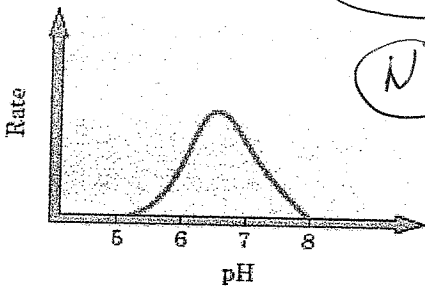


Name Key (print) Name \_\_\_\_\_ (sign)

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**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question. (2 pts each, 30 pts total)**

- 1) The area on the enzyme that interacts with the substrate is called the: 1) C  
 A) regulatory site B) allosteric site C) active site D) modulator site
- 2) Which of the following nitrogenous bases is found only in RNA? 2) B  
 A) Adenine B) Uracil C) Thymine D) Cytosine
- 3) Consider the following graph for the rate of an enzyme catalyzed reaction. 3) C



BA = bad attempt BBA = bad bad attempt  
NA = not attempted  
NW = no work

What would be the optimum pH for carrying out this

reaction?

- A) 5.0 B) 7.5 C) 6.5 D) 8.0
- 4) In naturally occurring unsaturated fatty acids the double bonds are: 4) A  
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- 5) The pattern the backbone folds, for example alpha-helix or beta pleated sheet, is the \_\_\_\_\_ structure of a protein. 5) B  
 A) quaternary B) secondary C) tertiary D) primary
- 6) All amino acids contain a chiral carbon except for one. Which one? 6) C  
 A) Cysteine B) Histidine C) Glycine D) Phenylalanine
- 7) What type of bonding holds the double strand of DNA together? 7) C  
 A) Covalent bonding B) Ionic bonding  
 C) Hydrogen bonding D) None of these

8) Which of the following distinguishes a neurotransmitter from a hormone?

8) C

- A) the distance over which it acts
- B) the chemical structure of the compounds
- C) the diversity of compounds in the classification
- D) the source of the compound

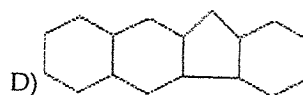
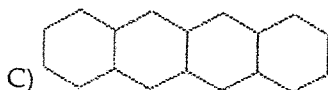
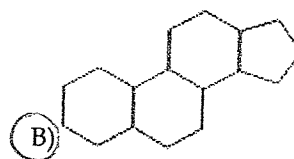
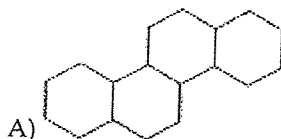
9) What is the primary function of enzymes?

9) C

- A) Neurotransmitters
- C) Biochemical catalysts
- B) Structure
- D) Transport

10) Which of the following structural arrangements is the steroid structure?

10) B



11) The sequence of amino acids is considered to be the \_\_\_\_\_ structure of a protein.

11) B

- A) quaternary
- B) primary
- C) secondary
- D) tertiary

12) A correct set of complimentary base pairs in DNA are:

12) B

- A) AG
- B) GC
- C) AU
- D) TC

13) When acetylcholine is adsorbed onto a cholinergic receptor of a neuron,

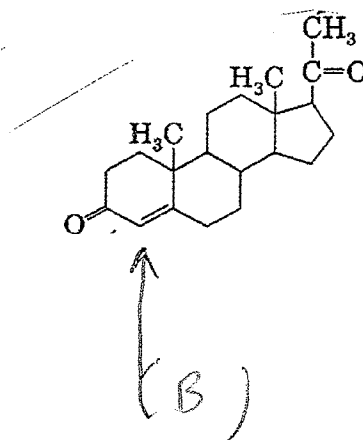
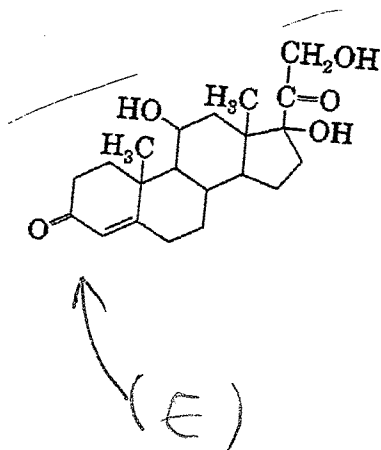
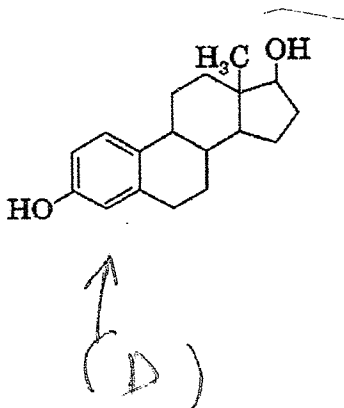
13) D

- A) the axon of the neuron breaks off.
- B) the membranes of the neurons become rigid and breakable.
- C) the membranes of the neurons are destroyed.
- D) the ion gates are opened and ions freely flow across the membranes.
- E) more than one of the above happens

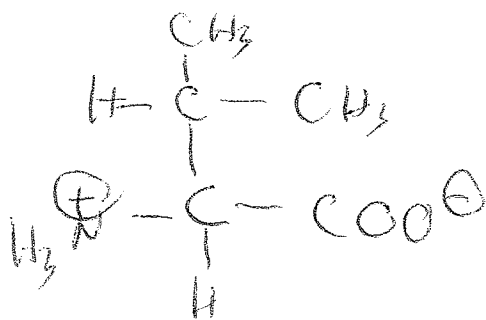
Part II: Short Answers (40 pts)

1. Given the following molecules, match to the name of the structure of the lipid shown.

(A) Prostaglandin (B) progesterone (C) testosterone (D) estradiol (E) cortisol (12 pts total, 4 pts each)



2. Draw the structure of the amino acid valine at its isoelectric point. (5 pts)



pH when entire structure is neutral

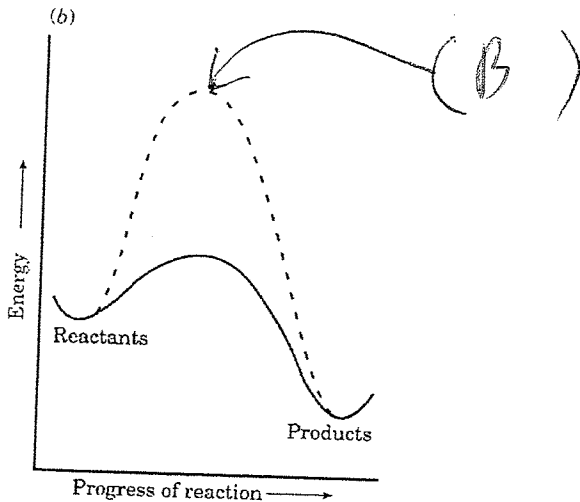
$\text{pI} = -2 \frac{1}{2}$

3. List 4 things which effects enzyme activity. (8 pts total, 2 pts each)

(a) Temperature (b) pH

(c) substrate conc (d) enzyme concentration

4. In the figure below, label the energy diagram by filling in the parenthesis. (A) energy diagram of the enzyme catalyzed reaction (B) energy diagram of the uncatalyzed reaction (5 pts)



5. Match the following words to the definition blanks. (each word can be used one time and each blank must have one answer)(10 pts total, 2 pts each)

(A) Antagonist (B) agonist (C) acetylcholine (D) prostaglandins (E) zwitterion

E a molecule which is neutral because a (+) charged part of the molecule is offset by a (-) charged part of the molecule with a charge separation in the molecule.

A a pharmaceutical which blocks a receptor and prevents its stimulation.

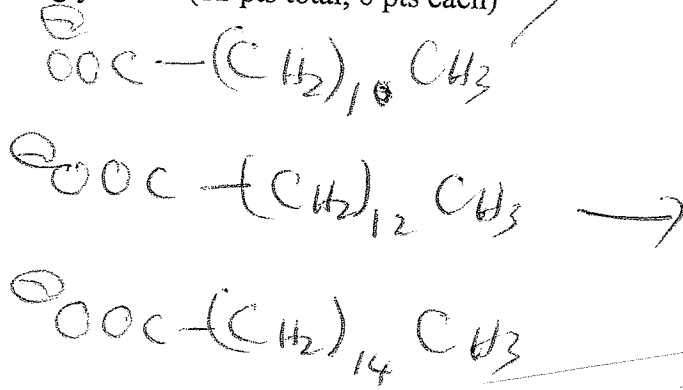
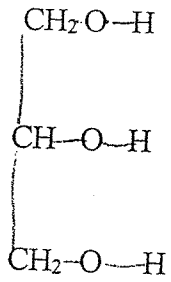
B a pharmaceutical which competes with a natural messenger for a receptor site.

C The main cholinergic receptor.

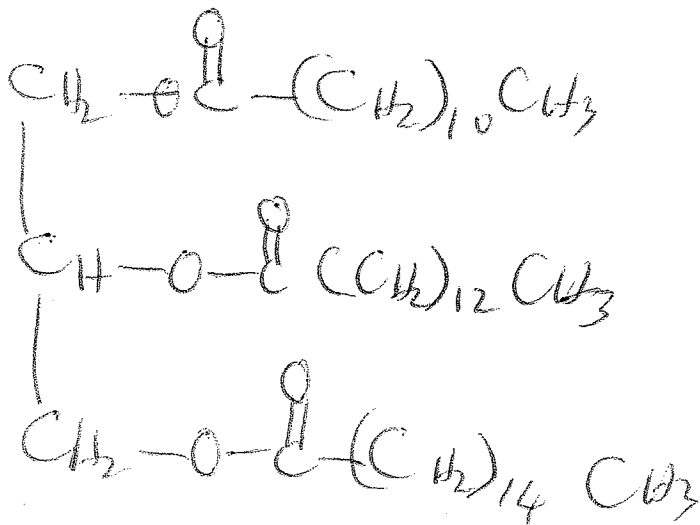
D aspirin and other NSAIDS inhibit the enzyme cyclooxygenase (COX). This blocks which naturally occurring lipid involved in pain?

Part III: Long Answers (34 pts)

1. (a) The structure of glycerol is shown. Use 3 different fatty acids from the chart and show the structure of a triglyceride. (12 pts total, 6 pts each)



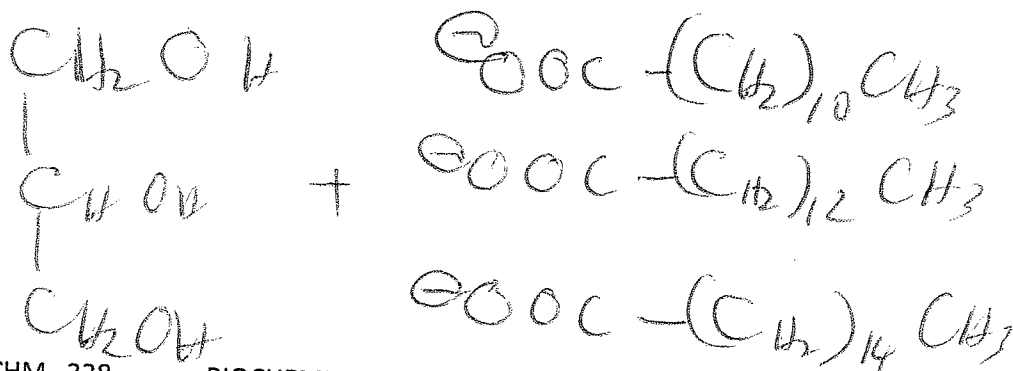
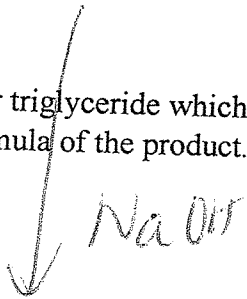
3 argother  
choice  
of fatty  
acids



BA = -3 pt

Attachment wrong  
-1 to -2

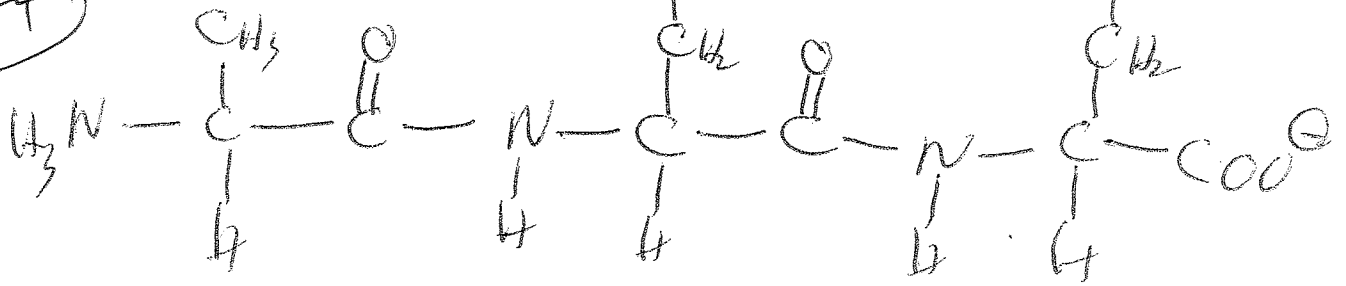
(b) From your triglyceride which you drew above, do a reaction with NaOH (saponification) and show the structural formula of the product.



