

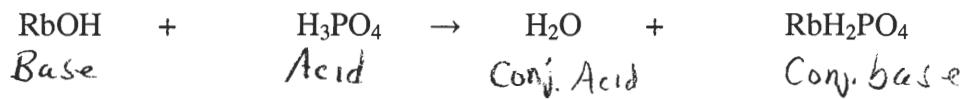
CHM 151/54 Quiz #5 25 Pts Spring 05 Name: Key

****SHOW ALL WORK TO RECEIVE CREDIT****

1. (6 Pts) Complete and balance each of the following reactions:

- a. $3\text{Ca}(\text{OH})_2 + 2\text{H}_3\text{PO}_4 \rightarrow 6\text{H}_2\text{O} + \text{Ca}_3(\text{PO}_4)_2$
- b. $3\text{HCH}_3\text{COO} + \text{Al}(\text{OH})_3 \rightarrow 3\text{H}_2\text{O} + \text{Al}(\text{CH}_3\text{COO})_3$
- c. $\text{NaHCO}_3 + \text{HNO}_3(\text{aq}) \rightarrow \text{NaNO}_3 + \text{H}_2\text{O}(l) + \text{CO}_2(g)$

2. (4 Pts) In the following reaction, identify the acid, base, conjugate acid, and the conjugate base.



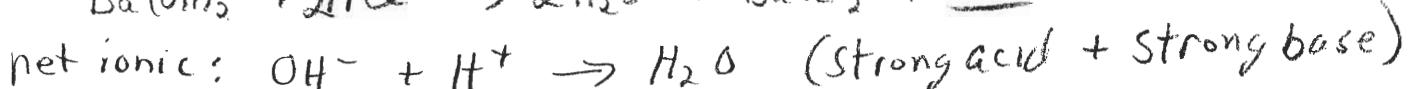
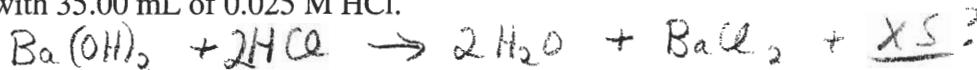
3. (8 Pts) Determine the $[\text{H}^+]$, $[\text{OH}^-]$, pH and the pOH of each of the following:

a. 25 mL of 0.040 M HBr solution.
 $[\text{H}^+] = 0.040\text{M}; \text{pH} = 1.40; [\text{OH}^-] = \frac{10^{-14}}{0.040} = 2.50 \times 10^{-13}; \text{pOH} = 12.60$

b. 50.0 mL of 0.035 M Ba(OH)₂ solution.

$$[\text{OH}^-] = 0.070\text{M}; \text{pOH} = 1.15; [\text{H}^+] = 1.43 \times 10^{-13}; \text{pH} = 12.85$$

4. (7 Pts) Determine the pH of a solution formed by combining 35.00 mL of 0.022 M Ba(OH)₂ solution with 35.00 mL of 0.025 M HCl.



(1) mole acid: $\frac{35.00 \text{ mL}}{1000 \text{ mL}} \times \frac{0.025 \text{ mol HCl}}{1 \text{ mol HCl}} = 8.75 \times 10^{-4} \text{ mol H}^+$

(2) mol OH⁻: $\frac{35.00 \text{ mL}}{1000 \text{ mL}} \times \frac{0.022 \text{ mol Ba(OH)}_2}{1 \text{ mol Ba(OH)}_2} = 1.54 \times 10^{-3} \text{ mol OH}^-$

(3) subtract for Xs: $6.65 \times 10^{-4} \text{ mol OH}^-$

(4) $\text{pOH} = -\log\left(\frac{6.65 \times 10^{-4}}{0.070 \text{ L}}\right) = 2.02$

$$\text{pH} = 14 - 2.02 = \underline{\underline{11.98}}$$