

CHEMISTRY I (H)  
Acid/Base Practice

1. Which tastes sour, acids or bases?...bitter?
2. What color will bromothymol blue be in an acid?... base? (1 pt.)
3. Which would react with a metal, an acid or a base?...organic material?
4. What base is present in lye soap?
5. What acid is present in soured milk?
6. What color is phenolphthalein in the presence of an acid?...a base?
7. Define an Arrhenius acid and base.
8. Using the following reaction:  
$$\text{H}_2\text{NNH}_2(g) + \text{H}_2\text{O}(l) \leftrightarrow \text{H}_2\text{NNH}_3^{1+}(aq) + \text{OH}^{1-}(aq)$$
identify the formula of the Brønsted-Lowry acid, base, conjugate acid, and conjugate base.
9. Using the following reaction,  
$$\text{CO} + \text{BH}_3 \leftrightarrow \text{BH}_3\text{CO}$$
identify the Lewis acid and base. (*hint...draw the Lewis structure of everything*)
10. Given that the pOH of a solution is 9.42, determine that solution's  $[\text{H}^{1+}]$ ,  $[\text{OH}^{1-}]$ , and pH. State whether the solution is acid, neutral, or basic. (10 pts.)
11. Trimethylamine,  $(\text{CH}_3)_3\text{N}$ , is used as a warning agent in natural gas. It has a pungent, fishy odor and a saline taste. It is sold either as a liquefied gas or as a 25%(m/v) aqueous solution. What is the pH of the aqueous solution if the  $K_b$  for trimethylamine is  $6.31 \times 10^{-5}\text{M}$ ? (*hint...you might want to review your notes on mass/volume percent*)
12. Hydrocyanic acid, HCN, is used in exterminating rodents and insects in enclosed areas. If the pH of a 2.00L sample containing 10.0g of hydrogen cyanide is 4.97, what is the  $K_a$  of HCN? (*hint...think about how you get  $\text{H}^+$  from pH*)
13. Oxalic acid,  $\text{H}_2\text{C}_2\text{O}_4$ , is used as a solvent to remove paint, varnish, rust, ink, etc. When 20.0g of oxalic acid are added to enough water to make 500mL of solution, determine the equilibrium concentrations of all four species and the pH of the solution.  $K_{a1}$  is  $5.60 \times 10^{-2}$  and  $K_{a2}$  is  $5.42 \times 10^{-5}$ .

SELECT ANSWERS

1-7. check your notes

8. acid-- $\text{H}_2\text{O}$ , base-- $\text{H}_2\text{NNH}_2$ , conjugate acid-- $\text{H}_2\text{NNH}_3^{1+}$ , conjugate base-- $\text{OH}^{1-}$

9. see my work

10.  $[\text{H}^{1+}] = 2.63 \times 10^{-5}$ ,  $[\text{OH}^{1-}] = 3.80 \times 10^{-10}$ , pH=4.58, acid

11. pH = 12.2

12.  $K_a = 6.19 \times 10^{-10}$

13.  $[\text{H}_2\text{C}_2\text{O}_4]_{\text{eq}} = 0.312\text{M}$

$[\text{HC}_2\text{O}_4^{1-}]_{\text{eq}} = 0.132\text{M}$

$[\text{H}^{1+}]_{\text{eq}} = 0.132\text{M}$

$[\text{C}_2\text{O}_4^{2-}]_{\text{eq}} = 5.42 \times 10^{-5}\text{M}$

pH = 0.879