

WS 10.11 Review Worksheet

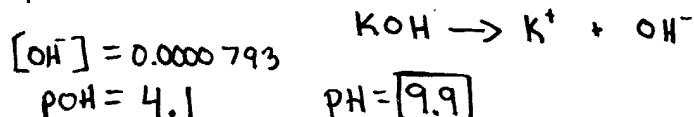
1. A solution has an $[\text{OH}^-] = 2.6 \times 10^{-3} \text{ M}$. What would be the $[\text{H}^+]$, pH, and pOH?

$$[\text{H}^+] = \frac{1 \times 10^{-14}}{2.6 \times 10^{-3}} = 3.8 \times 10^{-12} \text{ M}$$

$$\text{pOH} = -\log(2.6 \times 10^{-3}) = 2.6$$

$$\text{pH} = 14 - 2.6 = 11.4$$

2. What would be the pH of a 0.0000793 M KOH solution?



3. The pH of a really diluted acid, such as 0.00000000022M HCl, is 7. Why?

the $[\text{H}^+]$ due to the self-ionization of water ($1 \times 10^{-7} \text{ M}$) is greater than the $[\text{H}^+]$ of the really diluted acid.

4. 2.63 g NaOH are dissolved in 156 mL of solution. Determine the NaOH concentration & the pH.

$$2.63 \text{ g} \times \frac{1 \text{ mol}}{40. \text{ g}} = 0.06575 \text{ mol}$$

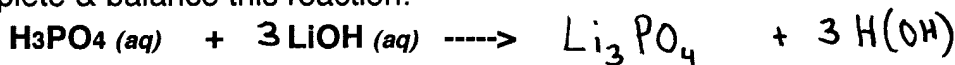
$$[\text{NaOH}] = 0.421 \text{ M}$$

$$M = \frac{\text{mol}}{L} = \frac{0.06575 \text{ mol}}{0.156 \text{ L}} = 0.421 \text{ M}$$

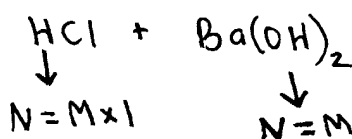
$$\text{pOH} = -\log(0.421) = 0.376$$

$$\text{pH} = 14 - 0.376 = 13.6$$

5. Complete & balance this reaction:



6. It takes 35.92 mL of 0.165 M $\text{Ba}(\text{OH})_2$ and 23.62 mL of HCl to reach the endpoint of a titration. What is the molarity of the $\text{Ba}(\text{OH})_2$ solution?



$$N_1 V_1 = N_2 V_2$$

$$(1) \text{ M} (23.62) = (2) (0.165) (35.92)$$

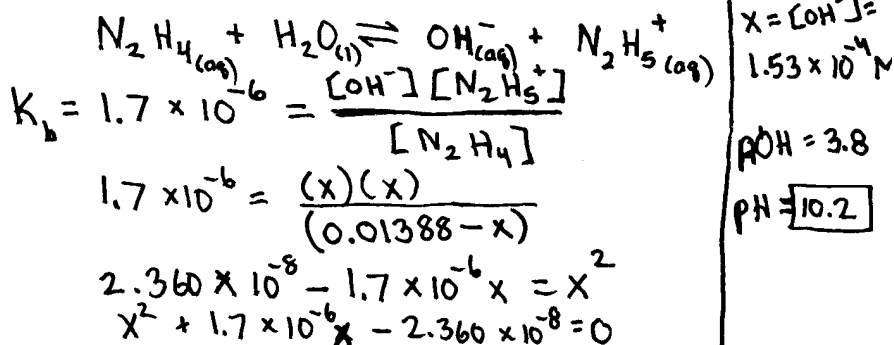
$$M = 0.502 \text{ M}$$

7. Calculate the pH of a 500. mL solution of containing 0.222 g of hydrazine (liquid rocket propellant)?

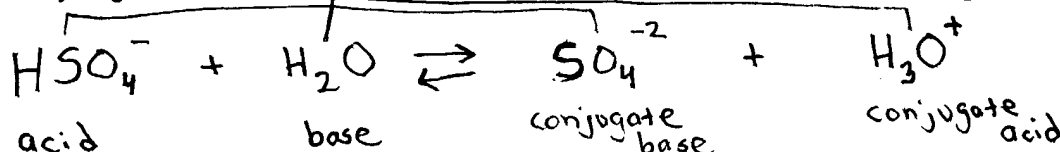
[see wkst 10.9 for values]

$$0.222 \text{ g} \times \frac{1 \text{ mol}}{32 \text{ g}} = 0.00694 \text{ mol}$$

$$M = \frac{0.00694 \text{ mol}}{0.500 \text{ L}} = 0.01388 \text{ M}$$



8. The hydrogen sulfate ion is a Brønsted acid. Show its reaction with water, labeling all acid/base pairs.



9. BaCO_3 is made of what acid H_2CO_3 and what base $\text{Ba}(\text{OH})_2$. Would BaCO_3 be acidic, basic, or neutral in water?

$\text{H}_2\text{CO}_3 = \text{weak acid}$ $\text{Ba}(\text{OH})_2 = \text{strong base}$ **basic**

10. With respect to the $\text{HSO}_4^- / \text{SO}_4^{2-}$ buffer system, show how it reacts to the addition of an acid and a base:

