

**CHM376 Biochemistry I**  
**Fall 2022**  
**Problem Set 9C: Enzyme Mechanisms**

1. *What accounts for the unusual acidity of protons attached to carbon atoms that are one bond away from a carbonyl group? Your answer should include appropriate organic structures.*
2. *What accounts for the unusual lability (weakness) of carbon-carbon bonds between carbons that are one and two bonds away from a carbonyl group? Your answer should include appropriate organic structures.*
3. *What is the active site? Are amino acid side chains that form the active site generally close in the primary sequence? How does this explain why proteins must fold to become biologically active? Other than the active site, are there other parts of the protein that are also important?*
4. *What types of amino acids are "over-represented" at enzyme active sites? What types of interactions can these amino acids participate in? What might be the general function of these amino acid side chains?*
5. *What are some of the functions of ionizable amino acid side chain residues? Why is it odd that serine appears in this list?*
6. *Explain (don't simply state) the nine general "tools" used by enzymes to carry out catalysis.*
7. *What is a transition state analog, and what can we learn from the study of transition state analogs?*
8. *What is the distinction between a specific acid (or base) and a general acid (or base)? How might general acids and general bases contribute to catalysis?*
9. *What is unique about the use of acids and bases in enzyme chemistry in comparison with solution chemistry?*
10. *How does covalent catalysis facilitate the loss of  $\text{CO}_2$  from acetoacetate to form acetone? What amino acid side chain likely participates in this reaction?*
11. *Given the structure of  $\text{NAD}^+$  draw the mechanism of oxidation of an alcohol.*
12. *Draw the three critical structures that illustrate the role of ATP in the synthesis of glutamine from glutamic acid, ammonia, and ATP?*
13. *Where is " $\text{CO}_2$ " carried on the biotin molecule? How many  $\text{CO}_2$  can be carried by a single biotin? To what amino acid side chain is biotin attached in proteins, and how?*

# Problem Sol Gde Biochemistry

**Jane M. Magill**



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Stelios Rigopoulos,2024-11-21 A self contained text that explains the population balance methodology including its coupling  
with fluid mechanics and its applications      **Whitaker's Book List** ,1991      **Problem Solving in Biochemistry** Jane M.  
Magill,1988-01-01      Cumulated Index Medicus ,1967      *Thermodynamic Properties of Aqueous Solutions Organic*  
*Substances* V. P. Belousov,Mikhail I U'r'evich Panov,1994 Thermodynamic Properties of Aqueous Solutions of Organic  
Substances discusses the structure of aqueous solutions of organic substances and the intermolecular reactions in them  
presenting experimental data modern concepts concerning the properties of these solutions and the results of computer  
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organic molecules as well as the specific enthalpies of mixing The Addendum contains experimental data on the  
thermodynamic properties of infinitely dilute solutions      *Faculties, Publications, and Doctoral Theses in Chemistry and*  
*Chemical Engineering at United States Universities* American Chemical Society. Committee on Professional Training,1991  
*Selected Water Resources Abstracts* ,1976-10      Bookseller and the Stationery Trades' Journal ,1982      *El-Hi*  
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[**American men and women of science / A Biographical directory of today's leaders in physical, biological and**  
**related sciences ] ; American men & women of science. A Biographical directory of today's leaders in physical,**  
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