**CHEMISTRY 2022-23 March 31, 2023**

**Today’s Agenda (Day 136)**

1. HOUSEKEEPING ITEMS

**🡪**  BRING:

1. Homework Check:

🡪Chapter 17 Vocabulary

1. Class Activity:

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🡪BEGIN: Chapter 18 PPT Review

1. **Section 18.1 – Introduction to Acids and Bases**
2. Section 18.2 – Strengths of Acids and Bases
3. Section 18.3 – Hydrogen Ions and pH
4. Section 18.4 - Neutralization

HOMEWORK:

* READ: Chapter 18 – Acids and Bases
* COMPLETE:
* STUDY: Ch 17 & 18 Vocabulary Quiz and Ch 18 Test

CHAPTER 17 VOCABULARY

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| chemical equilibrium | common ion | common ion effect | equilibrium constant | heterogeneous equilibrium | homogeneous equilibrium |
| law of chemical equilibrium | Le Chatelier's principle | reversible reaction | solubility product constant |  |  |

CHAPTER 18 VOCABULARY

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| acid ionization constant | acid-base indicator | acidic solution | Amphoteric | Arrhenius model | base ionization constant |
| basic solution | Bronsted-Lowry model | Buffer | buffer capacity | conjugate acid | conjugate acid-base pair |
| conjugate base | end point | equivalence point | ion product constant for water | Lewis model | neutralization reaction |
| pH | pOH | Salt | salt hydrolysis | strong acid | strong base |
| Titrant | Titration | weak acid | weak base |  |  |

REMINDERS:

* QUIZ: **Ch 17\_18 Vocabulary 🡪 April 4**
* TEST: **Ch 18 🡪 April 6**
* QUIZ: **Ch 19 Vocabulary 🡪 April 11**
* TEST: **Ch 19 🡪 April 13**
* QUIZ: **Ch 20 Vocabulary 🡪 April 18**
* TEST: **Ch 20 🡪 April 20**

**CHEMISTRY 2022-23 LAUNCH LAB**

**CHAPTER 18 LAUNCH LAB – What is in Your Cupboards?**

You can learn something about the properties of products in your household by testing them with strips of paper called litmus paper. Can you separate household products into two groups?



**Procedure **

1. Read and complete the lab safety form.

2. Place three or four drops of several **household products** into separate wells of a **microplate**. Draw a chart to show the position of each liquid.

3. Test each product with **red and blue litmus paper**. Place two drops of **phenolphthalein** in each sample. Record your observations.

**WARNING**: Phenolphthalein is flammable. Keep away from flames.

**Analysis**

1. Classify the products into two groups based on your observations.

2. Describe how the groups differ. What can you conclude?

**Inquiry**

Choose one sample that reacted with the phenolphthalein. Can you reverse the reaction? Design an experiment to test your hypothesis**.**

**CHEMISTRY 2022-23 MINI LAB**

**CHAPTER 18 MINI LAB – Compare Acid Strengths**

How can you determine the relative strengths of acid solutions?

**Procedure **

1. Read and complete the lab safety form.

2. Use a **10-mL graduated cylinder** to measure 3 mL of **glacial acetic acid**. Use a **dropping pipette** to transfer the acid into Well A1 of a **24-well microplate**.

**WARNING**: Glacial acetic acid is corrosive and toxic by inhalation. Handle with caution.

3. Lower the electrodes of a **conductivity tester** into Well A1. Record your results.

4. Rinse the graduated cylinder and pipette with water. Measure 3 mL of **6.0M acetic acid** and transfer it to Well A2 of the microplate. Test and record the conductivity of the solution.

5. Repeat Step 4 **with 1.0M acetic acid** and **0.10M acetic acid** using wells A3 and A4, respectively.

**Analysis**

1. Write the equation for the ionization of acetic acid in water and the equilibrium constant expression (Keq = 1.8 × 1 0-5). What does the size of Keq indicate about the degree of ionization?

2. Explain whether the following approximate percent ionizations fit your laboratory results: glacial acetic acid, 0.1%; 6.0M acetic acid, 0.2%; 1.0M acetic acid, 0.4%; 0.1M acetic acid, 1.3%.

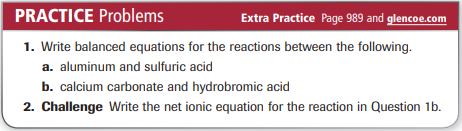
3. State a hypothesis that explains your observations using your answer to Question 2.

4. Utilize your hypothesis to draw a conclusion about the need to use large amounts of water for rinsing when acid spills on living tissue.

