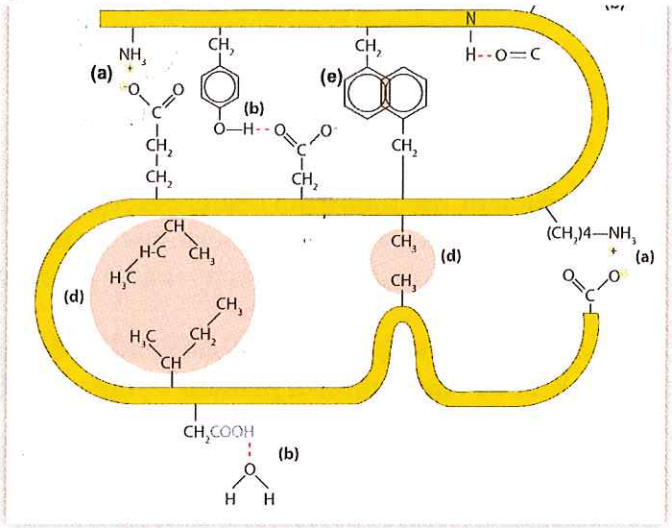
Name: Answer Key

QUIZ #1

Chapters 2-4: Chemical Compounds, Energy, and Protein structure
(12 points)

1. **In the diagram below, what type of chemical interactions are present?** (1pt total)



a) ionic bond

b) hydrogen bond

d) hydrophobic

e) covalent bond

2. **Place the bonds a, b and e that are identified in question 4 in order of INCREASING strength.** (0.5pt)

a b e

3. **Complete the sentence:** (0.5pt)

A Dehydration reaction results in the joining of two subunits and the release of water.
OR condensation a small molecule

4. ***A.* Identify the monomer and polymer for three major types of macromolecules in the cell.** 1.5pt total.
***B.* Identify the type of covalent bond that holds each type of monomers together: peptide bond, glycosidic bond, or phosphodiester bond.** (0.5pt total)

	monomer	polymer	bond
1	amino acid	protein	peptide
2	nucleotide	DNA / RNA	phosphodiester
3	sugar	polysaccharide	glycosidic

5. **What are two ways that RNA and DNA molecules differ? Drawings are not necessary, but you must be specific.** (1pt)

RNA uses ribose / DNA uses deoxyribose sugar

RNA uses uracil / DNA uses thymine

6. **Describe two features of fatty acids that may influence their behavior within a lipid membrane membrane. Use a drawing if helpful.** (1pt)

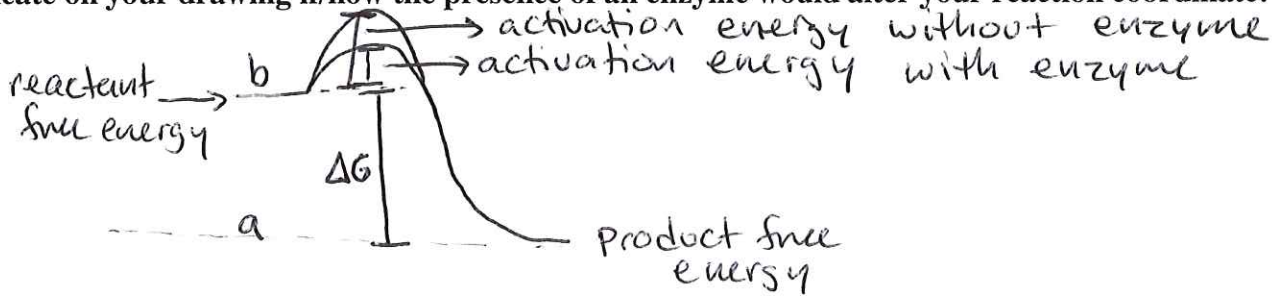
- saturation of carbon in the hydrocarbon tail influence fluidity / rigidity
- polar headgroups allow exposure to aquous cytoplasm & extracellular space & molecules

7. **Choose the best answer to complete the sentence.** (0.5pt)
The energy used by the cell to generate specific biological molecules and highly ordered structures is stored in the form of

a) Heat (b) Chemical bonds c) Light d) Oxygen

Name:

8. ***A.* Draw a diagram showing the reaction coordinates of a favorable reaction. Label on your drawing: reactant free energy, product free energy, activation energy, and ΔG of the reaction.** (1pt)
***B.* Indicate on your drawing if/how the presence of an enzyme would alter your reaction coordinate.** (1pt)



9. **For each of the following sentences, fill in the blanks with the best word selected from the following list:** (1pt total, no partial credit) composition covalent denatured highest irreversible lowest noncovalent renatured reversible sequence stable unstable

A newly synthesized protein generally folds up into a stable **conformation. All the information required to determine a protein's conformation is contained in its amino acid** sequence**. On being heated, a protein molecule will become** denatured **as a result of breakage of** noncovalent **bonds. On removal of urea, an unfolded protein can become** renatured**. The final folded conformation adopted by a protein is that of** lowest **energy.**

10. **Although all protein structures are unique, there are common folded structures that serve as structural building blocks in many different proteins.**
    A. Identify two of these common folded structures (0.5pts)

α-helix β-sheet

    B. What makes it possible for proteins to have these common structural elements? Choose the best answer. (0.5pts)
    1. **specific amino acid sequences**
    2. **side-chain interactions**
    3. **hydrophobic core interactions**
    4. **hydrogen bonds along the protein backbone**

11. **Chapter 4 described several ways in which protein function can be regulated. Describe one manner of regulation and what the expected effect on protein function would be. Use a diagram if you find it helpful.** (1pt)

ex: - allosteric inhibition of enzyme (non-covalent binding of another protein or small molecule)
ex: - phosphorylation (covalently bound small molecule like phosphate, ubiquitin)
ex: ATP hydrolysis by motor proteins (non-covalent binding to an ATP/GTP molecule that hydrolyzes to ADP/GDP)

12. **Name TWO features of a scientific article that indicates it is a primary RESEARCH article.** (0.5pt)

1. Orginal Data Figures depicting experimental results
2. Methods section describing how the experiments were performed