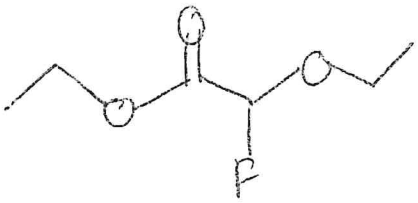
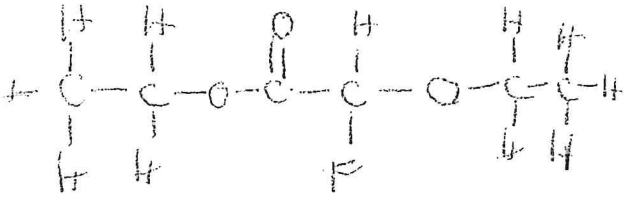
Biochemistry CHE 461 Dr. Hahn MWF 11 to 11:50 am Final Exam 4/28/23 Friday
Name Key (Print)
Please show work on all questions for partial credit even on questions which do not specify.

1. Given the following Lewis Dot structure, give both the equivalent skeletal form and condensed form. (8 pts, 4 each)





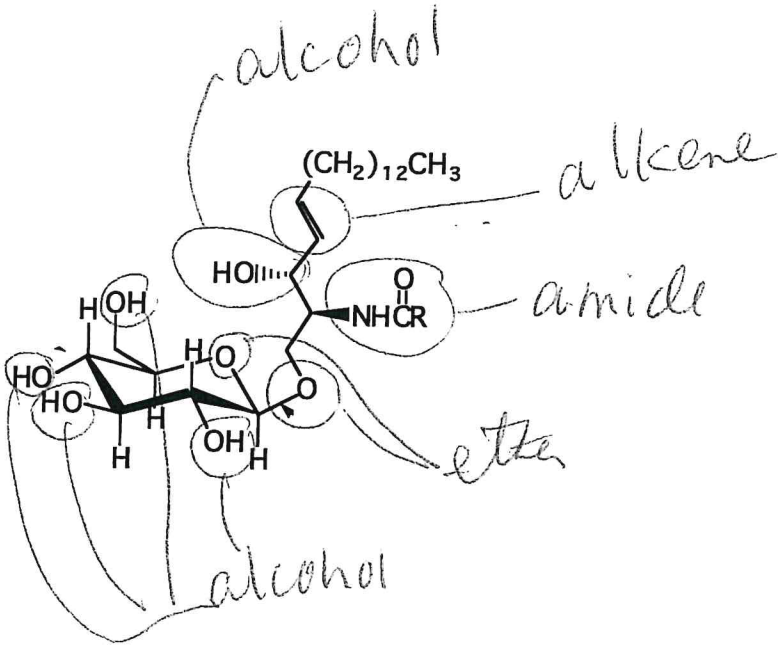
$CH_3CH_2OC(O)CHFOCH_2$

~~$(CH_3CH_2(O)CO CHF O$~~
~~CH_2CH_3~~

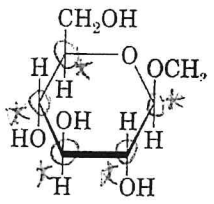
8 pt

Lewis skeletal 4 pt condensed 4 pt

2. Given the following structure circle and label all functional groups that you see (8 pts, 1 pt each)

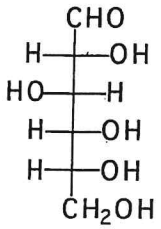


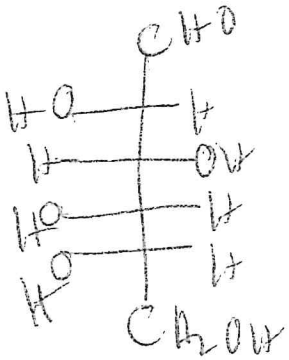
3. Put a * by all chiral centers in the given molecule. (10 pts, 2 pts each)



