

BIO 126L
EXAM 1, Sample 2

PRINT YOUR NAME

TA'S NAME

Please sign below if you wish to have your grades posted by the last five digits of your SSN

Signature

INSTRUCTIONS:

BIO 126 L EXAM I has 8 pages, and 45 questions.

There are a total of 200 points, accounting for 20% of your final grade.

Place your name and SSN at the top of each page and check that your exam is complete.

ANSWER ALL QUESTIONS.

Be brief and precise in your answers. **DO NOT RAMBLE!**

You must show your calculations where asked.

Copying and all other forms of cheating will be met with the appropriate disciplinary action.

In case you dispute the answer that is deemed correct, you **MUST** first submit to your TA your question and the reason that you think your answer is the best (not just right, but the best of the answer choices) along with references that support your viewpoint. This must be done within 1 week after the exams are returned.

YOU MUST HAND OVER YOUR COMPLETED EXAM TO YOUR TA WHEN LEAVING THE ROOM AND MAKE SURE THAT YOUR NAME HAS BEEN WRITTEN DOWN

NAME _____ SSN _____

7. (8 points) Calculate the resolution using a 500 nm light wave length, a 10 X ocular and a 100 X objective (with numerical aperture=1): Give the formula and DO NOT forget the units.

Formula: _____

a. _____

For a 100 X ocular, (everything else remaining the same as in (a), the resolution would be:

b. _____

8. (4 points) Under which circumstances is it important to use a chemically defined (synthetic) media as compared to the complex media?

9. (4 points) Bacterial cells are divided morphologically into different shapes. A 'coccus' means the cell is:

- a. rod shaped
- c. helical

- b. spherical
- d. comma shaped

10. (4 points) _____ technique is the process by which one handles material with out introducing unwanted organisms.

11. (4 points) True / False You would pick a colony NOT located on a streak line to isolate a bacterial species from a plate streaked with a mixed population.

12. (4 points) In Gram staining, iodine acts as a _____.

13. (4 points) Which of the following treatments are likely to cause some or all of the Gram positive bacteria to appear Gram negative. (Choose the most complete answer)

- I. Prolonging the alcohol wash step to 30 minutes during Gram staining
- II. Treating the culture with 0.1% lysozyme for 10 minutes before Gram staining
- III. Eliminating the crystal violet step during the Gram staining of a fresh culture

- a. I only
- d. II and III

- b. II only
- e. I and III

- c. I and II
- f. I, II and III

NAME _____ SSN _____

14. (4 points) Agar plates are incubated with their agar side facing down so that
- the plate does not dry out
 - the condensed water will not fall on the plate and smudge the colonies
 - no contaminants get into the plate
 - the bacteria will only grow on the surface of the plate
15. (9 points) Oblique reflected / transmitted stereomicroscopy is used for examining colony morphology on opaque medium. A plain / concave / convex / no mirror is used for this. Total magnification achieved in stereomicroscopy is 30 / 100 / 300 / 1000 fold.
16. (3 points) Which of the following can help differentiate between various species of bacteria?
- colony morphology
 - cell morphology
 - Gram stain
 - All of these
17. (4 points) Briefly describe the difference between an organism that is a facultative anaerobe and one that is an aerotolerant anaerobe.
18. (6 points) A bacterial species that **requires** free oxygen for growth, but only at **low/limited concentrations**, is called a _____: In a tube culture, where would you expect this class of organism to grow? (Sketch out its growth pattern below.)
19. (6 points) A special medium, Thioglycolate plus glucose, is used to determine the oxygen tolerance of an organism.
- What is the role of cysteine in the Thioglycolate plus glucose medium?
 - Briefly explain whether the growth pattern of an organism will change if you forgot to add Methylene blue to this medium?

NAME _____ SSN _____

20. (4 points) You used a "desferal" disk on a lawn of *Arthrobacter flavescence* JG-9 (an auxotroph for siderophore). What was the reason for using the desferal disk?

21. (4 points) What is the chemical nature of siderophore?

- a. protein b. organic acid c. nucleic acid d. inorganic acid

22. (4 points) MacConkey agar is differential based on a bacterial species ability to ferment _____

23. (4 points) Name 2 components of MacConkey's agar that make it selective.

