**Microbiology II Laboratory Midterm Pre-Exam**

1. What are the **products** of the reaction: tryptophan + tryptophanase, and which *bacterium* expresses the enzyme responsible for these products?
   1. **Urea, pyruvate, and ammonia**/*Klebsiella pneumoniae*
   2. **Indole and ammonia**/*Bacillus subtilis*
   3. **Indole, pyruvate, and ammonia**/*Escherichia coli*
   4. **Indole, pyruvate, and ammonia**/*Staphylococcus aureus*
2. Beta-hemolytic is
   1. Partial destruction of hemoglobin
   2. Complete destruction of hemoglobin
   3. None of these
   4. Both of these
3. Considering the previous question, what observation would result in this type of hemolysis?
   1. Nothing would happen to the media
   2. Greenish or cloudy appearance would be present
   3. Decolorizing of hemoglobin would be seen producing a clear zone around the colony
4. To test for indole, which of the following reagents would be used?
   1. Kovach’s reagent
   2. Simmons citrate
   3. Methyl red
   4. Nitrate reagent
5. From the correct choice above, which of the following is the main constituent that allows for the indole presence to be verified?
   1. Carboxylic acid
   2. Ortho-chlorohexose
   3. Para-aminobenzaldehyde
   4. Sodium thiosulfate
6. When indole is verified, what color would be seen to prove its presence?
   1. Yellow
   2. Blue
   3. Red
   4. Green
7. Fermentation is
   1. Aerobic catabolism of carbohydrates
   2. Anaerobic anabolism of carbohydrates
   3. Anaerobic catabolism of carbohydrates
   4. None of the above
8. Permeases are found in
   1. Aerobes
   2. Anaerobes
   3. Both A and B
   4. Neither
9. Carbohydrase is a member of the
   1. Exoenzymes
   2. Endoenzymes
   3. Alpha enzymes
   4. Beta enzymes
10. Fermentation usually will yield which of the following products?
    1. Acids
    2. Gases and acids
    3. Salts
    4. Both A and B
    5. None of the above
11. Which of the following pH indicators will turn yellow when a bacterial species yields an acidic product?
    1. Bromthymol blue
    2. Methyl red
    3. Phenol red
    4. None of these
12. Is it true that some bacterial species can metabolize carbohydrates aerobically (oxidation)? And if so, which of the following species would exhibit such metabolic properties?
    1. Yes, it is true/*Escherichia coli*
    2. Yes, it is true/*Bacillus subtilis*
    3. No, it is not possible
13. Triple sugar iron agar will identify which of the following species of bacteria?
    1. *Escherichia coli*
    2. *Staphylococcus aureus*
    3. Gram negative enteric rods
    4. Both A and C
    5. None of these
14. In relation to the agar mentioned above, which of the following sets of percentages of sugars would be found in such a medium?
    1. Glucose (0.01%); Sucrose (1.0%); Lactose (1.0%)
    2. Glucose (0.1%); Sucrose (1.0%)
    3. Lactose (1.0%)
    4. The combination of choices B and C
15. In the same agar as mentioned in the previous two questions, where would glucose likely be metabolized within the tube?
    1. The whole tube
    2. The middle of the tube
    3. The butt of the tube
    4. Glucose is not found in this medium
16. When *Escherichia coli* is grown in TSI agar, what would be the likely outcome?
    1. No change would be observed
    2. Agar would change to a black color due to production of H2S
    3. Yellow only on the surface of the agar slant
    4. Yellow throughout the agar slant
17. Asserting from the previous question, which of the following pH indicators would cause the color change, if any?
    1. Bromthymol blue
    2. Methyl red
    3. Phenol red
    4. Safranin
18. Nitrate reduction is a process where
    1. Aerobes use nitrate as the final electron acceptor
    2. Anaerobes proceed in denitrifying nitrates
    3. Both anaerobes and aerobes produce nitrites
19. Another name for the process of nitrate reduction is nitrate respiration.
    1. True
    2. False
20. Which of the following bacteria species is positive for catalase?
    1. *Streptococcus faecalis*
    2. *Staphylococcus aureus*
21. If catalase is present, what should result if 3% H2O2 is added to the culture?
    1. Bubbling
    2. The culture will turn green
    3. Nothing will happen
22. Oxidase is essentially what?
    1. An enzyme that inhibits production of catalase
    2. An enzyme that acts to catalyze redox reactions
    3. An enzyme that is found in all anaerobes
