**Quiz 3**

# Directions: Answer each of the following questions. Be sure to use complete sentences where appropriate. For full credit be sure to show all of your work. Where appropriate answers should be boxed for clarity, written to the correct number of significant figures, and, include the proper units.

1. When must you wear eye protection in the lab (3 points)?

You must wear eye protection in the lab whenever anyone is working with chemicals or flames.

1. Answer the following questions about the titration curve experiment (5 points):
   1. What are you using as your titrant in this week’s experiment? Sodium hydroxide
   2. How many weak acids are you titrating? Three
   3. What is the identity of the weak acid(s) you are titrating? Acetic acid, phosphoric acid and an unknown acid
2. A buffer consists of 0.22 M KHCO3 and 0.37 M K2CO3. Carbonic acid is a diprotic acid with Ka1 = 4.5 × 10-7 and Ka2 = 4.7 × 10-11 (12 points).
   1. Which Ka value is more important to this buffer? \_\_\_\_\_\_Ka2, because the buffer solution is between HCO32- and CO32-, so the second proton of carbonic acid, HCO3, is undergoing chemical reaction. If the buffer solution was created using carbonic acid and potassium hydrogen carbonate Ka1 would be more important. \_\_\_\_\_\_\_\_\_\_
   2. What is the buffer pH?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | HCO3- (aq) + | H2O (g) | CO32- (aq) | H3O+ (aq) |
| I | 0.22 M | n/a | 0.37 M | ~0 M |
| C | -x | n/a | +x | +x |
| E | 0.22 M – x =  0.22 M – 2.8 × 10-11 M ≈  0.22 M | n/a | 0.37 M + x =  0.37 M + 2.8 × 10-11 M ≈  0.37 M | x = 2.8 × 10-11 M |

Check approximation:

Check math:

Or using the Henderson-Hasselbach equation: