

BIO 126L
EXAM 2, Sample 3

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:

MIC 129 K EXAM II has 7 pages, and 30 questions.

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

Place your name 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

GRADES WILL BE POSTED BY THURSDAY MAY 13 ON THE LAB DOORS

NAME _____ SSN _____

1. (4 pts) Mention TRUE or FALSE for the following:

- a. _____ Enrichment allows an organism to grow by inhibiting the growth of non desired organisms.
- b. _____ At neutral pH DNA is negatively charged.
- c. _____ Plaques are seen when the bacteriophage "eats" up the nutrients in the plate.
- d. _____ A clear zone around a colony is defined as gamma hemolysis.

2. (15 pts) In the "Enrichment" lab your class was given a soil sample and 5 different media.

a. Give the following information for the medium you would use to enrich for Pseudomonas?

Nitrogen source: _____

Carbon source: _____

Incubation temp: _____

b. Could you have used "glucose" as a carbon source to enrich for Pseudomonas?
Explain your answer in less than 20 words.

c. In less than 20 words explain why you should NOT add more than a pinch of soil to your first tube.

3. (6 pts) Name the 2 ways by which the phenotypic properties of an organism can be altered.
Explain the difference(s) between these two ways in less than 30 words.

4. (5 pts) Which of the following is NOT a characteristic of "enteric bacteria"?
Circle the BEST answer.

a. Glucose fermenter

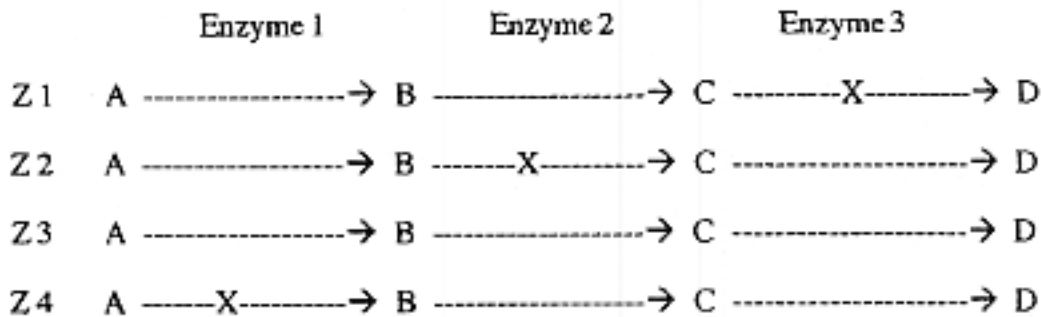
b. Gram negative rods

c. Nitrogen fixer

d. Catalase positive

NAME _____ SSN _____

5. (12 pts) The following figure describes the various mutants/wild type strains of organism "Z" used in a cross-feeding experiment. Based on this figure answer the following questions:



a. Name ALL the strains that Z 1 can cross-feed (i.e. serve as a donor resulting in their being able to NOW produce the end-product) _____

b. Name ALL the strains that Z 4 can be cross-fed BY (i.e. allow Z 4 to produce the end-product) _____

c. Name the strain which will NOT accumulate any intermediate of the pathway. _____

d. Which of the following accumulates in Z 2 and therefore allows Z 2 to cross-feed other mutants in the pathway?

- | | |
|------------------------------|-------------------|
| A. Gene coding for enzyme 2. | B. Enzyme 2 |
| C. Intermediate B | D. Intermediate C |

6. (12 pts) Name the component(s) of CNA blood agar that allow it to be

- a. Selective:
- b. Differential:
- c. Enriching:

7. (6 pts) Is KIA slant differential? Yes/No. If yes which component(s) make it differential?

NAME _____ SSN _____

8. (5 pts) Would you expect both Gram positive and Gram negative organisms to grow on KIA slants? Explain your answer in less than 20 words.

9. (8 pts) If a KIA slant was made with 1.0% lactose and 1.0% glucose, what would the color of the slant for a:

a. glucose fermenter at 24 hours: Red/yellow

b. lactose fermenter at 24 hours: Red/Yellow

10. (12 pts) How would you interpret the results observed for the two microorganisms shown below on KIA slants?

	<u>Slant</u>	<u>Butt</u>
a.	yellow	Black
b.	red	Yellow

Circle ONLY the correct answers. If you circle incorrect answers YOU WILL LOSE points!

Microorganism (a) is: aerogenic, glucose fermenter, lactose fermenter, produces hydrogen sulfide

Microorganism (b) is: aerogenic, glucose fermenter, lactose fermenter, produces hydrogen sulfide

11. (8 pts) Phenol red is the pH indicator used in carbohydrate fermentation broth. At pH 7.0-7.4 the color of the broth containing this indicator would be yellow / orange-red / magenta; whereas at pH 6.8 or below it would be yellow / orange-red / magenta. (Circle the BEST answer)

12. (4 pts) Decarboxylases are inducible enzymes. They are induced in the presence of the substrate, provided the environment is both _____ and _____

13. (5 pts) Lambda is a bacteriophage that infects *E.coli*. Is it safe to call it a virus or not? Explain in less than 20 words.

