

**General Microbiology  
Examination #3  
Winter Semester 2007**

**Student name:** \_\_\_\_\_

**Score:** \_\_\_\_\_ points out of 65points

**Your percent score is** \_\_\_\_\_%

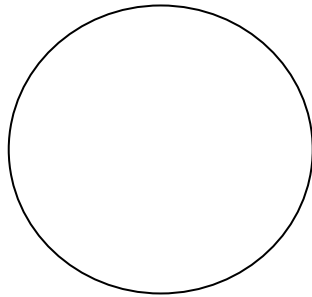
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**Students:**

- 1. Please use a #2 pencil on the scantron sheet.**
  - 2. Each scantron question has a point value of 0.91 points**
  - 3. Record any erasures on the list provided at the front of the room. Protect yourself, as the verdict of the scoring machine is final.**
  - 4. Feel free to ask for further information about any of the questions.**
  - 5. The total value of this portion of the examination is 45.5 points**
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1. If your microscope had 20X oculars and a 40X objective, its total magnifying capacity would be \_\_\_X.
    - A) 2
    - B) 60
    - C) 200
    - D) None of these.
  2. *Mycobacterium leprae* is the scientific name of the causative agent of the disease, leprosy. This bacterium belongs to the genus, \_\_\_\_.
    - A) *leprae*, B) *Mycobacterium*, C) *Mycobacterium leprae*, D) None of these.
  3. A number of bacterial organisms are heterotrophic in nature. You would expect that these bacteria \_\_\_\_.
    - A) Would be capable of causing human disease
    - B) Would be able to utilize carbon dioxide as a carbon source
    - C) Would be able to form endospores
    - D) None of these.
  4. Generally speaking, bacterial organisms exhibit or show a glycocalyx. Usually this material is a type of \_\_\_\_.
    - A) Nucleic acid
    - B) Protein
    - C) Carbohydrate
    - D) None of these.

5. The process of \_\_\_\_ played a central role in the experimental findings of the Harden and Young group.
- A) Chromatography
  - B) Electrophoresis
  - C) Dialysis
  - D) None of these
6. The chemiosmotic or proton motive force idea is an attempt to explain \_\_\_\_.
- A) The duplication of the bacterial chromosome
  - B) The generation of ATP by cells
  - C) The generation of molecules of reduced coenzymes
  - D) None to these
7. The equation shown below best illustrates the process of \_\_\_\_.
- A) Deamination
  - B) Transamination This is the equation  $\rightarrow A-NH_2 \rightarrow A + NH_3$  (ammonia)
  - C) Isoamination
  - D) None of these
8. The biochemical pathway known as beta-oxidation is associated with the metabolism of \_\_\_\_.
- A) Fatty acids
  - B) Sterols
  - C) Chitin
  - D) None of these.
9. The use of reverse electron transport to produce reduced coenzymes such as  $NADH_2$  or  $NADPH_2$  is associated \_\_\_\_.
- A) Oxygenic photosynthesis
  - B) Anoxygenic photosynthesis
  - C) Chemotaxic photophosphorylation
  - D) None of these.
10. The commonest form of the Dark Reactions (Light Dependent Reactions) of photosynthesis is that known as \_\_\_\_.
- A) Glycolysis
  - B) The Glyoxallate Bypass
  - C) The Calvin-Benson Cycle
  - D) None of these.
11. The greatest use for the Light Reaction Products of photosynthesis is in the conversion of \_\_\_\_.
- A) Ribulose biphosphate into PGA
  - B) Carbon dioxide into ribose
  - C) PGA into PGAL
  - D) None of these

12. Which of the following colonies is most likely a “blow in”?



13. Which diagram indicates how a Petri dish is to be put away for incubation under most circumstances?

A)

B)

14. The lack of the enzyme \_\_\_ is the most common explanation for the existence of the so-called strict anaerobic bacteria?

- A) Coagulase
- B) Phosphofructokinase
- C) Superoxide dismutase
- D) None of these.

15. Candle Jars are usually employed \_\_\_.





- A) In the cultivation of strict anaerobic bacteria
- B) To generate environments that have an enriched level of carbon dioxide
- C) To grow microbes that require the presence of a very hypertonic environment
- D) None of these.

16. If you needed information concerning Brain Heart Infusion Broth, you would be best advised to consult \_\_\_.

- A) Your class textbook
- B) Standard Methods
- C) The Difco manual
- D) None of these

17. Mannitol Salt Agar is a medium, which has the ability to select out members of the medically important genus, \_\_\_.

- A) *Bacillus*
- B) *Streptococcus*
- C) *Staphylococcus*
- D) None of these.

