

**Pathogenic Microbiology
Examination #2
Fall 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. Which of the following resolving powers (RP) is the best?
 - A) RP = 42 micrometers
 - B) RP = 4.2 micrometers
 - C) RP = .42 micrometers
 2. Pasteur's work for Mr. Dumas resulted in ____.
 - A) The discovery of microorganisms
 - B) The determination of what microbe was responsible for fermentation of sugar
 - C) The determination that microorganisms could kill animals
 - D) None of these
 3. The successful application of Koch's Postulates will allow you to determine ____.
 - A) How microbes kill their hosts
 - B) How microbes are transferred from one animal to another
 - C) If this microbe actually causes that disease
 - D) None of these.
 4. Which of the following elements (if any) are always found in protein molecules?
 - A) Phosphorus
 - B) Iron
 - C) Calcium
 - D) None of these

5. DNA and RNA are two different types of ____.
- A) Proteins
 - B) Carbohydrates
 - C) Lipids
 - D) None of these
6. If a chemical substance undergoes reduction, it is correct to say that it has ____.
- A) Loss electrons
 - B) Gained electrons
 - C) Gained oxygen
 - D) None of these.
7. The depth of field of the optical system of your microscope ____ as you move from the lowest power objective to the highest?
- A) Increases
 - B) Decreases
 - C) Is unaffected
8. You were introduced to the so-called simple stain procedure in the laboratory. This procedure is conducted mainly to ____.
- A) Determine the optical density of the bacteria
 - B) Make bacterial cells easier to see under the microscope
 - C) Better stick bacteria to the slide
 - D) None of these
9. The above mentioned procedure (#8) involves ____.
- A) Adding mordants to the bacterial smear
 - B) Treating the smear with a single stain
 - C) Not heat fixing your smear before staining
 - D) None of these.
10. The major reason for heat fixing a smear of bacterial cells is to ____.
- A) Have them stick on the slide better
 - B) To kill the bacterial cells
 - C) To increase the isoelectric point of the bacterial cells
 - D) None of these.
11. The cell association pictured in association with this question is that known as a ____ formation.
- A) Streptococcal
 - B) Staphylococcal This is the arrangement →
 - C) Isococcal
 - D) None of these

12. In a correctly executed Gram stain, bacteria that are Gram positive will appear ____ in color.
- A) Purple
 - B) Pink
 - C) Green
 - D) None of these.
13. The best Gram stain reactions are obtained from cells which are ____.
- A) Young
 - B) Old
 - C) Any age since age does not matter in this reaction
14. You had the opportunity to view a culture of *Penicillium chrysogenum* in the laboratory. The entire collection of microscopic tubes that made up the body of this organism is referred as the ____.
- A) Conidiophore
 - B) Scleroium
 - C) Mycelium
 - D) None of these
15. You were introduced to several biologists in my short history of the cell. R. Virchow was associated with the idea that ____.
- A) Cells form the structural basis of life
 - B) Cells have the ability to reproduce
 - C) Cells have the ability to undergo the process of respiration
 - D) None of these
16. Cells which lack a nuclear membrane and hence what some individuals call a “true nucleus” would be considered ____ in nature.
- A) Prokaryotic
 - B) Eukaryotic
 - C) Pankaryotic
 - D) None of these
17. Penicillin interferes with the ability of some bacterial organisms to produce what constituent of their cell wall?
- A) Phospholipids
 - B) Mycolic acid
 - C) Peptidoglycan
 - D) None of these
18. The above-mentioned material plays a very important role in bacterial organisms because of its ____.
- A) Insolubility in water
 - B) High level of positive electrical charge
 - C) Great strength
 - D) None of these

19. You had the opportunity to view *Candida albicans* in the laboratory. This microbe is really a type of ____.
- A) Bacterium
 - B) Virus
 - C) Yeast
 - D) None of these.
20. An infection with the above-mentioned microbe in the oral cavity or mouth is referred to as ____.
- A) Chronic wasting disease
 - B) Impetigo
 - C) Thrush
 - D) None of these
21. One of the major reasons that the organism mentioned above (#19 and #20) can cause infections in adults can be traced to ____.
- A) Genetic defects
 - B) The use of antibiotics
 - C) High ozone levels in the atmosphere
 - D) None of these.
22. Which of the following is probably an acid fast positive bacterium?
- A) *Bacillus cereus*
 - B) *Mycoplasma pneumoniae*
 - C) *Mycobacterium smegmatis*
 - D) None of these
23. The mechanism which determines whether a bacterium will be acid fast positive or negative is located in the ____ of the cell.
- A) Ribosome
 - B) Plasma or cell membrane
 - C) Cell wall
 - D) None of these
24. Which of the following is most likely an endospore (spore) forming bacterium?
- A) *Bacillus stercorophilus*
 - B) *Mycoplasma pneumoniae*
 - C) *Mycobacterium smegmatis*
 - D) None of these
25. Endospores will appear ____ in color if correctly stained by the procedure that you utilized in the laboratory.
- A) Green
 - B) Blue
 - C) Red
 - D) None of these.