14. (5 pts) How would the T 7 bacteriophage's plaque assay be affected if you forgot to add any *E. coli*? Answer in less than 10 words.

NAME _____ SSN _____

15. (6 pts) Fill in the table below with the appropriate reagent/pH indicator and the color of the positive reaction.

<u>Reaction/Test</u>	<u>Reagent/Indicator</u>	<u>Color of the positive result</u>
Phenylalanine deaminase	_____	_____
Decarboxylase	_____	_____
Citrate utilization	_____	_____

16. (4 pts) Agarose gel electrophoresis is used to separate DNA fragments based on their size/charge.

17. (4 pts) Agarose concentration best suited for separating large DNA fragments (~10 kbp) is _____

- a. 0.1%
- b. 0.5%
- c. 1.0%
- d. 2.0%

18. (4 pts) Agarose concentration best suited for separating small DNA fragments (~1 kbp) is _____

- a. 0.1%
- b. 0.5%
- c. 1.0%
- d. 2.0%

19. (5 pts) Name the dye that was used in the lab to stain the DNA fragments in the agarose gel.

20. (4 pts) Of the following DNA sequences which one(s) is/are palindromic and therefore a potential recognition site for a Type II restriction endonuclease (the kind you used in the lab).

Note: Only ONE of the two strands of DNA is shown.

- a. GGATCC
- b. GATTAG
- c. AAAGGG
- d. GAGAGA

21. (5 pts) Define conjugation:

NAME _____ SSN _____

22. (6 pts) You have two organisms, A and B. You also have access to two kinds of plates, one containing minimal medium and the other TSA. You streaked the two organisms on both the plates. A grew on both minimal medium and TSA plates, whereas B grew only on TSA plates. Based on this information, you determined that :

"A" is an auxotroph/prototroph/both/ neither

"B" is an auxotroph/prototroph/both/ neither

23. (5 pts) What is the difference between a cell that is Hfr and one that is F⁺?

24. (5 pts) An F⁻ *E. coli* acts as a donor/recipient in conjugation.

25. (5 pts) After a successful conjugation between an Hfr and an F⁻ cell, the donor strain is found to be:

a. F⁻

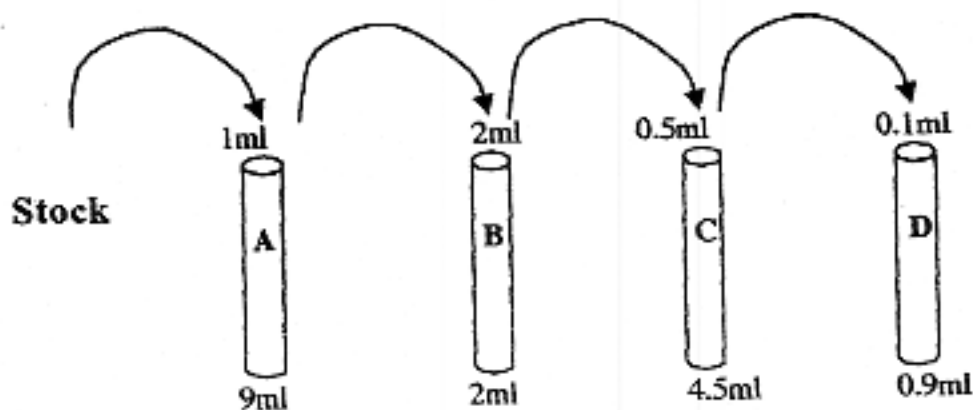
b. F⁺

c. Hfr

d. F[']

26. (10 pts) Given the following information, determine the titer of the PHAGE STOCK:
You obtained 50 plaques when you plated 100 μ l from tube D and used 2 ml of soft agar.
(Show your calculations)

Titer of the phage stock: _____ (Write down the appropriate units)



NAME _____ SSN _____

27. (6 pts) Blood from an individual agglutinates with anti - B and anti - D. This blood did not react with anti - A.

The blood type of this individual is: _____

List all possible blood types that can be donors for this individual: _____

28. (20 pts) Define the following terms as used in serology:

a. Agglutination:

b. Antigen:

c. Cross-reacting antigens:

d. Flocculation:

29. (4 pts) What does an antibody attach to?

- a. Dr. Saxena
- b. precipitate
- c. itself
- d. antigen

Bonus Question:

30. (5 pts) Which lab did you enjoy the MOST and why?