

FINAL EXAM . . . THANK GOODNESS

Name \_\_\_\_\_

30 April 1998

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

1. Movement by myxostelids is usually brought about by. . .
  - a. protoplasmic streaming
  - b. cytoplasmic streaming
  - c. pseudopodia
  - d. heterokaryon
  - e. myxostelids do not move, rather their cells replicate
  
2. Which nucleic acid polymer is cDNA transcribed from:
  - a. DNA
  - b. tRNA
  - c. mRNA with introns
  - d. mRNA without introns
  
3. What enzyme is used to cut dsDNA at specific nucleotide sequences?
  - a. T<sub>aq</sub> polymerase
  - b. Reverse transcriptase
  - c. Restriction enzymes
  - d. Kinase
  - e. People with sharp swords
  
4. During the spring of 2010, there is a large outbreak of *Hepatitis A* in St. Louis. Drs. Boes and Dalpaiz, working out of Washington University, in St. Louis, work out the details of the outbreak. They agree to a phone interview where a reporter from the Chicago Tribune asks them, Can this disease be spread through the air? The two researchers remember reading/hearing in Herrera s class when they were undergraduates about Pat Ross and *Hepatitis A* and the general requirements for contact, indirect and airborne transmission. And they answer the reporter:
  - a. The virus is spread by airborne transmission, which requires the virus to be transmitted over a meter to a new host.
  - b. The virus is spread by airborne transmission, which requires the virus to be transmitted over 10 meters in the air to a new host.
  - c. The bacteria is spread by airborne transmission, which requires the virus to be transmitted over a meter in the air to a new host.
  - d. The bacteria is spread by airborne transmission, which requires the virus to be transmitted over 10 meters in the air to a new host.
  - e. The virus is spread by indirect (fomite) or direct transmission, which requires the virus to be transmitted over a meter in the air to a new host.
  - f. The virus is spread by direct transmission only.
  - g. The virus is spread by indirect (fomite) or direct transmission.
  
5. The monitor/projection system is showing:

- a. The Zygomycete: *Rhizopus*
- b. The Deuteromycete: *Penicillium*
- c. The Deuteromycete: *Aspergillus*
- d. The Zygomycete: *Radiolaria*
- e. The Zygomycete: *Aspergillus*
- f. The Deuteromycete: *Cladosporium*

6. Fever does all of the following **except**:

- a. resets hypothalamic activity
- b. stimulates production of leukocytes
- c. decreases availability of iron in the blood system
- d. increases production of estrogen
- e. enhances specific activity of the immune system

7. Besides fungi, the group of organisms most often cited for producing antibiotics are the:

- a. algae
- b. actinomycetes
- c. mutualistic bacteria
- d. Viruses
- e. all of the above

8. Using the xeroxed table on the back of this test, answer the following question: Drs. Meyer and Peterson have isolated a strain of *Staphylococcus* from an infection growing on a patient's eye. They decide to use the Kirby-Bauer method to test the microbes susceptibility to a variety of antibiotics. They obtain the following results:

<u>Antibiotic(s) used</u>	<u>Diameter of kill zone (clear zone; in mm)</u>
1 g of Oxacillin	14
5 g of Methicillin	13
combo of 75 g of Ticarcillin/10 g Clavulanic Acid	14
combo of 100 g of Piperacillin/ 10 g of Tazobactam	17

In order to treat the infection MOST efficaciously, the doctors should treat the infection with:

- a. 1 g of Oxacillin
  - b. Either 1 g of Oxacillin or 5 g of Methicillin
  - c. 5 g of Methicillin
  - d. combo of 75 g of Ticarcillin/10 g Clavulanic Acid
  - e. combo of 100 g of Piperacillin/ 10 g of Tazobactam
  - f. Can't approximate with information given
9. In most vertebrates, what location is there likely to be the lowest concentration of microbes?

- a. the lower urogenital tract
  - b. the oral cavity
  - c. the stomach
  - d. the small intestine
  - e. the urinary bladder
10. You know that one of the statements below is false, which one is it?
- a. Yogurt is produced by a yeast
  - b. Compared to water, milk is usually a better growth medium for microbes
  - c. The microbes in wine produce CO<sub>2</sub> as a bi-product of metabolizing grape juice
  - d. Pasteurized milk that is autoclaved is sterile
  - e. Milk is sometimes referred to as moo-juice
  - f. You will do well on this test
11. Many herbivores have the capacity to ferment different carbohydrates in their stomachs. How do microbes help in this process?
- a. they degrade toxins
  - b. they break 1-4 beta bonds
  - c. outcompete pathogenic microbes
  - d. liberate nutrients
  - e. all of the above
12. The population of microbes living in your GI tract is:
- a. Approximately  $3 \times 10^{13}$ , many of which are excreted daily
  - b. Approximately  $3 \times 10^{13}$ , few of which are excreted daily
  - c. Approximately  $1 \times 10^{24}$ , many of which are excreted daily
  - d. Approximately  $1 \times 10^{24}$ , few of which are excreted daily
  - e. Counted every ten years
13. A primary stain used to determine whether an organism is acid fast is . . .
- a. Nigrosine
  - b. Malachite green
  - c. Carbol green
  - d. Carbol fuchsin
  - e. Nigrosamine
  - f. Malachite red
14. Why is yogurt helpful for certain infections?
- a. yogurt contains small amounts of penicillin that eliminate some yeasts
  - b. yogurt contains yeasts that can outcompete the yeasts that cause the infection
  - c. yogurt is a probiotic
  - d. yogurt forces yeast to enter the death phase of their growth cycle
15. Which of the following aseptic procedures **is necessary** for transferring a bacteria from one

