

**General Microbiology
Examination #2
Winter Semester 2007**

Student name: _____

Score: _____ points out of 65points

Your percent score is _____%

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. In the case of your laboratory microscope, the depth of field ____ as you move from the lowest power objective (4X) to the highest power objective (100X).
 - A) Is unchanged
 - B) Increases
 - C) Decreases
 - D) None of these
 2. As the resolving power of a microscope increases or gets better, ____.
 - A) The magnification capability increases
 - B) The image formed by the instrument gets sharper
 - C) The optical density of the instrument improves
 - D) None of these
 3. "Old" Gram positive cultures of bacteria, can in many cases, ____.
 - A) Form endospores
 - B) Lose their ability to stain correctly if a Gram stain is run on them
 - C) Develop many mutant bacterial cells
 - D) None of these
 4. Koch's postulates are applied to answer the question, ____
 - A) Does this bacterial organism cause this particular disease
 - B) Does this bacterial organism have the ability to form endospores
 - C) How does this bacterial organism bring about disease symptoms
 - D) None of these.

5. You would expect the following bacterium to stain acid fast positive.
- A) *Enterobacter aerogenes*
 - B) *Proteus proteus*
 - C) *Escherichia coli*
 - D) None of these.
6. There are ___ currently recognized domains of life.
- A) 3
 - B) 4
 - C) 5
 - D) None of these
7. The so-called negative staining procedure can be replaced by what is known as a ____.
- A) Phase Contrast Microscope
 - B) Dark Field Microscope
 - C) Atomic Field Microscope
 - D) None of these.
8. The most common means by which bacterial cells move about their environment involves the use of ____.
- A) Pseudopodia
 - B) Contractile vacuoles
 - C) Fimbriae
 - D) None of these.
9. The moving molecules of the material that the bacterial cells are suspended in gives rise to a type of motion called ____.
- A) Torsonial movement
 - B) Retrograde movement
 - C) Darwinian movement
 - D) None of these.
10. Bacterial cells are almost always very small in nature, which insures that they will have a ___ surface area to volume ratio.
- A) Small
 - B) Large
11. If you view a bacterial culture and see spirals of many lengths, this bacterium would be considered to be ___ in nature. (Remember, this was the situation with *Rhodospirillum rubrum*).
- A) Amorphic
 - B) Monomorphic
 - C) Pleomorphic
 - D) None of these

12. The following diagram best describes a ___ formation.
- A) Staphylococcal
 - B) Streptococcal
 - C) Streptobacillus
 - D) None of these
- This is the diagram → OOOOOOOOOOOOOO
13. Which of the following is an invariant structure in the bacterial cell?
- A) Golgi body
 - B) Mesosome
 - C) Pilus
 - D) None of these.
14. Quorum sensing phenomena revolve around the ability of bacterial cells to detect ____.
- A) pH
 - B) Oxygen levels in their environment
 - C) Cell density
 - D) None of these
15. The arrow in the diagram shown below is indicating the ___ of the cell.
- A) Corona
 - B) Epitope
 - C) Glycocalyx
 - D) None of these.
- This is the diagram →
16. The above-mentioned structure is usually constructed from various types of ____.
- A) Carbohydrates
 - B) Lipids
 - C) Proteins
 - D) None of these.
17. The wall of the bacterial cell has as its prime function ____.
- A) Defending the cell against other attacking bacteria
 - B) Protecting the cell from the adverse effects of ultra violet light
 - C) Protecting the cell from the effects of living in hypotonic solutions
 - D) None of these.
18. The above-mentioned function relies on the ___ component of the wall.
- A) Cellulose
 - B) Dextran
 - C) Peptidoglycan
 - D) None of these.

19. The cell wall of the Gram ____ bacteria is multilayered and very heterogeneous in its chemical composition.
- A) Positive
 - B) Negative
20. Volutin granules are a type of inclusion body that has been used as a major marker to identify the bacterium, which causes ____.
- A) Anthrax
 - B) Bubonic plague
 - C) Typhoid fever
 - D) None of these
21. At the present time, the above-mentioned disease is encountered very, very infrequently in the USA because of ____.
- A) The climate of the country
 - B) The use of sterilizing equipment such as autoclaves in the hospital setting
 - C) The recent, large influx of disease resistant people into the general USA population
 - D) None of these.
22. The nucleoid of the bacterial cell is really the area of the cell where its ____ is located.
- A) Golgi body
 - B) Mesosome
 - C) Glycocalyx
 - D) None of these
23. The above-mentioned structure is usually considered to be ____ in nature.
- A) Rod-like
 - B) Dumbbell-like
 - C) Triangular
 - D) None of these.
24. The following diagram best describes a ____ chemical reaction.
- A) Mesobolic
 - B) Anabolic
 - C) Catabolic
 - D) None of these
25. The term enzyme was introduced into the literature of the biological sciences by the work of ____.
- A) Pasteur
 - B) Watson
 - C) Kuhn
 - D) None of these

26. The term enzyme derives from what two words.
- A) Big yeast
 - B) Active yeast
 - C) In yeast
 - D) None of these
27. A man by the name of ___ actually isolated the first enzyme.
- A) Martin
 - B) Marshall
 - C) Mitchell
 - D) None of these
28. At the present time, all known enzymes are ___ in nature.
- A) Lipid
 - B) Protein
 - C) Carbohydrate
 - D) None of thee
29. The current thought as to how enzymes actually identify the molecules that they interact with contends that the enzyme and its substrate(s) must ___.
- A) Be of the same chemical composition
 - B) Be capable of fitting together tightly
 - C) Be isotonic to each other
 - D) None of these
30. The Haber process was discussed in class. It is currently employed by man as a process to fix ___.
- A) Carbon
 - B) Oxygen
 - C) Iron
 - D) None of these.
31. Bacterial organisms, which can grow within the human body, would be considered ___ in nature.
- A) Pschrophilic
 - B) Thermophilic
 - C) Mesophilic
 - D) None of these.
32. The antimicrobial drug, sulfanilamide was used to illustrate what is known as ___ of an enzyme molecule.
- A) Noncompetitive inhibition
 - B) Competitive inhibition
 - C) Transformational inhibition
 - D) None of these.

