Exam 2, Micr-22, ver 4.17 (1pt each, unless noted; scaled to 50pts) Microbiologist: _____

1. Please draw a diagram showing feedback inhibition of an enzyme. 2pts

2. Draw a diagram of the electron transport chain in bacteria, showing the chemiosmotic generation of ATP. Please label carefully. 5pts

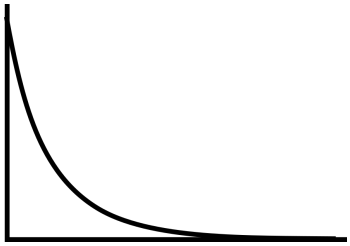
3. Please distinguish among these four major metabolic classifications (photoautotroph, photoheterotroph, chemoautotroph, chemoheterotroph). You may find it useful to draw a table. 2pts

4. Why is oxygen poisonous to some organisms? Make your explanation as specific as you can. 2pts

5. Please solve the following: (a) $\log_{10}(10{,}000)$ = _____

   (b) If $\log_{10}$(# bacteria) = 8, then # bacteria = _____

6. This is the microbial death curve, where the x-axis = "time after introduction of a growth-control agent," and Y = "# bacteria alive."



(a) Why does this curve have its particular shape? 2pts

(b) On the same axes, draw the curve you would expect to see if there were lots of contaminants in the treatment area, such as body fluids or solid materials. 1pt

7. What, specifically, is pasteurization? 2pts

8. How can osmotic pressure control microbial growth? Use an example in your explanation. 3pts

9. Why might *Bradyrhizobium japonicum* be important to farmers? 3pts

10. If your patient has a fungal infection beneath their skin, and it appears to be spreading internally throughout their body, what two terms could you use to describe this mycosis? 2pts

11. The Ciliaphora was a name used to describe a certain group of single-celled animals.
(a) What does the name Ciliaphora likely mean? 1pt

(b) Given your answer in (a), why is this classification group probably no longer useful? (Hint: DNA is a factor.) 2pts

12. (a) How is the pentose phosphate pathway different from glycolysis? 1pt

(b) How is the Entner-Doudoroff pathway different from glycolysis? 1pt

(c) What are two reasons that anyone cares about these two pathways? 2pts

13. Why might certain viruses lead to the development of cancer? Be as specific and clear as you can. 3pts

14. Regarding viral replication in bacteria, why is the lysogenic cycle so important to know about? 4pts

15. How is the E-test used evaluate antibiotics? It may be helpful to draw a diagram. 3pts

16. Describe the mode of action of one chemical control agent. 2pts

17. *Helicobacter* are curved rods. To what **class of Proteobacteria** do they probably belong? 1pt

18. Which one of these is a gram-positive coccus? _____

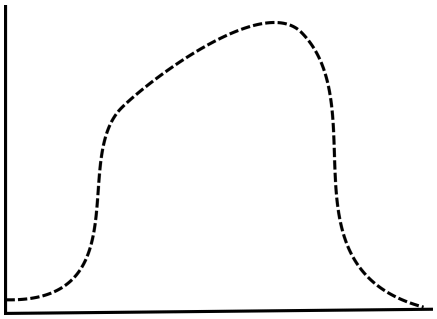
19. Which two of these are yeasts? _____

20. Which one of these is known for producing a red pigment? _____

21. Bonus: How do prions work? 1pt

Key for #18 - 20:
A. *Enterobacter cloacae*
B. *Enterococcus faecalis*
C. *Candida glabrata*
D. *Candida krusei*
E. *Serratia marcescens*
F. *Klebsiella oxytoca*
G. *Klebsiella pneumoniae*

22. Bonus: On this graph, the x-axis = time, and the y-axis = # of *E. coli* alive. The growth environment was a tube partially filled with nutrients, and sealed with an air-tight cap. What is happening in each part of this curve? 3pts



23. What is one question you'd really hoped would be on this test? (Please write it here; no need to answer it.) 1pt