23. Which of the following is the **dye** that is used in determining if oxidase is present in a bacterium, and which color will be observed?
    1. **Para**-**aminobenzaldehyde**/purple or blue
    2. **Phenylenediamine**/purple or blue
    3. **Carboxylic** **acid**/purple only
    4. **Phenylalanine**/blue only
24. Which of the following bacteria species is negative for oxidase?
    1. *Escherichia coli*
    2. *Pseudomonas aeruginosa*
25. Which of the following pH indicators is used in Simmons citrate agar?
    1. Bromthymol blue
    2. Methyl red
    3. Phenol red
    4. Safranin
26. If citrate can be utilized by a microorganism, then there will be a bluing of the area of utilization in the Simmons citrate agar. The previous question’s correct answer will direct you toward the pH indicated by the change in color. Using this understanding, which of the following substances would be the cause of the bluing of the medium?
    1. Sodium citrate
    2. Sodium carbonate
27. What is the color of Simmons citrate agar plate prior to inoculation?
    1. Blue
    2. Red
    3. Green
    4. Yellow
28. If Simmons citrate agar plate were to be inoculated with *Bacillus subtilis*, then what would be the color of the agar after incubation?
    1. Blue
    2. Red
    3. Green
    4. Yellow
29. The sole nitrogen source in Simmons citrate agar is
    1. Sodium citrate
    2. Ammonium ion
    3. DNA
30. If starch is hydrolyzed, which of the following would be observed?
    1. Blue appearance
    2. Yellow appearance
    3. Formation of a clear zone surrounding growth
    4. Nothing would happen
31. Starch can be brought directly into the bacterial cell.
    1. True
    2. False
32. *Bacillus subtilis* can hydrolyze starch.
    1. True
    2. False
33. Which of the following enzymes hydrolyze starch in certain bacteria?
    1. Amylase
    2. Oligo-1,6-glucosidase
    3. Catalase
    4. Both A and B
34. DNAse acts to
    1. Degrade DNA
    2. Degrade RNA
    3. Degrade nucleotides
    4. Both A and C
35. Which of the following bacteria species produces a nuclease (DNAse) that is thermostable?
    1. *Staphylococcus aureus*
    2. *Bacillus subtilis*
    3. *Pseudomonas aeruginosa*
    4. *Klebsiella pneumoniae*
36. During the DNA hydrolysis test, once 1N HCl was added to the incubated culture, what was observed in the culture of *Staphylococcus aureus*?
    1. Nothing happened
    2. DNA precipitate
    3. Cloudy appearance of total plate
    4. Clear area surrounded by cloudy areas
37. When urease works upon urea, what will the product(s) be?
    1. Ammonia
    2. CO2
    3. Organic acids
    4. Both A and B
    5. Both B and C
    6. None of the above
38. Bacterial protein metabolism yields \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ as its end product.
    1. Ammonia
    2. CO2
    3. Organic acids
    4. Urea
39. Phenol red, when used in the urease test, changes color to purple (or deep fuschia) when NH3 is released, resulting in a positive test. Which of the following bacteria species is capable of eliciting this reaction?
    1. *Klebsiella pneumoniae*
    2. *Staphylococcus aureus*
    3. *Escherichia coli*
40. Blood agar is also known as a \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_, because it allows for the researcher to differentiate between the ability for bacteria species to elicit a certain hemolytic type.
    1. Circumferential medium
    2. Static medium
    3. Regulatory medium
    4. Differential medium

**Matching**

1. Beta-hemolyis
2. Alpha-hemolysis
3. Gamma-hemolysis
4. Non-hemolytic
5. Greenish cloudy area
6. Indole test
7. *Staphylococcus aureus*
8. Durham tube
9. Positive for nitrite
10. Positive for nitrate
11. Positive for denitrification
12. Zinc + 5 drops of 6M HCl
13. Facultative anaerobe
14. Starch A.K.A.
15. Breaks down H2O2
16. Final electron accepter (aerobic)
17. Green at neutral pH
18. Endoenzyme
19. Sodium thiosulfate
20. Black color in TSI plate

**Word Bank** (Choices may be used more than once.)

Denitrification observation tool 02 Catalase Carbohydrase

Reduced to H2S *Escherichia coli* Polysaccharide Nitrate testing application

*Bacillus subtilis Staphylococcus aureus* Thermostable nuclease H2S production

Bromthymol blue *Pseudomonas aeruginosa* Kovach’s reagent

Gamma-hemolysis *Streptococcus faecalis* Alpha-hemolysis Radiation

Oligo-1,6-glucosidase Phenylenediamine Permeases C6H7NaO7

Na2CO3  Amylase H2O2 Nitrite reagent