18. The agar in the growth medium, nutrient agar has as its prime function that of a \_\_\_\_.
- A) Vitamin source
  - B) Energy source
  - C) Solidifying agent
  - D) None of these
19. If you are conducting a standard plate count, you are limited to diluent volumes of \_\_\_\_.
- A) 10 and 99ml
  - B) 99ml
  - C) 1 and 10ml
  - D) None of these.
20. Some time was spent commenting on members of the genus, *Streptomyces*. This genus of bacteria is inordinately important to man because of \_\_\_\_.
- A) Its ability to produce highly heat resistant endospores
  - B) The many disease causing bacteria that it contains
  - C) The numerous antibiotics that are produced by its members
  - D) None of these.
21. In the case of the Chlamydia, the form, which is infective for us, is called the \_\_\_\_ body.
- A) Reticulate
  - B) Dimorphic
  - C) Elementary
  - D) None of these.
22. Which of the following diagrams best describes the process of binary fission in a bacterium such as *E. coli*?
- A) 
  - B) 
  - C) 
  - D) 
23. If you were doing a standard plate count, you would require which of any of the following pieces of equipment?
- A) A microscope
  - B) A 250ml beaker
  - C) A Petri dish
  - D) None of these.

24. You would expect to find the fastest rate of reproduction during the \_\_\_\_ of the growth curve.
- A) Log
  - B) Stationary
  - C) Lag
  - D) None of these.
25. If you were conducting a MPN procedure, you would need which if any of the following pieces of equipment.
- A) A pipette
  - B) A bottle of liquefied Nutrient agar
  - C) A microscope
  - D) None of these.
26. If you were doing a direct count, you would need, which if any of the following pieces of equipment.
- A) A pipette
  - B) A bottle of liquefied Nutrient agar
  - C) A microscope
  - D) None of these.
27. You would need to make use of a spectrophotometer if you were attempting to determine the number of bacteria per milliliter by a \_\_\_\_
- A) Direct count
  - B) MPN
  - C) Standard Plate Count
  - D) None of these.
28. If you began with 50 bacterial cells, which divided every 30 minutes, and you then proceeded to cultivate them for 4 hours, you would have \_\_\_\_ at the end of this time.
- A)  $2^8(50)$
  - B)  $2^{50}(8)$
  - C)  $2^2(200)$
  - D) None of these.
29. You have raised or cultivated bacteria in the laboratory on several occasions. When you have done this, you have made use of what is known as \_\_\_\_ cultivation.
- A) Batch
  - B) Continuous
  - C) Lysogenic
  - D) None of these

30. The rumen is a structure that is found in the \_\_\_\_ system of certain animals.
- A) Circulatory
  - B) Respiratory
  - C) Excretory
  - D) None of these.
31. The microbes of the rumen allow those animals, which possess this structure to quite effectively metabolize the carbohydrate \_\_\_\_, a feat that most animals cannot carry out.
- A) Glycogen
  - B) Peptidoglycan
  - C) Amylose
  - D) None of these
32. Which of the following animals is a ruminant?
- A) Horse
  - B) Cow
  - C) Bear
  - D) None of these
33. Ruminant animals use \_\_\_\_, a product of the rumen fermentation, as a source of energy to run or operate their bodies.
- A) Glycogen
  - B) Methane
  - C) Organic acids
  - D) None of these.
34. Fecal coliforms are routinely looked for when dealing with the safety of drinking water supplies because they \_\_\_\_.
- A) Are highly dangerous disease causing microorganisms.
  - B) They are indicators of low oxygen concentrations in the water
  - C) They are reliable indicators of the presence of disease causing microbes in the water supply.
  - D) None of these
35. During the laboratory exercise on transformation, you attempted to insert genetic information into \_\_\_\_.
- A) *Bacillus subtilis*
  - B) *Proteus vulgaris*
  - C) *Staphylococcus aureus*
  - D) None of these.