BA -3

2. (a) Show the tripeptide made from Ala, Trp and Ser (look at your chart of amino acids) (12 pts total, 8 pts this letter) (show the correct peptide bond)

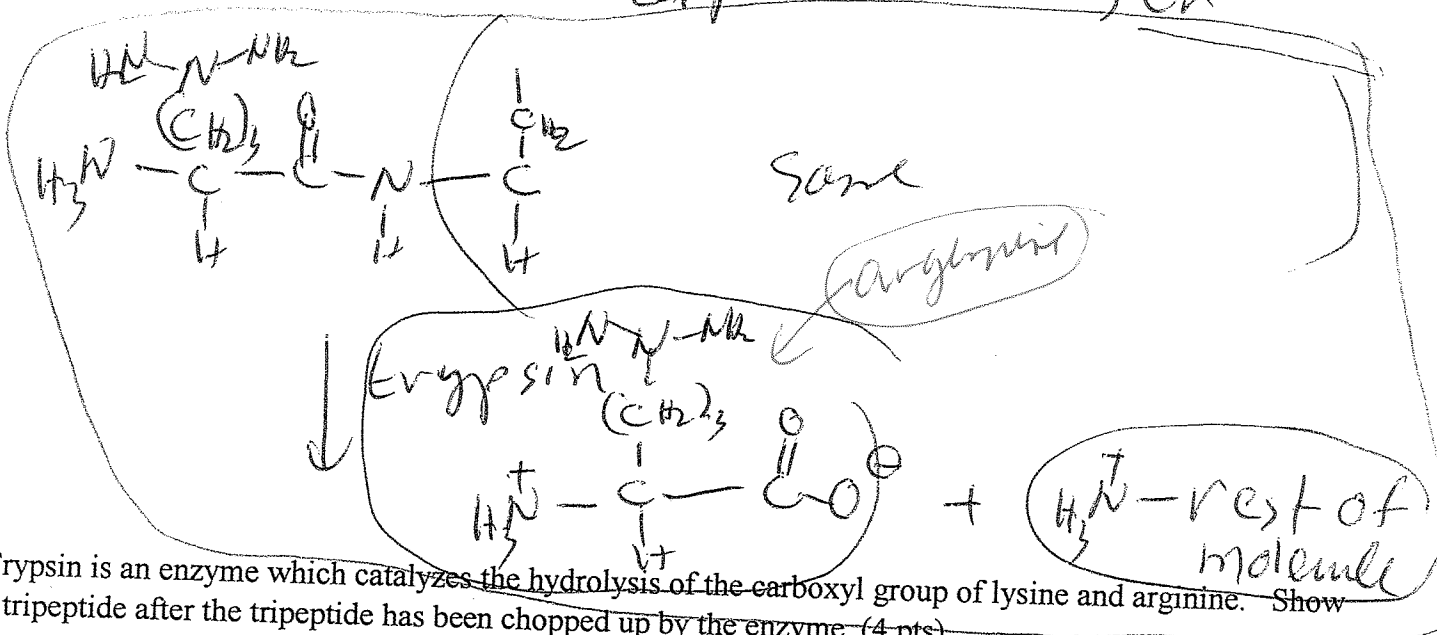
13A-4



ala

Trp

ser



(b) Trypsin is an enzyme which catalyzes the hydrolysis of the carboxyl group of lysine and arginine. Show your tripeptide after the tripeptide has been chopped up by the enzyme. (4 pts)

same as above no lysine or arginine in tripeptide

tryptophan in question -

#2a should have been

Arg - Try - Ser  
(not Ala)

3. (a) Is [(HDL)] or (LDL) (circle one) the good cholesterol? (15 pts, 5 pts each)

(b) Explain briefly and concisely how cholesterol travels from the liver to the serum and back. You must mention the following in the correct sequence.

LDL, HDL, VLDL, serum, liver, cell, LDL receptors

(BA - 2 1/2)

at liver cholesterol is part of VLDL



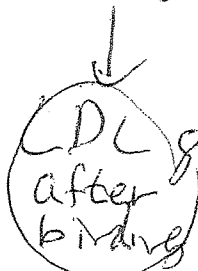
VLDL carried to serum



VLDL loses fat → becomes LDL in plasma



LDL carries cholesterol to cell, LDL receptors bind to LDL



(c) Why is the bad cholesterol [from part (a)] a factor in atherosclerosis and heart attack?