24. (4 points) Analyze the following media descriptions and answer below if they are selective, differential, both or neither:

- a. rich nutrient medium containing an antibiotic
b. rich medium containing maltose and a color-change pH indicator

a. _____ b. _____

25. (4 points) The Kirby-Bauer Test for antibiotic inhibition of microbes is based on this type of microbial interaction:

- a. antagonism b. commensalism c. killism d. neutralism

26. (4 points) An association between two organisms where one organism benefits from the interaction and the other is unaffected is called _____.

- a. antagonism b. commensalism c. neutralism d. synergism

27. (4 points) In antibiotic sensitivity testing, what does "ZOI" stand for?

NAME _____ SSN _____

28. (4 points) The dial of the P1000 micropipettor is set at 0-7-1 (from top to bottom). What volume of water will this setting correspond to?

_____ micro liters _____ milliliters

29. (4 points) The dial of the P200 micropipettor is set at 0-7-1 (from top to bottom). What volume of water will this setting correspond to?

_____ micro liters _____ milliliters

30. (4 points) You plated 0.100 ml from a cumulative dilution of 1 (i.e. no dilution) and obtained 100 colonies on the plate. What is the titer of the culture? (Remember to include the appropriate units.)

31. (4 points) If you dilute a 100% dye solution (safranin) by a factor of 10^{-1} , what is the concentration (in %) of the diluted dye?

32. (4 points) You have a stock culture of *E. coli*, titer of 2×10^7 . You plated 0.1 ml from a cumulative dilution of 1×10^{-4} . How many colonies would you expect to see the next day?

33. (4 points) Of the two methods that you used in the lab to determine cell growth, which one measures only viable bacterial cells?

34. (4 points) Why is the "Durham" tube placed up side down in carbohydrate fermentation tests?

35. (2 points) Carbohydrate fermentation test results must be read between _____ to _____ hours after inoculation.

36. (4 points) If the lactose fermentation broth is yellow after the desired incubation time, it implies the organism is a lactose fermenter / non-fermenter and the pH is acidic / alkaline / neutral.

NAME _____ SSN _____

37. (4 points) Tryptophan is broken down by "tryptophanase" into _____.

This chemical reacts with Kovac's reagent to produce a _____ color, indicating a positive reaction.

38. (4 points) Why is it important to refrigerate the gelatin liquefaction test tubes before "reading" the results?

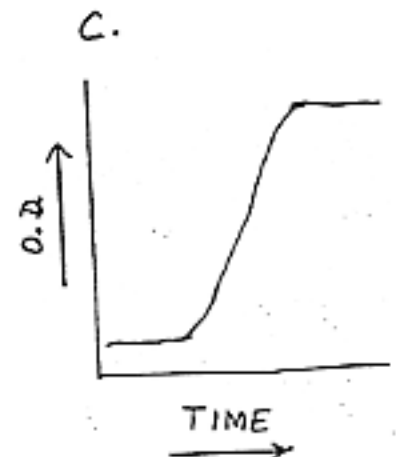
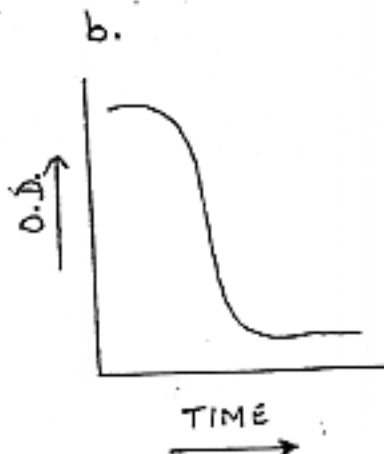
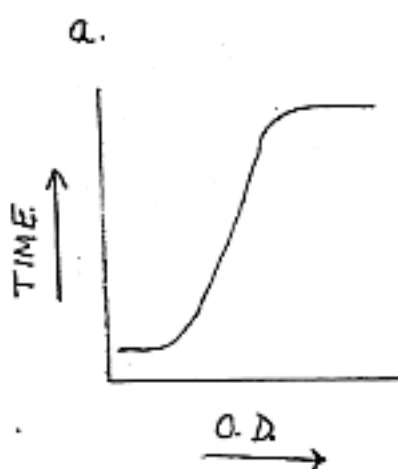
39. (4 points) What is the chemical name of the "catalase reagent"?

40. (4 points) What phase of a bacterial growth curve would you use to determine the generation time?

41. (6 points) A _____ antibiotic kills bacteria, while a _____ antibiotic only stops cell growth.

