Microbiology Lab Exam 2 – Study Guide

**Fermentation - 13**
1. What is fermentation?
2. What is being distinguished in the Carbohydrate fermentation test?
3. What is the indicator used in the carbohydrate fermentation test?
4. What is the appearance of a positive result for carbohydrate fermentation to an acid? To a gas?
5. What is the appearance of a negative result for carbohydrate fermentation?
6. What sugar is in the MR-VP broth?
7. What is being distinguished in the MR and VP tests?
8. What reagents are used in the MR and VP tests?
9. What is the appearance of a positive result for the MR and VP tests?
10. What is the appearance of a negative result for the MR and VP tests?

**Transformation Lab - 14**
1. Explain why you would expect no bacteria growth on an LB/amp - DNA plate.
2. Explain why you would expect isolated bacteria to grow on an LB/amp plate +DNA plate.
3. Explain the purpose of the arabinose on the LB/amp/ara +DNA plate.
4. Explain why you would expect a lawn of bacteria on the LB –DNA plate.

**Chemical Control of Microbes - 15**
1. Define antiseptic and disinfectant. Which of the chemicals used were antiseptics? Disinfectants?
2. What are the factors that affect the efficiency of the disinfectants and antiseptics?
3. What does the "zone of inhibition" indicate about the bacteria's relationship to the chemical?
4. What is the phenol coefficient? How is it determined?

**Antibiotic Sensitivity Testing - 16**
1. Compare the terms antibiotic and chemotherapeutic agent.
2. What is the minimum inhibitory concentration? How is it determined?
3. What conditions must be controlled to make this test repeatable and accurate?
4. What are the modes of action for the antibiotics used?

**Handwashing and Epidemiology Lab – 17**
1. What is epidemiology?
2. What government organization is the main source of epidemiological information for the United States?
3. What is an “index case”?
4. How is an “index case” determined?
5. What is a case definition?
6. Define communicable and non-communicable.
7. What are some direct methods of transmission? Indirect?
8. Define fomite. Is it direct or indirect?
Identification: Primary Isolation Media – 18
1. What is selective media?
2. What is differential media?
3. Can a media be both?
4. For each of the following media, know the following:
   a. For what are they selective and/or differential?
   b. What is the selective agent (if any)?
   c. What is its appearance?
   d. How is it differential?
   e. What indicator is used (if any)?
   f. What is the appearance of a positive test?
5. For each of the following media, know the above information
   a. Blood Agar (BA),
   b. Mannitol Salt Agar (MSA)
   c. Phenylethanol Agar (PEA)
   d. Eosin Methylene Blue (EMB)
   e. MacConkey (MAC).

Identification: Biochemical Tests – 19
1. What type of test (fermentation or enzyme/substrate)?
2. What does this test distinguish?
3. What are the enzymes and substrates involved (if applicable)?
4. What sugar is fermented (if applicable)?
5. What are the indicators and reagents?
6. What are the appearances of a positive and negative test?
7. For each of the following tests know the above information.
   a. Starch Hydrolysis (Amylase)
   b. Catalase
   c. Gelatinase
   d. Phenylalanine Deaminase
   e. SIM
   f. Urease

Identification: Immunological Methods - 20
Agglutination
1. What is agglutination?
2. What is hemagglutination? Give an example of a hemagglutination test.
3. What is passive agglutination? Give an example of a passive agglutination test.
4. Why is it important that these two tests are so rapid and so accurate?
Identification: Enzyme Linked Immunosorbant Assay - 21
1. What does ELISA mean?
2. Why is it better to have and “Enzyme-linked” antibody rather than “Substrate-linked” antibodies in this test?
3. Illustrate one “well” of an indirect ELISA test (include the primary antibody, secondary antibody, antigen and substrate.)
   a. Where did the primary antibody come from?
   b. Why should the secondary antibody stick to the primary antibody?
4. Why is a blocking agent added to the plate in a clinical setting?
5. Why is it necessary to switch “tips” or pipettes when removing serum from the wells of different rows (between patients’ serum or between different dilutions).
6. Why is it necessary to wash between each step?

Identification: Microbes of the Skin (Staphylococcus) – 22
1. Microbes of the Respiratory Gram Reaction and Morphology?
2. What are the three species we worked with in class?
3. Where are they found?
4. What diseases do they cause?
5. What are their respective results and appearance?
6. Remember the following tests:
   1. Hemolysis
   2. Novabiocin (mode of action)
   3. Mannitol Salt Agar
   4. Catalase
   5. Coagulase (enzyme, substrate, +/- test results)

Identification: Microbes of the Respiratory System (Streptococcus) – 23
1. Gram Reaction and Morphology
2. How many Lancefield groups of Streptococci have been identified?
3. What is the primary pathogen in Group A strep?
4. Where are it found?
5. What diseases does it cause?
6. The Rapid Strep Test was used to identify which group of Streptococcus?
7. What is the basis of the Rapid Strep Test?
8. What test would you use to distinguish between Staphylococcus and Streptococcus?
9. Which is Catalase +? Which is Catalase -?

Identification: Unknown Microbe Lab - 24
1. Why is a gram stain performed first in the identification process?
2. What test can distinguish Staphylococcus from Streptococcus without doing a gram Stain?
3. Name the Enterobacteriaceae bacteria tested for in this unknown lab. Why are biochemical tests required to identify bacteria?
4. How are fermentation tests used to identify bacteria?
5. What are the five I’s of the microbiology lab and how were they used in this lab?
6. How could Selective and Differential Media have helped in identification of the unknown bacteria?
**Food Contamination Lab - 25**

1. What is the purpose of determining the concentration of bacteria in the original sample of food?
2. Is milk typically sterile?
3. Describe the processes (time and temperature) used to purify milk for consumption.
4. What type of bacteria are we concerned about as contaminants of hamburger?
5. What type of bacteria are we concerned about as contaminants of potato salad?

**Water Contamination Lab - 26**

1. Describe the membrane filtration technique.
2. What are “coliforms”? Why are “coliforms” an indication of pollution?
3. What type of media is used to identify coliforms?
4. What is the standard for “potable” water?
5. How much water should be sampled if the water is from a swimming pool? Lake?