33. Allosteric inhibition of an enzyme results in ____,
A) The inhibitor binding to the active site of the enzyme
B) The alteration of the shape of the enzyme
C) The digestion of the enzyme down to the amino acids which make it up
D) None of these.
34. The chemiosmotic theory is an attempt to explain ____.
A) The generation of reduced coenzyme molecules such as NADH₂
B) The consumption of oxygen by fermenting yeast cells
C) The generation of ATP molecules
D) None of these
35. The above-mentioned theory (#34) has as its central feature the movement of ____ across membranes.
A) Glucose molecules
B) Water molecules
C) Nitrate ions
D) None of these.
36. The following equation best describes ____.
A) Oxidative phosphorylation
B) Polar phosphorylation $X-PO_4 + ADP \rightarrow ATP + X$
C) Mesotrophic phosphorylation
D) None of these.
37. The electron transport chains of bacterial cells are found in the ____ of these cells.
A) Mesosomes
B) Plasma membrane
C) Cell walls
D) None of these.
38. The Weizmann Culture technique was noted in class as an example of a fermentation, which does produce drinking, or ethyl alcohol. It was used to produce ____ during WWI.
A) Chlorine gas
B) Fixed forms of nitrate
C) Acetone
D) None of these.
39. In the eukaryotic microbial cell, one would expect to find electron transport chains in the ____ of the cell.
A) Lysosomes
B) Golgi bodies
C) Chloroplasts
D) None of these.

40. Denitrification can result in the production of ____.
- A) Nitrate ions
 - B) Oxygen gas
 - C) Nitrogen gas
 - D) None of these.
41. Some time was spent discussing the concept of the dead zones. The area that was mentioned in class is found ____.
- A) In the Atlantic ocean
 - B) In the Pacific ocean off of Southern California
 - C) In the Gulf of Mexico off the mouth of the Mississippi River
 - D) None of these.
42. The above-mentioned dead zone is thought to come into existence as the result of ____ getting released to the environment.
- A) Oxygen
 - B) Cobalt
 - C) Platinum
 - D) None of these.
43. The underlying problem in areas where “dead zones” are encountered involves ____.
- A) Low levels of phosphates
 - B) Low levels of oxygen
 - C) Low levels of nitrates
 - D) None of these.
44. The fermentation mentioned in question #38 is thought by some to have influenced the politics of ____.
- A) Australia
 - B) The Far East
 - C) The Mid or Near East
 - D) None of these.
45. In a discussion of the chemiosmotic theory, the enzyme complex known as ____ plays a central role.
- A) ATPase
 - B) Lactase
 - C) ATP synthase
 - D) None of these.
46. The institution which supports the “seaweed website” is ____.
- A) The Smithsonian Institute
 - B) Yale University
 - C) The Royal Society of London
 - D) None of these.

47. Based on the information provided by the seaweed website. the greatest number of known species of algae belong to a group known as the ____.

- A) Euglenophyta
- B) Brown algae
- C) Green algae
- D) None of these

48. The use of seaweed as a human food source is most prevalent in ____.

- A) South America
- B) Asia
- C) Africa
- D) None of these.

49. Agar is a chemical substance, which is widely used in the science of microbiology. This chemical substance is ____ in nature.

- A) Protein
- B) Carbohydrate
- C) Lipid
- D) Nucleic acid

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. 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. What are the 3 principle shapes that bacterial cells assume? (1.5pts)

1.
2.
3.

2. A number of bacterial cell structures are what are called variant in nature. You were introduced to several reasons that a structure is variant. Cite 3 such reasons. **(3pts)**

1.
2.
3.

3. If you were an amino acid molecule on the outside of a bacterial cell, what would be the 3 structures that you would have to past through in order to reach the cytoplasm of the cell? (3pts) Note list them in order beginning with the first structure. **(3pts)**

1.
2.
3.

4. The website dealing with seaweed detailed 5 widespread uses for seaweeds. Cite 3 of those noted on the site. **(3pts)**

1.
2.
3.

5. Using the information below, determine the length of the bacterium. (1 pt)

Stage micrometer, smallest graduation = 25 micrometers

Ocular micrometer

Bacterium

6. What are the 3 cardinal temperatures that every bacterial species exhibits. Define each of these temperatures (3pts)

Temperature	Definition
1.	
2.	
3.	

7. The respiratory reactions of living cells (including bacteria) can be subdivided into 3 major classes or types based on the nature of the final electron acceptor that is used. What are those classes? Define each based on the nature of the electron acceptor. (3pts)

Class	Definition based on nature of electron acceptor
1.	
2.	
3.	

8. Describe the Nobel Prize winning work of the Buchners. (2pts)