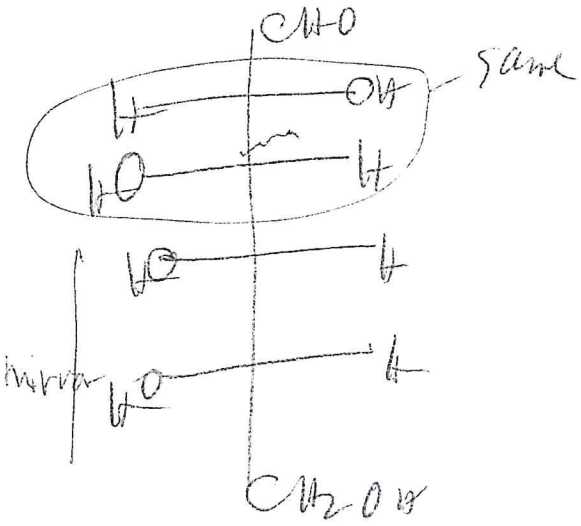
~~5~~ 4 total

4. Draw a fisher projection for the enantiomer of the following molecule shown below as a Fisher projection formula. (8 pts, 4 pts each)





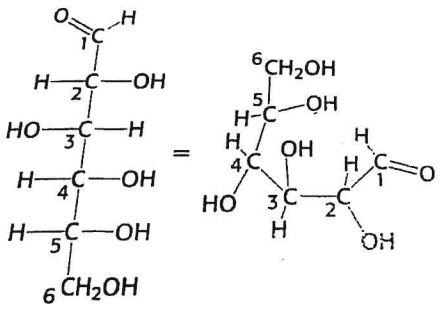
enantiomer

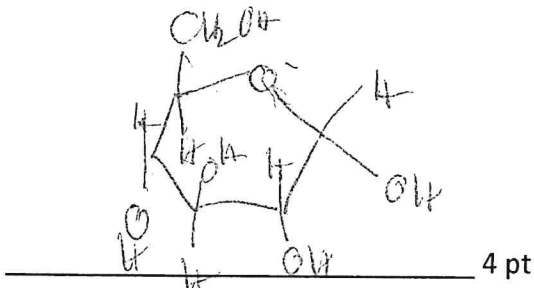


diastereomer

+ many more

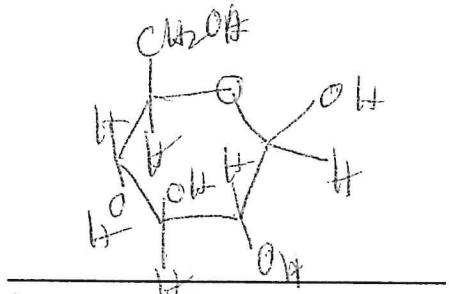
5. a. Cyclize the sugar below to form the pyranose as a Haworth formula (10 pts)





4 pt

α anomer of the cyclized sugar



4 pt

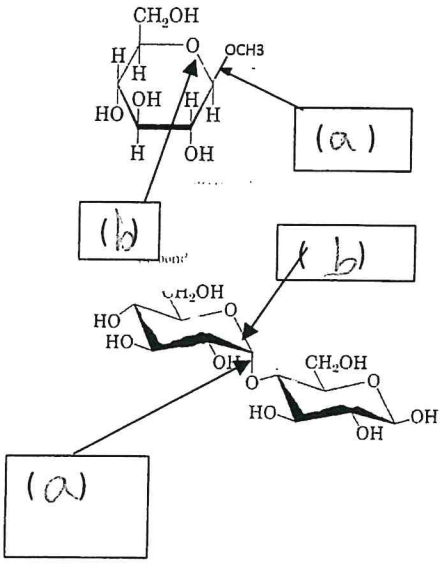
β anomer of the cyclized sugar

b. given the 2 anomers which you drew above, which is the more stable. [(α) or (β)] (1 pt)

c. The mutarotation equilibrium is shown above, why is the more stable cyclized sugar more stable ? (1 pt)

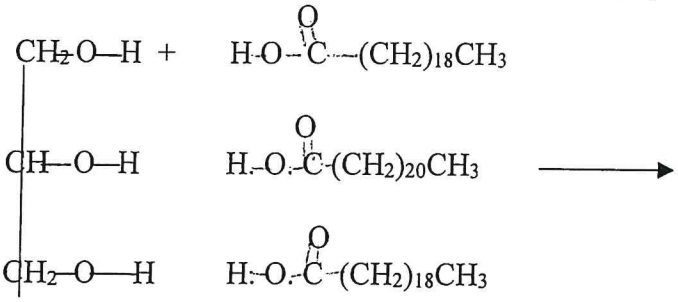
β is more stable because the OH is in an equatorial position