26. Diffusion contends that materials will move from ____.
- A) Regions of high concentration to regions of low concentration
 - B) Regions of low concentration to regions of high concentration
 - C) Regions of high optical density to regions of low optical density
 - D) None of these.
27. If a material enters into a cell via the process of diffusion, it has moved in via ____ transport.
- A) Active
 - B) Passive
 - C) Conjugative
 - D) None of these
28. Some time was spent discussing membrane carriers in reference to cellular transport. Most of these carriers are ____ in nature.
- A) Lipid
 - B) Carbohydrate
 - C) Protein
 - D) None of these
29. During your laboratory work, you had the opportunity to view the ____, a living organism which makes use of the phagocytosis to secure its food supply.
- A) Euglena
 - B) Spirogyra
 - C) Amoeba
 - D) None of these.
30. Active transport systems have a requirement for ____ in order to operate.
- A) Oxygen
 - B) Energy
 - C) Nitrogen
 - D) None of these
31. The above-mentioned requirement is tied to the operation of the ____ processes of the cell.
- A) Neural
 - B) Osmotic
 - C) Respiratory
 - D) None of these.
32. The plasma membranes of cells (including those of bacteria) have as their structural backbone a double layer of ____ molecules.
- A) Protein
 - B) Carbohydrate
 - C) Lipid
 - D) None of these

33. Negative staining is a technique that can be replaced by the use of ____.
- A) Phase contrast microscope
 - B) A Dark Field microscope
 - C) A Confocal microscope
 - D) None of these
34. You had the opportunity to view an encapsulated bacterium in the laboratory. Bacterial capsules are usually constructed from ____.
- A) Lipid
 - B) Protein
 - C) Carbohydrate
 - D) None of these
35. Capsules of bacteria present problems to our body as it tries to deal with this type of invading microbe. The capsule of *Streptococcus pneumoniae* makes it difficult for ____.
- A) Our body's endocrine system to combat the microbe
 - B) Our clotting mechanism to do its job
 - C) Our phagocytes to take up these invaders
 - D) None of these.
36. Some time was spent discussing *Streptococcus mutans*. This particular microbe causes a very important health problem in man. This problem is that of ____.
- A) Bladder infections
 - B) Dental cavities
 - C) Stomach ulcers
 - D) None of these.
37. Bacterial organisms which are of the Gram positive nature have wall which are chemically rather ____.
- A) Homogenous
 - B) Heterogeneous
38. LPS (Lipopolysaccharide) is a characteristic component of the cell wall of the ____ bacteria.
- A) Gram negative
 - B) Gram positive
 - C) Gram neutral
39. The cell wall of bacteria appears to have as its major function, the conferring of protection against ____.
- A) The antibody molecules of the human body
 - B) The action of hypotonic solutions
 - C) The action of predatory protozoans
 - D) None of these

40. The most common method that bacterial cells make use of to reproduce is that known as ____.
- A) Fusion
 - B) Binary fission
 - C) Conjugation
 - D) None of these
42. If you were using the direct count method to determine the number of bacteria in a milliliter of milk, you would need to have a(an) ____.
- A) Spectrophotometer
 - B) Petri dish
 - C) Microscope
 - D) None of these
43. The Chlamydia of the world are bacteria which exist in ____ principle forms.
- A) 2
 - B) 3
 - C) 4
 - D) None of these.
44. While Chlamydia infections are a major cause of STD in this country, they are also a significant cause of human ____ on the world scene.
- A) Tooth decay
 - B) Stroke
 - C) Blindness
 - D) None of these
45. The use of a chemostat would be associated with ____ cultivation of microorganisms.
- A) Complex
 - B) Concave
 - C) Complete
 - D) None of these
46. According to the article on Biofilms, these were first described by ____.
- A) Joseph Lister
 - B) L. Pasteur
 - C) A. Van Leeuwenhoek
 - D) None of these
47. Based on the article, it is estimated that about ____ percent of bacterial infections in the Western World involve the development of Biofilms.
- A) 20
 - B) 30
 - C) 50
 - D) None of these

48. Biofilms involving a bacterium by the name of *Pseudomonas aeruginosa* are of major importance in lung infections of ___ patients.

- A) Smokers
- B) Multiple myeloma
- C) Cystic fibrosis
- D) None of these.

49. Some time was spent by the authors of the article on Biofilms discussing methanogens. These type of bacteria were noted as being the microbes that are associated with the production of methane by ___.

- A) Fish
- B) Birds
- C) Cows
- D) Earthworms

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 the wording of your answer.
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. What are the 3 major cell shapes that bacteria assume? (1.5pts)

1.
2.
3.

2. Cells can be used in 1 of 4 ways to construct living organisms. Cite two of those ways and provide an example of an organism that is constructed in the ways you have chosen. (2pts)

Type of organism	Example

3. The following is the directions for making 1000ml of Sodium Hippurate Broth. Add 25 grams of Heart infusion broth and 10 grams of sodium hippurate to 1000ml of distilled water. How would you make 4.5 liters of this material? **(3pts)**

Number of Grams of Heart Infusion Broth	
Number of Grams of Sodium Hippurate	
Milliliters of Distilled Water	

4. Cite 2 means by which you can control the light entering into your microscope other than the use of the off/on switch. **(2pts)**

1.
2.

5. Cite 3 characteristics of endospores which make them different from their corresponding vegetative cells. **(3pts)**

1.
2.
3.

6. Cite 2 methods that the phagocytic cells of your body use to kill the microbes that they have taken up. **(2pts)**

1. Phagocytes
2. Phagocytes

7. Determine the length of the bacterium based on the information provides. Place the answer into the box provided. Show all work. **(2pts)**

8. Draw and label a standard bacterial growth curve in the space provided below. **(2pts)**

9. Cite two of the environments that were mentioned by the article where one would expect to find the presence of Biofilms. (2pts)

1. Biofilms can be found
2. Biofilms can be found

