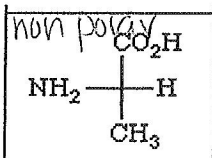
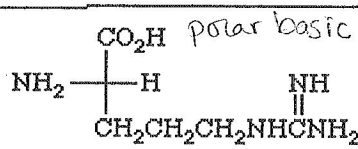
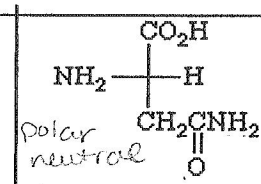
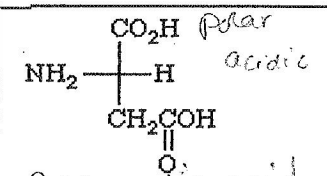
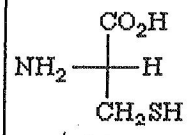
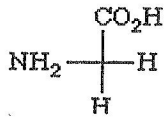
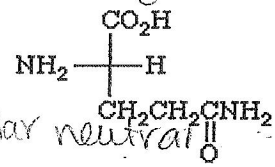
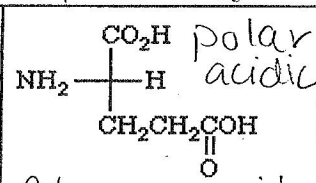
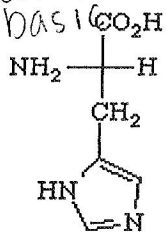
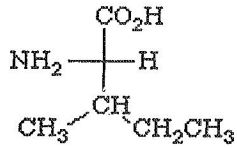
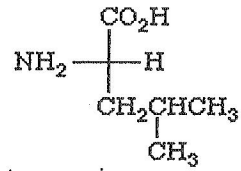
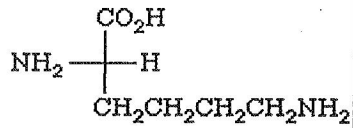
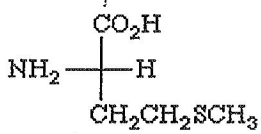
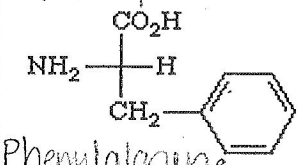
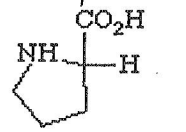
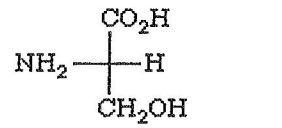
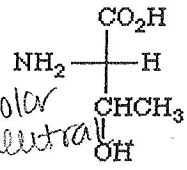
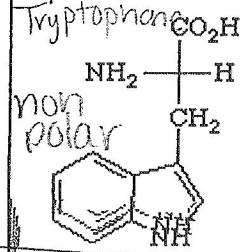
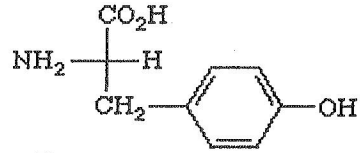
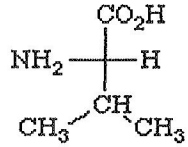
HOMEWORK #10

CHEM 121, section 1
Background for the Chapter. 20. Proteins
Homework 1

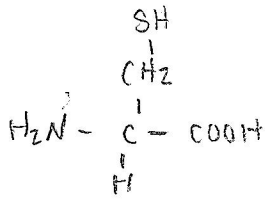
Printed Name: Key

Group Name:

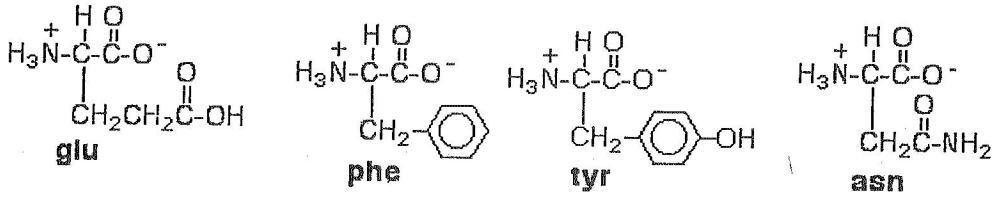
1) (3 pts) Give name, abbreviation and types (neutral, polar, non-polar, basic and acidic).

non polar  alanine	 polar basic Arginine	 polar neutral Asparagine	 polar acidic Asparatic acid
 systine polar-neutral	 glycine non polar	 polar neutral Glutamine	 polar acidic Glutamic acid
Polar basic  Histdine	non polar  Isoleucine	nonpolar  Leucine	polar basic  Lysine
non polar  Methionine	non polar  Phenylalanine	non polar  Proline	polar neutral  Serine
Threonine  polar neutral	Tryptophan  non polar	Polar neutral  Tyrosine	non polar  Valine

2) Draw the optical and L isomers for: cys.