broth to another?

- a. stir donor tube before taking an inoculation
  - b. allow four or five seconds for the flamed inoculating loop to cool before inoculating
  - c. use and inoculation needle instead of a loop
  - d. dispense out microbes into 4-5 loopfuls of distilled water before transferring
  - e. flaming this test
16. Which of the following is likely NOT to change the microbiota of your face?
- a. probiotics
  - b. hormones
  - c. temperature
  - d. stress
  - e. all of the above are likely to change the microbiota of your skin
17. Which of the following is the most egregious (serious) error in procedure?
- a. Using a pipette to transfer microbes to a broth culture
  - b. Shake an FTM tube after reading (assessing) it
  - c. Using an inoculating needle to conduct the gelatinase test
  - d. Shake an FTM tube before reading (assessing) it
  - e. Shake, chili and greasy fries on a date
18. What is the principal reasons epidemiologists take mid-stream urine samples?
- a. 1st part of urine stream is likely infected by commensal microorganisms
  - b. 1st part of urine stream is likely to be oxidized in the lower GI tract
  - c. 1st part of urine stream is likely uninfected with any microorganisms
  - d. Last part of urine stream is contaminated by urea particles
  - e. They are detectives, not urologists.
19. LD<sub>25</sub> of a toxin is:
- a. the dose of the toxin that kills 25% of a test population
  - b. the dose of toxin that allows 25% of a test population to survive
  - c. the dose of toxin that 75% of a test population are susceptible to
  - d. the dose of toxin that 25% of a test population are susceptible to
  - e. the dose that 25% (1 out of 4) doctors agree, is helpful
20. What is the purpose of iodine in the gram stain?
- a. to decolorize the crystal violet into a pink
  - b. to stain the organisms a purple color
  - c. to make sure that the crystal violet complexes and remains within the cell
  - d. stains colorless cells pink so that they are visible

21. What is the purpose of a Spectrophotometer?
- Measure the spectral absorbance of a population of microbes in solution
  - Assist in measuring the number of microbial colonies by magnifying the Petri dishes.
  - To count the number of individual microbes with an electronic beam of light.
  - To help you keep track of the number of colonies you've counted
  - To help you count the number of blind extremists coming into the country.
22. Capsules can usually be best visualized on a compound scope by:
- using India ink to negative stain the slide
  - adding carbol-fuchsin to highlight the glycoproteins in the capsule
  - adding methylene blue to help distinguish the capsule from the background
  - using malachite green to distinguish the NAM and NAG layers from the capsule
23. In lecture, I told you that diatomaceous earth was produced by \_\_\_\_\_ and was useful for \_\_\_\_\_ (fill in the blanks with one of the options below)
- Golden-brown algae (Chrysophyta); producing agar
  - Golden-brown algae (Chrysophyta); insulation
  - Red algae (Rhodophyta); producing agar
  - Red algae (Rhodophyta); producing Dulce and other oriental foods
  - Brown algae (Phaeophyta); producing agar
24. The most appropriate way that viruses can be relatively enumerated is:
- Counting the virions under a light microscope
  - Infecting several cells and observing the number of cells that are infected
  - Assess the relative amount of hemagglutination in an agglutination assay
  - Dilute viral particles down in water and plate them out on nutrient agar plates
25. The disease, Lumpy jaw is produced by what type of organisms
- Actinomycetes
  - Algae
  - Fungi-Deuteromycetes
  - Fungi-Ascomycetes
  - Bacteria
  - Viruses
  - Trying to eat 20 saltines without water
26. Which of the following is not a guideline on selection, collection, and handling of clinical specimens?
- A small quantity of specimen should be obtained
  - The specimen selected should be representative of the infectious disease process
  - The specimens should be forwarded promptly to the clinical laboratory
  - Attention must be given to avoid contamination of the specimen

27. T/F Viruses can't contain RNA
28. T/F some scientists believe that viruses evolved from renegade nucleic acids
29. T/F Koala infants can consume their mother's feces to decrease microbial number in their GI tract.
30. T/F Viruses were first isolated by Louis Pasteur using porcelain filters
31. T/F The ELISA stands for Enzyme-Linked Immunosorbant Assay and is often used to detect presence of specific viral particles or their antibodies.
32. T/F Active immunization of a population will raise the general level of herd immunity.

