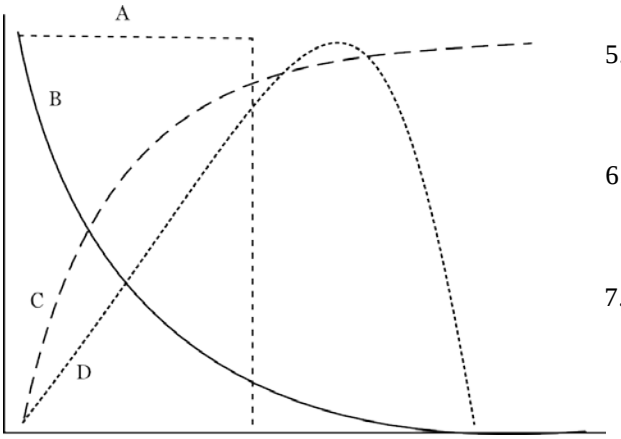
Exam 2, Micr-22, ver 10.15 (1pt each, unless noted; scaled to 100pts) Name: _____

Options for #1-4: A) Entner-Doudoroff pathway B) Pentose phosphate pathway C) Glycolysis

1. _____ Can break down glucose. Choose all that apply.
2. _____ Can produce 4-carbon sugars.
3. _____ Can utilize 5-carbon sugars.
4. _____ Can be used as at least part of a pathway to produce pyruvic acid. Choose all that apply.

Figure for #5-7:



5. ____ Assuming the axes are X = time after introduction of a growth-control agent and Y = # bacteria alive, which curve represents the microbial death curve?
6. ____ Which curve represents X = substrate concentration (ignoring osmotic pressure effects) and Y = enzyme reaction rate ?
7. ____ Which curve could represent X = glucose concentration and Y = bacterial growth rate?

Options for #8-11: A) Fermentation B) Aerobic respiration C) Anaerobic respiration

8. ____ Always requires oxygen as a final electron acceptor.
9. ____ Can produce many different end products such as acetic acid, propionic acid, hydrogen gas, and carbon dioxide.
10. ____ Requires an inorganic molecule as a final electron acceptor, but not oxygen.
11. _____ Can occur in anaerobic conditions. Choose as many as apply.

Options for #12-15: A) Differential medium B) Selective medium C) Enrichment medium / enrichment culture

12. ____ A culture medium on which only gram-positive organisms grow.
13. ____ A culture medium on which some organisms appear yellow, while others are pink.
14. ____ A medium that encourages the growth of one particular type of organism, **with the goal of increasing that organism's concentration in the medium.**
15. _____ A culture medium with salt to discourage some organisms, and a pH indicator to show the production of acid. Choose as many as apply.

Options for #16-18: A) Complex medium B) Chemically-defined medium

16. ____ A broth with extracts from beef brains and hearts.
17. ____ An agar containing glucose and sodium chloride.
18. ____ Chicken-noodle soup.

Options for #19-22:
A) obligate anaerobe B) aerotolerant anaerobe C) microaerophile D) facultative anaerobe E) obligate aerobe

19. _____ The one most likely to be poisoned by oxygen.
20. _____ Can live in an environment with low levels of oxygen. Choose as many as apply.
21. _____ Can live without any oxygen. Choose as many as apply.
22. _____ Is likely to have enzymes to detoxify toxic forms of oxygen. Choose as many as apply.

23. Please solve for the "# of spores." Log_{10} (# of spores) = 7 # of spores = _____

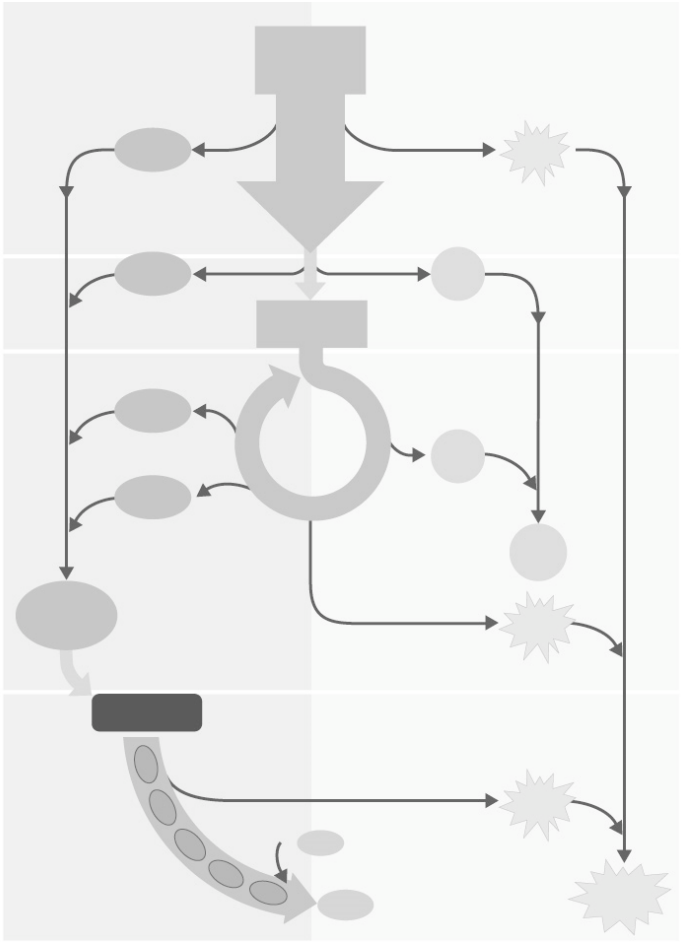
24. Please draw a diagram of a disk-diffusion test of an effective disinfectant. Label the following with their letters. 6pts

A. Petri plate
B. disk with disinfectant
C. zone of inhibition
D. area with bacterial growth
E. the agar area with the highest concentration of the disinfectant
F. the area that has the minimum inhibitory concentration of the disinfectant (Requires some ingenuity!)