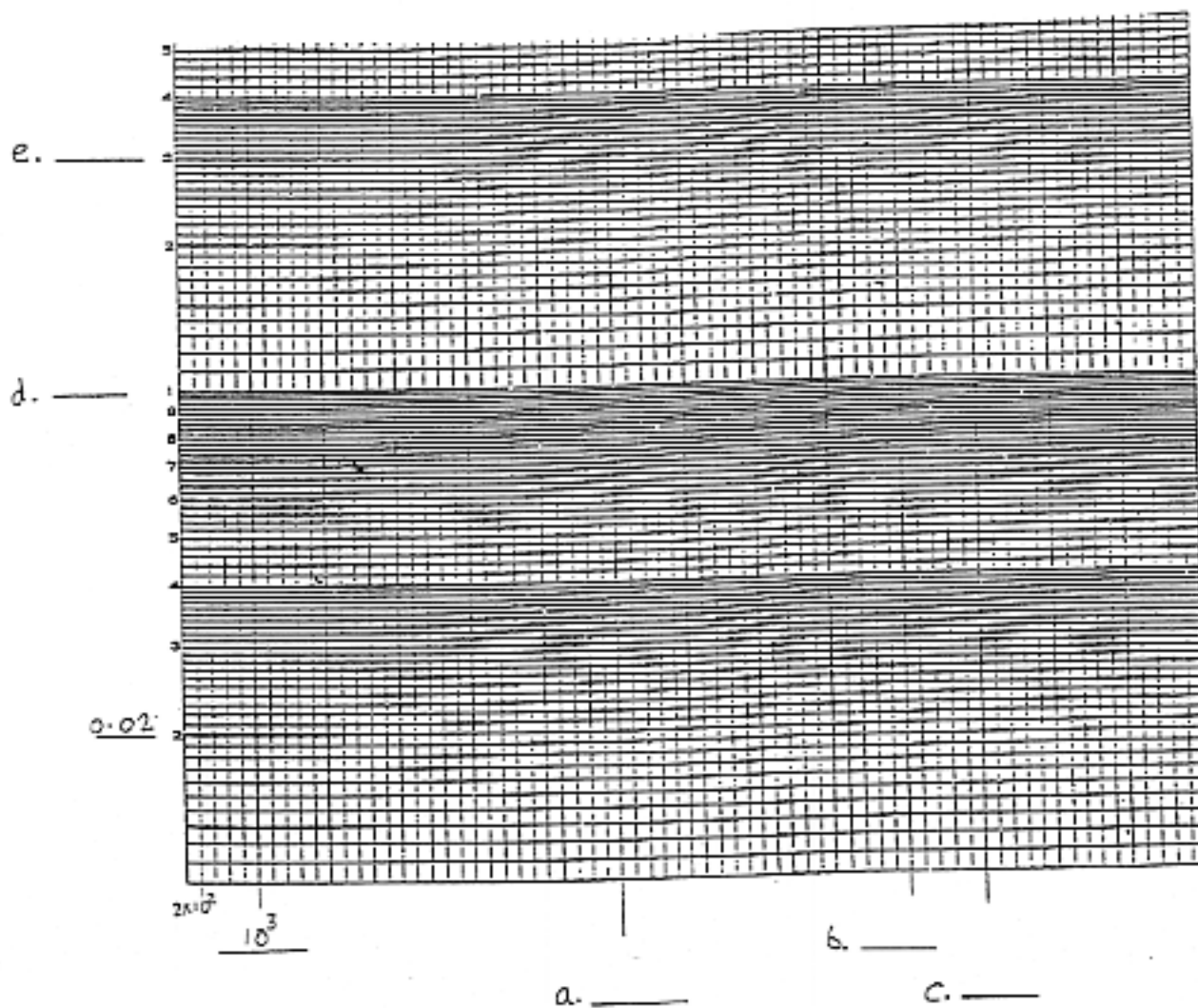
42. (6 points) Several environmental factors influence the growth of microorganisms. List 3 factors that may change the generation time of an organism even when the organism is grown in the same culture medium.

43. (4 points) Circle ONE of the following as the appropriately drawn "typical" bacterial growth curve.



NAME _____ SSN _____

44. (10 points) Finish labeling the X and Y axes on the following graph:



45. (5 points) Bonus: Give the scientific name (genus and species spelled correctly; NO abbreviations) of one organism that you have used in BIO 126L labs.