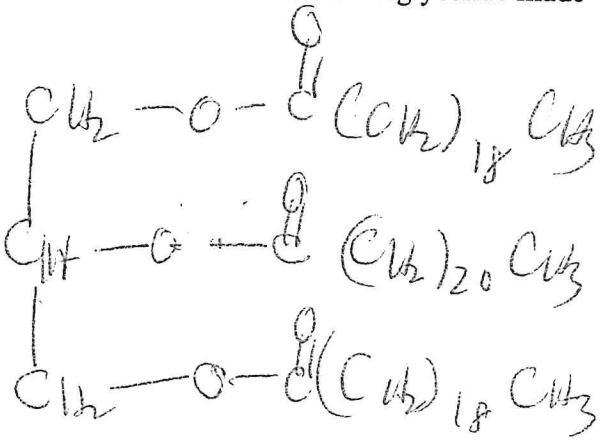
6. Fill in the blank with either (a) glycosidic bond (acetal /ketal formation) or (b) hemiacetal or hemiketal formation in the following molecules (8 pts, 2 pts each)



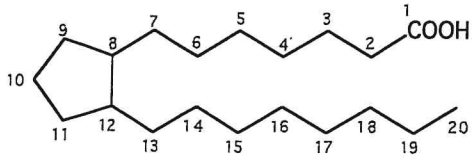
Lipids

7. (a) The structure of glycerol and the 3 fatty acids are shown. Show the structure of the triglyceride made from these elements via an esterification reaction. (8 pts)

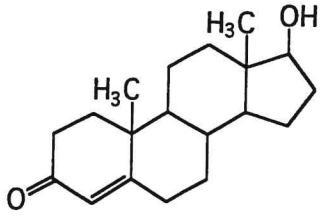




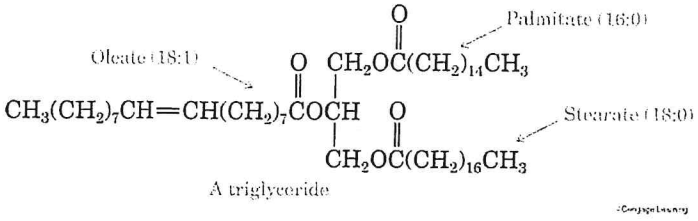
8. Match the following structures to the types of fats. (a) steroid. (b) triglyceride (c) prostaglandins (6 pts, 2 pts each)



[(a) or (b) or (c)] circle one



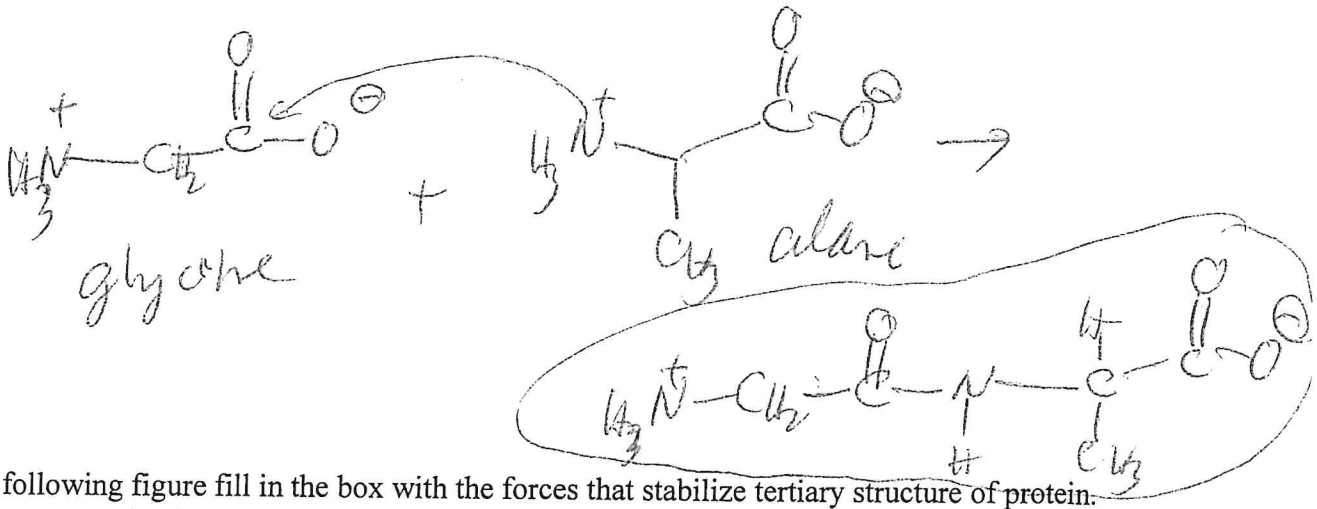
[(a) or (b) or (c)] circle one



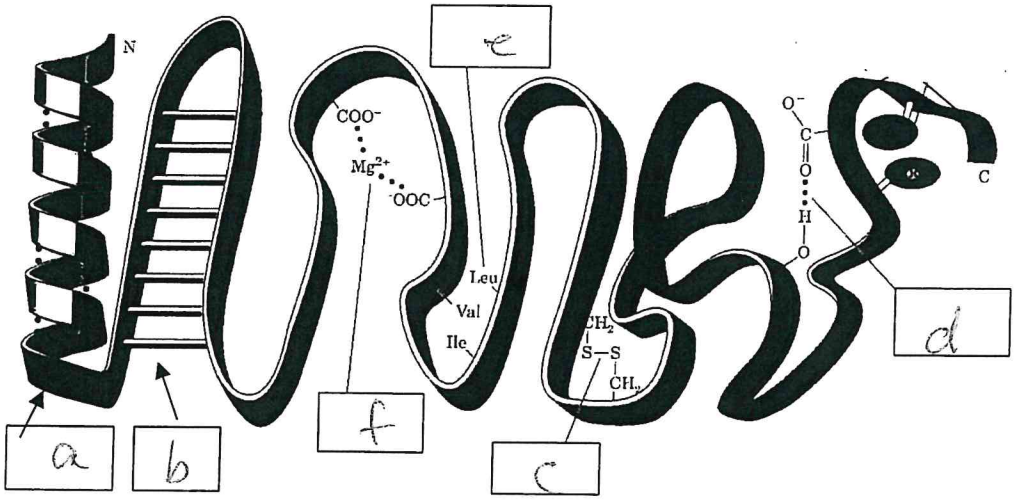
[(a) or (b) or (c)] circle one

Protein

9. From the amino acid structure list handout show the peptide link between Glycine (on left) and alanine (on right) to make a dipeptide. (10 pts)



10. In the following figure fill in the box with the forces that stabilize tertiary structure of protein. (a) helical structure. (b) sheet structure (c) covalent bonding. (d) side chain hydrogen bonding. (e) hydrophobic interaction (f) metal ion coordination. (6 pts, 1 pt each)

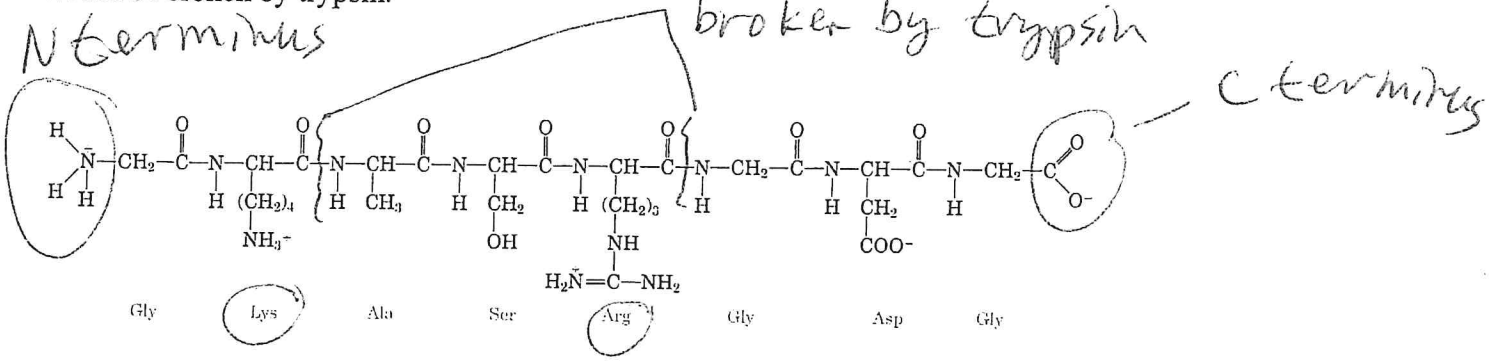


11 Given the following peptide. (6 pts, 2 pts each)

(a) circle and label the C terminus.

(b) circle and label the N terminus.