25. Please list three features that often vary among types of viruses. 3pts

26. Please label the following in the figure to the right (hint: this is not respiration vs. fermentation): 5pts

- ATP
- CO2
- FADH2
- H2O
- NADH
- O2
- glucose
- glycolysis
- Krebs cycle
- pyruvic acid
- electron transport chain



27. What does catalase do for an organism? Be specific. 1pt

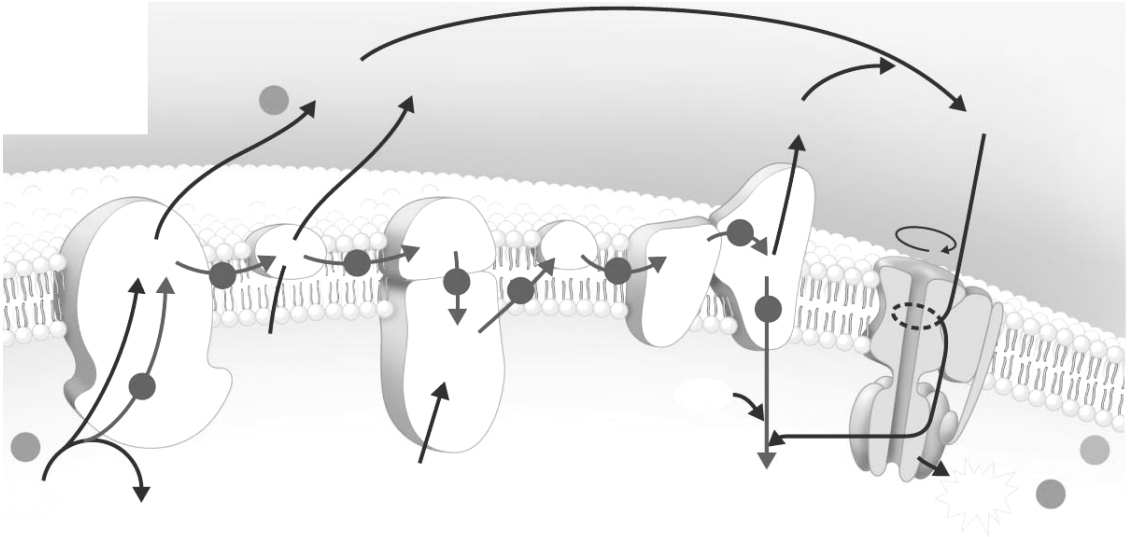
28. (a) List three important potential effects of lysogeny on the bacterial cell. 3pts

(b) Which of the effects in part (a) is most likely to move a gene from one bacterium to another? 1pt

29. Bonus: When bacterial viruses are released from the cell, they kill the host bacterium. How is it possible for animal host cells to survive their release of animal viruses? 1pt

30. Inhibition of protein synthesis involves interfering with the bacterial ribosome. What are three major locations on the ribosome that are targeted by drugs? 3pts

31. This is figure 5.16, showing electron transport and the chemiosmotic generation of ATP. Please label this as thoroughly as you can, and **describe what is happening.** (Some of the dark circles were originally step numbers, not objects.) 8pts



32. Match each phylum to the appropriate category, reusing or not using categories as needed. 5pts

Firmicutes	A. Found only in blood of vampires
Chlamydiae	B. Coiled, with two axial filaments
Spirochaetes	C. Typical Gram-positive cell wall
Proteobacteria	D. Typical Gram-negative cell wall
Actinobacteria	E. No peptidoglycan in cell wall

33. To what **class of Proteobacteria** do each of the following probably belong? 4pts

(a) *Helicobacter* are curved rods.

(b) *Caulobacter* are found in low-nutrient aquatic environments.

(c) *Sphaerotilus* grow well in low-oxygen conditions, such as in anaerobic sewage treatment plants.

(d) *Myxococcus* get nutrition by digesting other bacteria they encounter.

34. What are *Wolbachia* bacteria known for? 2pts

35. What are two major reasons that so little is known about most microorganisms? 2pts

36. What are two reasons that slime molds are important to those studying the development of multicellularity? 2pts

You spent some time learning about several pathogens for this exam. Unfortunately (or fortunately) the diseases they cause are not helpful in distinguishing them. Instead, please match the genus to the specific epithet to complete the species name you studied. Choose as many as apply.

37. _____ *Candida*

38. _____ *Enterobacter*

39. _____ *Enterococcus*

40. _____ *Klebsiella*

41. _____ *Serratia*

Key for #37 - 41:
A. *cloacae*
B. *faecalis*
C. *glabrata*
D. *krusei*
E. *marcescens*
F. *oxytoca*
G. *pneumoniae*

42. Which one of the bacteria above is gram-positive?

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