope:
 - a. Carrying the scope by arm and base using both hands
 - b. Cleaning off any remaining immersion oil off all the objective lenses
 - c. Turning the light intensity rheostat to the lowest setting before putting the scope away
 - d. Setting the scope at the highest magnification before putting the scope away
 - e. Covering the scope with a dust cover

6. If a Chromophore of a stain is negatively charged, the stain is usually classified as a(n):
 - a. Basic stain
 - b. Acidic stain
 - c. Acid-fast stain
 - d. Carbol-fuschin stain
 - e. None of the above

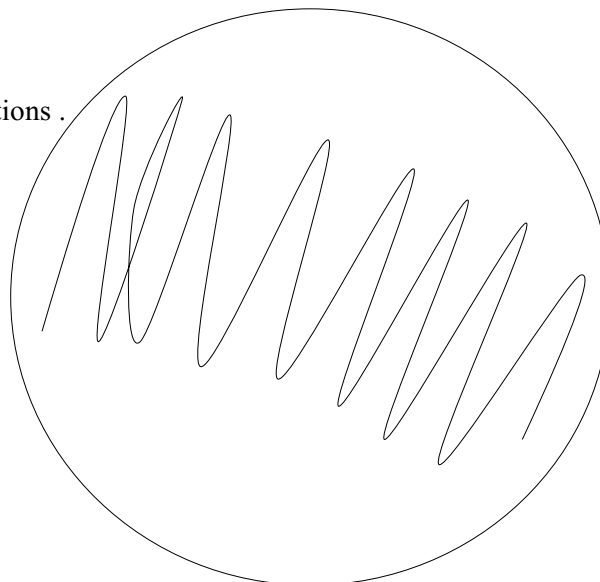
7. A wax pencil mark on the on the top surface of the slide is MOST useful because. . .

- a. Allows you to determine which way is up on the slide
 - b. Allows you to easily focus on the same plane as the microbes
 - c. Exactly centers the slide on the field of view
 - d. Allows for rapid determination of motility
 - e. None of the above are useful
8. Who among the following was most directly responsible for demonstrating the relationship between microbes and disease?
- a. Robert Koch
 - b. Anthony van leeuwenhoek
 - c. Ignaz Semmelweis
 - d. Joseph Lister
 - e. Fransesco Redi
 - f. Mary Montegue
9. Who could you argue was also directly responsible for showing that microbes caused disease (3 pts)?
10. Besides the presence of membrane bound organelles, what is another way to distinguish eukaryotes from prokaryotes?
- a. If the organism is only one cell, it is considered a prokaryote
 - b. Treat with crystal violet
 - c. Look at cells under a dissecting scope
 - d. Weigh ribosomes
 - e. None of the above
11. What color would *Bacillus megaterium* (a gram positive bacterium) be if, during the gram staining procedure, crystal violet were not used?
- a. Clear (no color)
 - b. Violet or blue
 - c. Pink or red
 - d. Brown
 - e. The world is not prejudiced and so doesn't look at color
12. Some tissue arrives from the coroner's office with the message, possible case of leprosy. There are some presumptive tests you can use to determine whether the guess from the coroner is correct. Among the test(s) that may be the MOST helpful is . . .
- a. Koch's postulates
 - b. Gram stain
 - c. Acid-fast stain
 - d. Redi's dictums
 - e. Spore stain
 - f. Herrera's test of microbiological trivia
13. The most likely reason a microbe may be categorized as gram + is (are) . . .

- a. The thickness of its cell wall
 - b. The consistency of its membrane proteins
 - c. The affinity for decolorizing alcohol
 - d. The ability of Methylene blue to complex with Iodine
 - e. The morphology is often bacillus
 - f. None of the above are true
14. During the 1300's, the microbe, *Yersinia pestis* was responsible for a worldwide epidemic of:
- a. Cholera
 - b. Dysentery
 - c. Bubonic plague
 - d. Prepubertal fever
 - e. Small pox
 - f. Cow pox
15. (T/F). Inclusion bodies are eukaryotic storage structures that can store carbon, enzymes (e.g., rubisco) and other compounds (2 pts).
16. Which of the following is true (**circle all, or none that apply; 4 pts**):
- a. Plasmids are only found in prokaryotes
 - b. Plasmids can be linear extra-chromosomal pieces of DNA
 - c. Plasmids can carry genes that code for antibiotic resistance
 - d. Griffith used dead bacteria that donated plasmids to transform live bacterial cells
17. Which of the following is NOT true (**circle all, or none that apply; 4 pts**)
- a. Dark field scope show bright organisms on a dark background
 - b. Brightfield scopes show dark organisms on a bright background
 - c. Transmission electron microscope uses electrons that are focused by a magnet to penetrate through the organism, captured by receivers and used to form an image on a monitor
 - d. Structures that differ in density or movement are best seen in action with the use of a phase contrast scope
18. Which of the following is TRUE (**circle all or none that apply; 4 pts**)
- a. Doctors during the 1500's used microscopes to detect infective microorganisms
 - b. Heat fixing a slide is a good idea when staining for capsules
 - c. Gram negative cells do not contain as many peptidoglycan layers as gram positive cells
 - d. Some bacteria contain nuclei
- 19.
- 20.

19. In lab, when I asked you to prepare a smear from an isolated bacterial colony growing on an agar **slant**, what is the first object that should have touched the colony (3 pts)?

. Use the plate below to answer the following questions .



a. Please draw on the plate where you would BE MOST LIKELY to find isolated colonies (draw little isolated circles where you would expect isolated colonies).

b. If you were interested in isolating microorganisms, would you use a needle, loop, swab or spreader.

c. After you re through streaking the plate what would you need to do next (check all that are appropriate)

- sterilize your plate lid
- incubate plate right-side up
- label on the top lid of the plate

d. On the plate, draw a circle around the most obvious mistake in the streak.

21. Give me an example of (or draw) the following (3 pts each):

a. Give me an example of a complex stain

b. Draw a microbe with peritrichous arrangement of flagella

c. Draw a sarcina

d. Give me an example of a Eukaryotic microbe

22. During lab a student washes her hands, the desktop, sterilizes her inoculating loop, flames the lip of a broth containing two species of bacteria and inoculates a tryptone agar plate with a loop. She then labels the bottom of her plate and places it right side up in the 30 C° incubator and waits for 24 hours before she observes her results. By changing ONE word or phrase to the statement above you may be able to change the MOST serious error to the student s procedure. Which word did you change and why (5 pts)?

23. Would you expect infrared wavelengths to increase the resolving power of a light microscope under oil immersion? Why or Why not? (5 pts).

24. Using the equation: $n = (\log N_t - \log N_0) / 0.301$, and $k = n/t$. . . A population of *Bacillus cereus* are growing in a broth culture in a laboratory. Using a Petroff-Hauser slide you find 80 individual microbes

in 25 of the total 100 grids (25%). Two hours later you sample the same broth and note that there are now 300 individual microbes in 25 of the total 100 grids (25%). Assuming that you use a Petroff-Hauser slide that measures microbes in a 0.5 ml volume . . .

A. What is the population concentration (in microbes/**ml**) at both sampling times (6 pts)?

B. Calculate (in minutes) the mean generation time (doubling time) for the population of the bacterium, *B. cereus* (10 pts)

Extra credit: What's the name of at least one of your TA s (first names acceptable)? (1 pt)