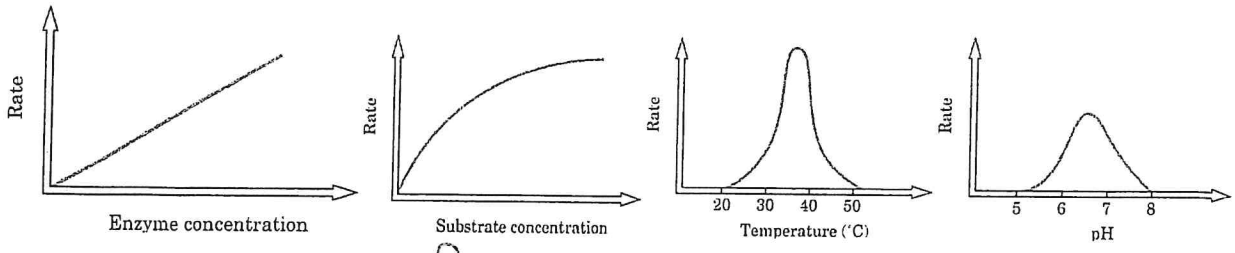
(c) the enzyme Trypsin catalyzes the hydrolysis of peptide bonds formed by the **carboxyl group of lysine and arginine**. The name of the amino acid is listed below the peptide. Draw a line to where the peptide would be broken by trypsin.



12 Match the following terms with the shown figure (10 pts)

(1). The figures below represents conditions which can effect enzyme action on a reaction. [(yes) or (no)] (circle one) (2 pts)

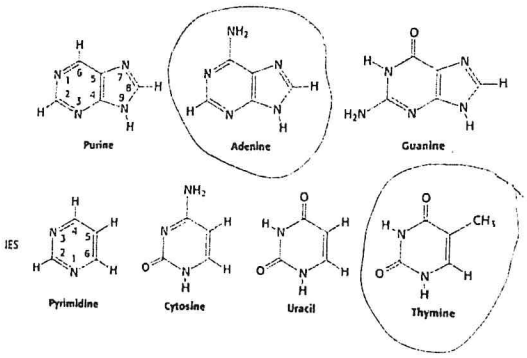
(2). Match (a) effect of rate to pH increases at an optimal pH. (b) the effect of rate on pH increase as the pH goes to higher numbers. (c) enzyme concentration increases rate (d) enzyme concentration has an optimal concentration and then decreases. (e) substrate concentration increase rate continuously to the highest substrate concentration. (f) increase in substrate concentration goes up to an optimal amount and then higher substrate concentration does not result in faster rate. (g). there is an optimal temperature for greatest rate (h) higher temperature results in faster rate **There are a lot more choices than you need. Each blank only gets ONE letter**. (8 pts, 2 pts each)



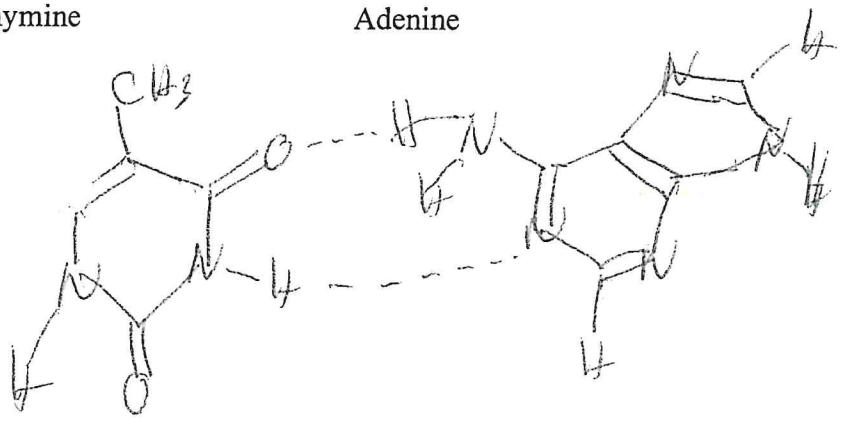
c f g a

Nucleotides

13. Draw in the hydrogen bonding interactions between the two pairs of nucleic acid bases. Given the following drawing of the bases. Note that Thymine hydrogen bonds to Adenine. Cytosine hydrogen bonds to Guanine. You will have to draw the molecule in the correct orientation to have the correct hydrogen bonding. (8 pts, 4 pts each)



Thymine Adenine



Cytosine Guanine