Chemistry 3785 - Fall 2003 - Quiz # 2

Name (Printed): _____,_____
(last) (first)

Signature:_____ /20 (Overall on Quiz)

1. (8 points) For the following tripeptide, draw the accurate molecular structure at the indicated pH. Be sure to draw in **every atom** and also to **draw in any lone pairs and/or charges** on Nitrogen, Oxygen, and Sulfur atoms. Give the net (total) charge for the tripeptide at this pH.

Pro-Arg-Cys

pH = 11.72

Total Charge = _____

Amino Acid	pK_1	pK_2	pK_R
Pro	1.95	10.64	-
Arg	1.82	8.99	12.88
Cys	1.92	10.70	8.37

/8 (Question #1)

Name (Printed): _____,_____
(last) (first)

2. (6 points) Clearly describe the strength and nature of a Hydrogen bond and then give two specific examples of specific molecules joined by Hydrogen bonds.

3. (6 points) Clearly describe the structure of the alpha-Helix units found in proteins. Be sure to include a complete description of what forces hold an alpha-Helix together. Relate the alpha-Helix structure to the structure of Keratin.

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/12 (Questions #2 & #3)

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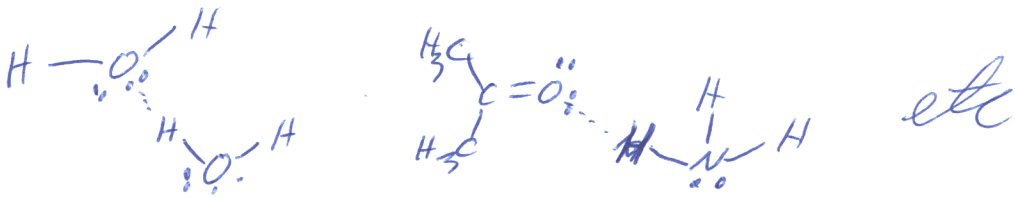
Name (Printed): Answers, _____
(last) (first)

2. (6 points) Clearly describe the strength and nature of a Hydrogen bond and then give two specific examples of specific molecules joined by Hydrogen bonds.

- 5-10% as strong as a covalent bond
- highly directionally specific
  D-H···:A must be in straight line so that donor-H bond points straight at lone pair on acceptor
- In biochemistry
  - OH & NH common H bond donor
  - :Ö: & :N: common H bond acceptor



etc

3. (6 points) Clearly describe the structure of the alpha-Helix units found in proteins. Be sure to include a complete description of what forces hold an alpha-Helix together. Relate the alpha-Helix structure to the structure of Keratin.

- side chains point outside α-helix
- H bonds between NH groups & carbonyls in backbone – attach 4 residues ahead
- 1.5 Å rise / AA, 100° turn / AA, pitch = 5.4 Å
  3.6 AA / full spiral
- every NH & C=O in backbone H bonds to residue 4 ahead

Keratin
- is a coiled coil of two alpha helices wrapped around on another

/12 (Questions #2 & #3)