35. Match the characteristic or concept to the MOST appropriate organism (1 pt each)

- |   |                  |
|---|------------------|
| _____ production of geosmin                           | A. Oomycetes     |
| _____ production of beer                              | B. Algae         |
| _____ responsible for red tides                       | C. Ascomycetes   |
| _____ are responsible for the process of transduction | D. Actinomycetes |
| _____ have flagellated spores                         | E. Bacteria      |
| _____ Prokaryotes (pick two letters!)                 | F. Viruses       |
| _____ fucoxanthin as a pigment                        |                  |

Longer questions. . . .

36. What's the difference between a **sign** and a **symptom**? (4 pts).

37. During your dinner party, your boss asks for a mild Margarita. She suggests that you dilute 1 cup of Tequila by a factor of 8. Without using the word **dilution**, give me the equation for dilution factor (please **DEFINE** all of your variables in your equation; 4 pts)

38. Give me an example (describe) of how resistance can be conferred by the environment (5 points).

39. Your favorite spice girls CD is missing and your fuming. But you're in luck because, at the crime scene, the thief left a drop of blood. The drop itself doesn't have enough DNA to analyze. Describe how you would go about duplicating a strand of DNA enough so that you could analyze it (you can't get out of this question by claiming you don't like the spice girls. ). In your description include the terms **T<sub>aq</sub>**, **reverse transcriptase**, **DNA**, **melt**, **primer**, and **reannealed** (6 pts).

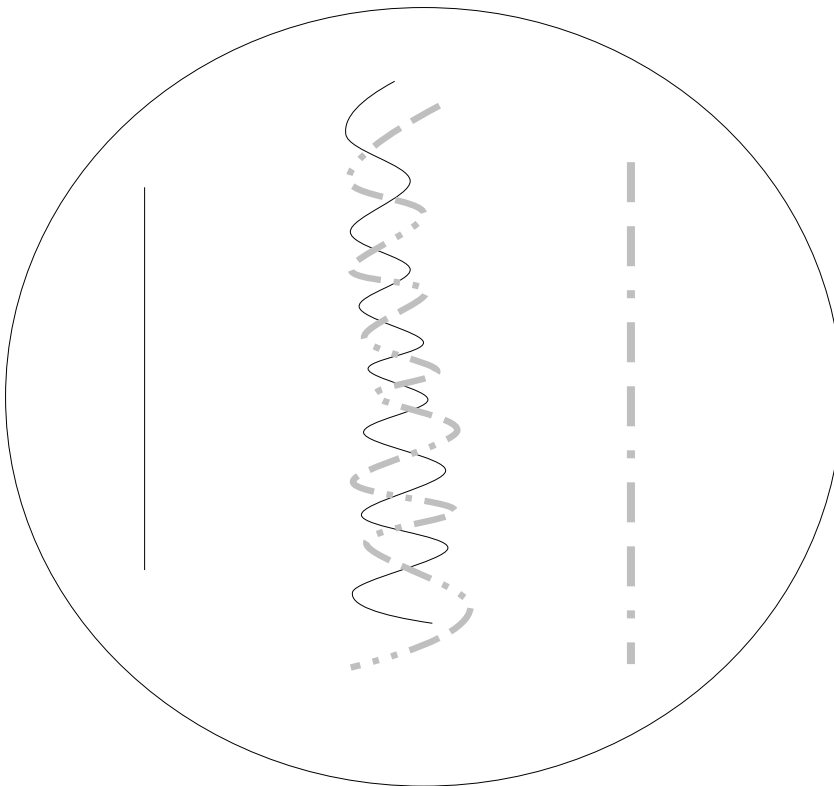
40. All gram negative enteric bacteria are not disease causing. So why did we look for these particular species when conducting water analysis during the lab period? (4 points)

41. Your laboratory instructor tells you that the plate below contains streptomycin but does not contain the amino acid tryptophan. Two different bacteria are streaked on the plate: E. Coli strain R-20 (recipient); E. Coli strain D-23.

\* Strain R-20 is competent to accept Plasmids from the donor strain but needs tryptophan as a nutritional supplement but is not susceptible to streptomycin.

\* Strain D-23 contains a plasmid that codes for production of the amino acids leucine and tryptophan, but is susceptible to streptomycin;

Using the plate below DRAW where you would expect colonies to grow; in addition, to avoid confusion, please describe the locations of growth below the drawing of the plate? (6 pts)



Extra credit: What s my office number? . . . SH???