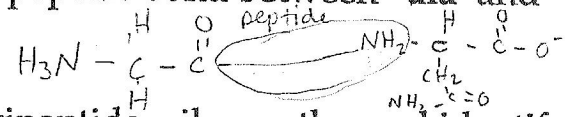
3) Use the following amino acids to answer the questions below:



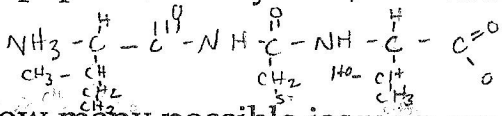
a. Which amino acid is most polar? tyr
b. Which amino acid is most non-polar? phe
c. Which amino acid gives an acidic solution? glu
d. Which amino acid gives a basic solution? asn

4) Draw the following:

a) Dipeptide bond between **ala** and **asp**, and identify C- and N-terminal.

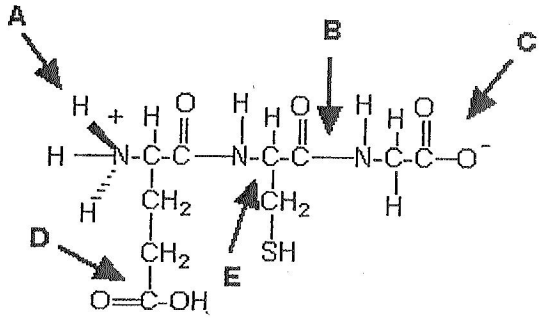


b) Tripeptide, ile-cys-thr, and identify N- (left) and C-terminal(right).



c) How many possible isomers are in the tripeptide formed with ile, cys and thr? Come up with a formula for linear chain with " n" amino acids.

d) Give the IUPAC name of the tripeptide with the sequence, ile-cys-thr.



5) Use the structure to answer the questions below

a. Which letter arrow points the end of the peptide that is the "amine" end-N-terminal? A
b. Which letter arrow points the end of the peptide that is the "carboxyl" end, C-terminal? D
c. Which letter arrow points to an amide or peptide bond? C

6) Explain the differences between primary, secondary, tertiary, and quaternary protein structures by giving brief definitions of each. What types of bonding are used in each?

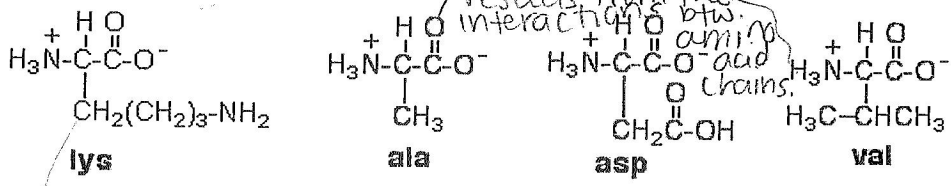
Primary is the order in which amino acids are linked together in a protein.

Secondary is the arrangement in space adopted by the backbone portion of a protein

Tertiary is the overall three dimensional shape of a protein that results from the interactions btw. amino acid chains.

Quaternary combinations of several proteins aggregate of smaller globular proteins. is the organization among the various peptide chains in a multimeric protein.

7)



Use the above structures to answer the questions below:

a. Which two amino acids may link in a salt bridge in tertiary protein structure?

lys, ala, asp

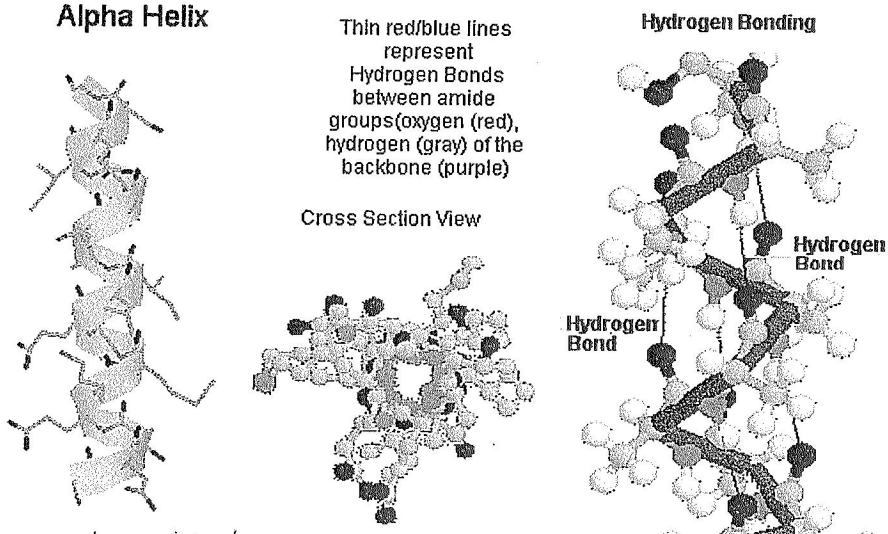
b. Which two amino acids may link in hydrophobic interactions in tertiary protein structure?

ala, val

c. Which two amino acids may link in hydrogen bonding interactions in tertiary protein structure?

lys and asp

8) Explain the difference between the alpha helix and the beta pleated sheet protein structures. What are the differences in the hydrogen bonding?



an alpha helix structure is a protein secondary structure in which a single protein chain adopts a shape that resembles a coiled spring, with the coil configuration maintained by hydrogen bonds. A beta pleated sheet structure is a protein secondary structure in which two fully extended protein chain segments in the same or different molecules are held together by hydrogen bonds.