36. One of the traits that you attempted to insert into the above- mentioned bacterium was the ability to produce GFP. This genetic trait exists naturally in \_\_\_\_.
- A) Certain Ants
  - B) Certain tropical plants
  - C) Certain marine jellyfish
  - D) None of these
37. The autoclave makes use of what type of heat to “do its job”? \_\_\_\_
- A) Dry heat
  - B) Moist heat
  - C) Isotropic heat
  - D) None of these
38. The storage period that is found in the tyndallization process \_\_\_\_.
- A) Provides a type for vegetative cells to reproduce
  - B) Allows heat shocked endospores to germinate
  - C) Allows for the sterilized object or fluid to become oxygen saturated
  - D) None of these.
39. Which type of heat is most effective in causing the destruction of microbial forms of life? \_\_\_\_
- A) Dry heat
  - B) Moist heat
  - C) Isotropic heat
  - D) None of these
40. Generally speaking, which type of radiation has the greatest degree of penetrating power? \_\_\_\_
- A) Ionizing
  - B) Nonionizing
  - C) Surfactant
  - D) Merozotic
41. The mode of action of Ultraviolet light is \_\_\_\_.
- A) To cause the destruction of the bacterial cell wall
  - B) To cause the destruction of the bacterial cell plasma membrane
  - C) To cause the disruption of the DNA of the bacterial cell
  - D) None of these.
42. Generally speaking, what major microbial group would cause the greatest problems, if you were trying to sterilize a fluid of some type by the use of filtration? \_\_\_\_
- A) The eukaryotic algae
  - B) The bacteria
  - C) The fungi
  - D) The viruses

43. If you needed to sterilize our laboratory room, you would be best advised to try to make use of \_\_\_\_.
- A) Heat
  - B) Radiation
  - C) Chemicals
  - D) None of these
44. Many hospitals make use of the so-called Gas Sterilizer. The most common killing agent used in these devices is \_\_\_\_.
- A) Hydrogen
  - B) Ozone
  - C) Carbon dioxide
  - D) None of these.
45. According the assigned article on the Chlamydia, their principle means of causing damage to the body is linked to their ability to \_\_\_\_.
- A) Digest human tissue
  - B) Sever as what is known as a superantigen
  - C) Provoke long term inflammation within the body
  - D) None of these.
46. At the present time, the current treatment for Chlamydial infections is based primarily on the use of \_\_\_\_.
- A) Surgical procedures
  - B) Radiation treatments
  - C) Antibiotics
  - D) None of these.
47. The body's immunity to Chlamydial infections can be generally described as being \_\_\_\_.
- A) Very long term, lasting for at least five years following the initial infection
  - B) Moderate in length, lasting for 1 to 2 years following the initial infection
  - C) Short in duration, lasting for perhaps only 6 months
48. Circulating antibodies, which play a significant role in the body's ability to control many infections, is not really very affective against Chlamydial infections because of \_\_\_\_.
- A) The ability of these bacteria to produce very large capsules
  - B) The ability of these bacteria to live within body cells
  - C) The ability of these bacteria to produce a wide range of cellulose digesting enzymes.
  - D) None of these.

49. Trachoma is a condition that is caused by certain species of the Chlamydial group. This condition, if not corrected, can lead to the development of \_\_\_\_ in infected individuals.

- A) Pneumonia
- B) Anemia
- C) Blindness
- D) None of these.

50. **Mark answer A. This is a “free” question.**

**Students:**

- 1. The following portion of the examination has a point value of 19.5 points.**
- 2. Each question has its point value indicated at its end.**
- 3. You may use either pencil or pen in answering this section of the examination.**
- 4. If you are to list items, for your own protection, list only the number that is being requested.**
- 5. Please use complete sentences where appropriate**
- 6. Please print your answers.**
- 7. Lastly, reread your answers before turning in your paper. Remember, I can only read and grade what you have actually written, not what you wanted to write.**

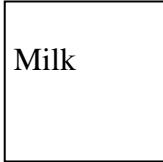
1. Bacterial organisms can be placed into 1 of 3 major classes based on their utilization of molecular oxygen (O<sub>2</sub>). What are those classes? Define each. **(3pts)**

Class	Definition

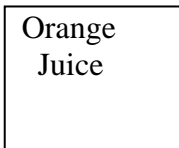
2. Cite 3 characteristics of bacterial colonies, which would indicate that the colonies are of different species. **(1.5pts)**

1.	
2.	
3.	

3. Indicate the dilution factors, which should be written on the Petri dishes shown in the dilution scheme that is pictured below. (3pts)



4. Show how you construct a 100 million-fold dilution of the orange juice. Note: in this type of problem, it is necessary to follow the “rules” which were stated in class. (2pts)



5. Draw and label a Standard Bacterial Growth Curve. (3pts)



6. Cite 2 different **reasons** that lag phases occur when conducting growth curve studies. **(2pts)**

1.
2.

7. What two things were done to make the bacteria used in the transformation exercise, competent? **(2pts)**

1.
2.

8. If a bacterium is competent (in the context of transformation) what does this mean? **(1pt)**

9. The article on the Chlamydia indicated several possible routes that are being explored to reduce the number of these infections in the future. Cite 2 of the approaches that were cited in the article. **(2pts)**

1.
2.