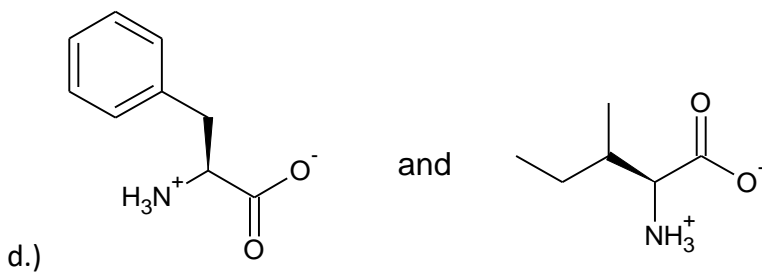
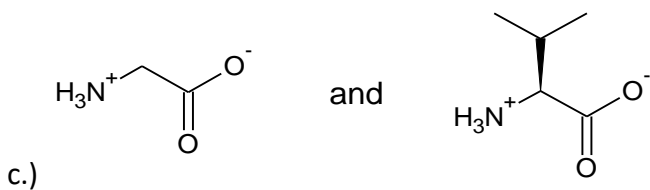
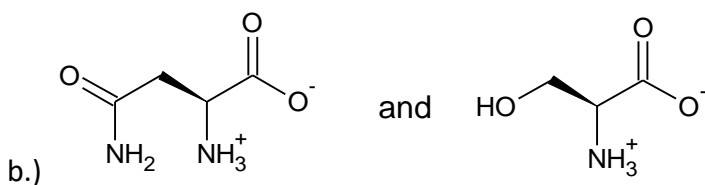
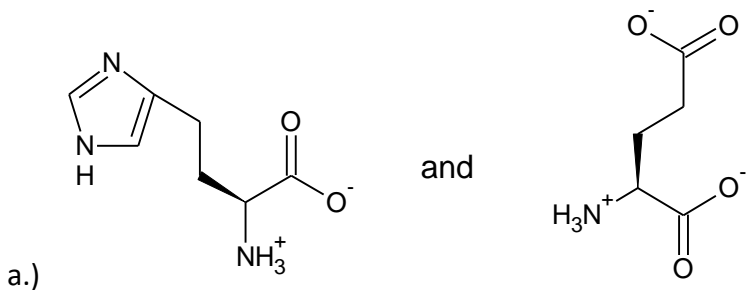


1.) Name **three** structural differences between DNA and RNA. (12 pts, 4 pts ea)

2.) For each pair of amino acids, (1) identify each by name, (2) classify each as acidic/polar, basic/polar, aromatic, aliphatic, neutral polar, sulfur, and/or twisty, and (3) list all possible interactions between the two that would hold together its tertiary structure. (80 pts, 20 pts ea)



3.) Consider the following fragment of a nucleic acid. (16 pts)

3'-GCATACGCCGCAACTATT...

- Is this DNA or RNA? **Explain.**
- Give the sequence of the *complementary* strand's matching fragment.
- Give the sequence of the product after *transcription* of the leading strand's fragment.
- Give the sequence of the product after *translation* of this fragment.

4.) Consider a generic dipeptide. (30 pts)

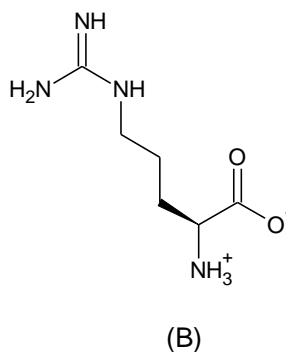
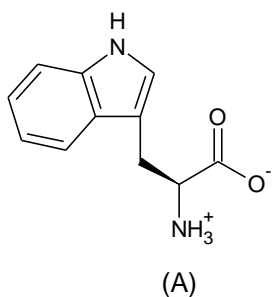
- Show the general mechanism for its formation. Show both amino acids in their *zwitterionic* forms. Indicate the side chains on each amino acid with "R". Show all *chirality* (wedges and dashes) and *geometry*.

- In the product above, identify the (1) C-terminus, (2) N-terminus, (3) amide linker and (4) peptide bond.
- Classify this type of reaction in **two** ways.

5.) Identify the type of molecule that forms the following secondary structures. (12 pts, 3 pts ea)

- α -helix _____
- double helix _____
- single strand knots _____
- β -sheet _____

6.) Consider the following amino acids. (25 pts)



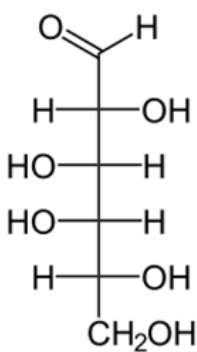
a.) Name (A). _____

b.) Name (B). _____

c.) Which amino acid is overall *more basic*? **Explain.** Your answer should include any relevant resonance structures. You may abbreviate the

structures to show only the relevant sections.

7.) Consider the following carbohydrate. (25 pts)



a.) Name this structure. _____

b.) Give the common structure name for this carbohydrate. _____

c.) Is this a *reducing sugar*? **Explain.**

d.) Draw the Haworth projection for this carbohydrate in α -cyclic form. (1) Star the anomeric carbon and (2) circle the hemiacetal functional group.