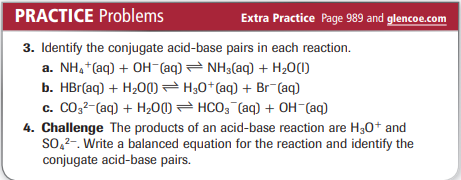
**CHEMISTRY 2022-23 PRACTICE PROBLEM**

**CHAPTER 18 – Acids and Bases**

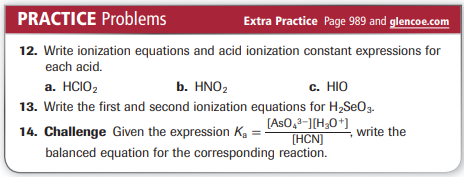
**Practice Problems 18.1 –** Properties of Acids and Bases

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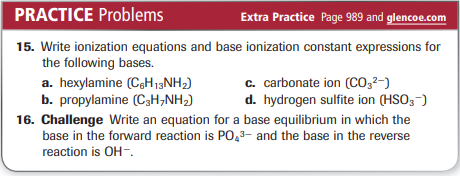
**Practice Problems 18.2 –** The Bronsted-Lowry Model



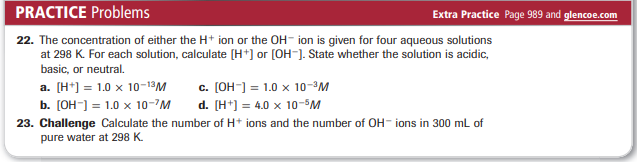
**Practice Problems 18.3 –** Acid Ionization Constant



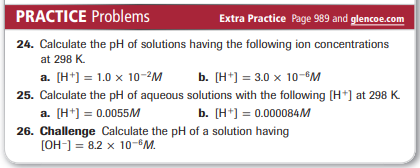
**Practice Problems 18.4 –** Base Ionization Constant

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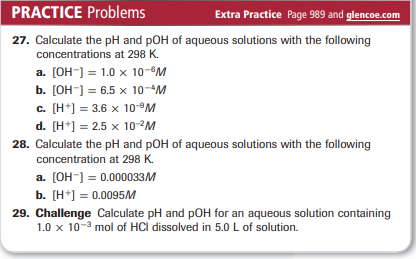
**Problems 18.5 –** Calculate [H +] and [OH -] Using Kw

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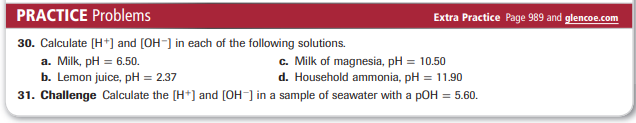
**Problems 18.6 –** Calculate pH from [H +]

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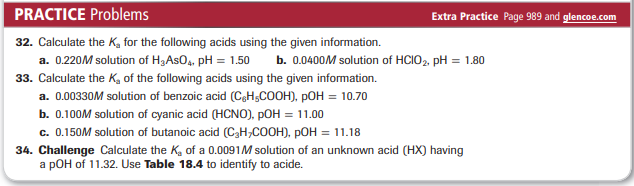
**Problems 18.7 –** Calculate pOH and pH from [OH -]



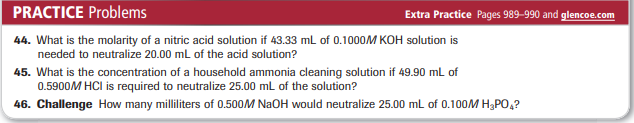
**Problems 18.8 –** Calculate [H +] and [OH -] from pH

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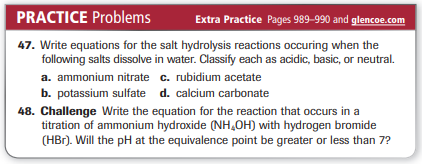
**Problems 18.9 –** Calculate Ka from pH

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**Problems 18.10 –** Molarity from Titration Data



**Problems 18.11 –** Salt Hydrolysis



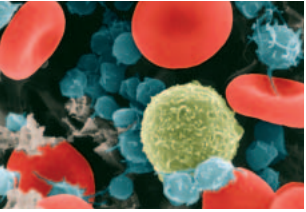
**CHEMISTRY 2022-23 PROBLEM-SOLVING LAB**

**CHAPTER 18 Problem Solving Lab – Apply Scientific Explanations**

**How does your blood maintain its pH?** Human blood contains three types of cells. Red blood cells deliver oxygen to every part of the body. White blood cells fight infections, and platelets aid in clotting when bleeding occurs. The critical functions of these cells are impaired if the pH of blood is not maintained within the narrow range of 7.1 to 7.7. Beyond this range, proteins in the body lose their structures and abilities to function. Fortunately, several buffers maintain the necessary acid/base balance. The carbonic acid/hydrogen carbonate (H2CO3/ HCO3-) buffer is the most important.



As acids and bases enter the bloodstream as a result of normal activity, the blood’s buffer systems shift to effectively maintain a healthful pH.

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**Analysis**

Depending on the body’s metabolic rate and other factors, the H2CO3/ HCO3- equilibrium will shift according to Le Châtelier’s principle. In addition, the lungs can alter the rate at which CO2 is expelled from the body by breathing, and the kidneys can alter the rate of removal of HCO3- ions.

**Think Critically**

1. **Determine** how many times greater the [H+] is if the blood’s pH changes from pH 7.4 to 7.1.

2. **Suggest** a reason why a 20:1 ratio of HCO3- to CO2 in the blood is favorable for maintaining a healthy pH.

3. **Predict** whether, for each situation, the pH of the blood will rise or fall, and which way the H2CO3/ HCO3- equilibrium will shift.

a. A person with a severe stomach virus vomits many times during a 24-h period.

b. To combat heartburn, a person takes too much (NaHCO3).

**CHEMISTRY 2022-23 CHEM LAB 17**

**Text

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