LDL at liver

(BA - 2 1/2)

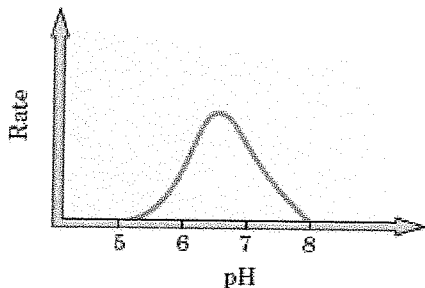
HDL takes cholesterol out of system to liver - LDL keeps cholesterol in system - cholesterol floats around + causes atherosclerosis + heart attack

Name \_\_\_\_\_ (print) Name \_\_\_\_\_ (sign)

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**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question. (2 pts each, 30 pts total)**

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- 3) Consider the following graph for the rate of an enzyme catalyzed reaction. 3) \_\_\_\_\_



What would be the optimum pH for carrying out this

reaction?

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- 4) In naturally occurring unsaturated fatty acids the double bonds are: 4) \_\_\_\_\_  
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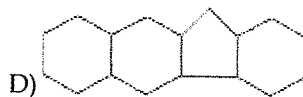
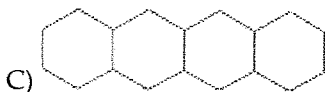
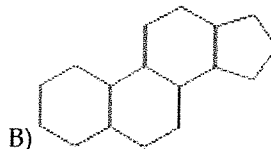
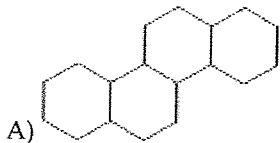
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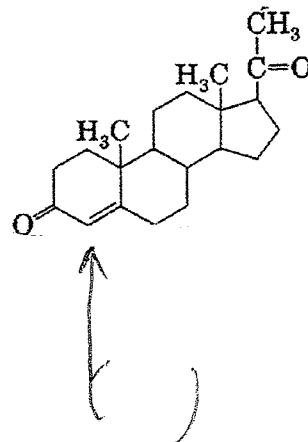
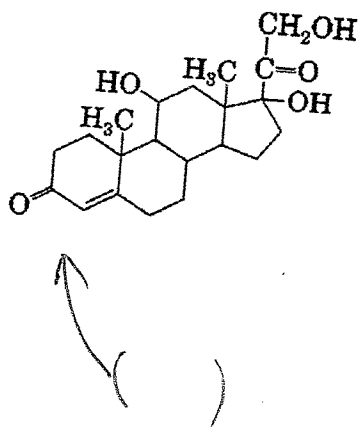
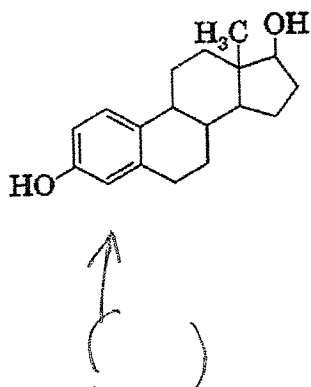
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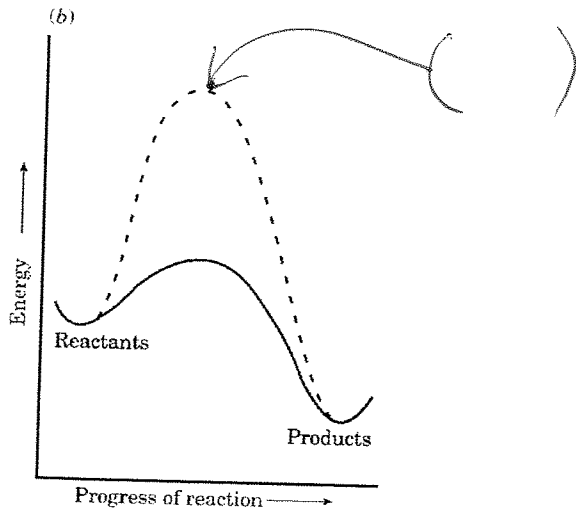
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3. List 4 things which effects enzyme activity. (8 pts total, 2 pts each)

(a) \_\_\_\_\_ (b) \_\_\_\_\_

(c) \_\_\_\_\_ (d) \_\_\_\_\_

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\_\_\_\_\_ a molecule which is neutral because a (+) charged part of the molecule is offset by a (-) charged part of the molecule with a charge separation in the molecule.

\_\_\_\_\_ a pharmaceutical which blocks a receptor and prevents its stimulation.

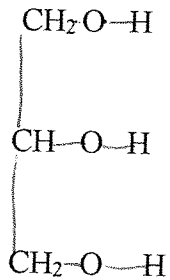
\_\_\_\_\_ a pharmaceutical which competes with a natural messenger for a receptor site.

\_\_\_\_\_ The main cholinergic receptor.

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