Chem 331 Biochemistry
Water, pH, & Buffers
Learning Objectives, Study Guides
and Practice Questions

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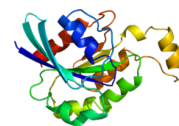
Chapter 2

Learning Objectives

- Evaluate the key properties of water that make it a critical component for life and biochemistry
- Understand the polar nature of water at the molecular level and apply this to its properties
- Use Coulombs law to describe water's role as a solvent
- Understand the difference between Ka, and Kw and why to use one constant vs the other
- Relate pKa and Ka in terms of predicting weak and strong acids/bases
- Understand the impact of microenvironment on altering pKa of ionizable groups
- Relate buffer capacity to the results of your pH/buffer calculations
- Analyze and create a titration curve for a simple acid/base and a polyprotic compound
- Know when to use the HH equation to calculate proton concentration
- Apply acid base chemistry for pH problems including those where acids or bases are liberated or consumed.

Study Notes from Dr P: *This is another one of those chapters where you've learned and used most of the chemistry. The challenge is to apply this appropriately and not be descriptive in understanding the importance of water. The role of water in biochemistry is very important and the concept is critical for your understanding the MECHANISMS you will see later on. Also – about half of the pH and buffer questions are not difficult. Don't be lulled into a sense of complacency, the most difficult question will be where you have to do some interpretation to determine concentrations or mass of the components of buffers, and then predict the new pH after some reaction has taken place. We will one or so of these in class and they will be on the exam!*

Pages – 22-28, 30-38

Chapter Questions (not assigned for homework but to help you practice, don't turn in. BUT some may or will show up on the exam).

- I like many of these problems. They are very similar to each other. Master the hardest problems and you will be fine.
- Chapter 2: 1, 4, 15, 16, 19, 20, 21, 24, 25, 26
- Check on sample calculation boxes 2-1, 2-3, 2-4 and the checkpoints