CHM151 Quiz #5b 25 Pts Spring 2005 Name: Key

1. (8 Pts) Determine concentration of the excess reactant when 25.0 mL of 0.235 M nitric acid is reacted with 12.7 mL of 0.075 M of barium hydroxide.

$2HNO_3 + Ba(OH)_2 \rightarrow 2H_2O + Ba(NO_3)_2$ ← "just pick a product"

25.0 mL, 0.235 mol/L | 12.7 mL, 0.075 mol/L

(XS) Based on HNO_3: $25.0\ mL \left|\frac{0.235\ mol\ HNO_3}{1000\ mL}\right| \frac{2\ mol\ H_2O}{2\ mol\ HNO_3} = 0.005875\ mol\ H_2O$

(LR) Based on $Ba(OH)_2$: $12.7\ mL \left|\frac{0.075\ mol\ Ba(OH)_2}{1000\ mL}\right| \frac{2\ mol\ H_2O}{1\ mol\ Ba(OH)_2} = 0.001905\ mol\ H_2O$ ← theoretical

Now using difference: $0.00397\ mol\ H_2O$ from XS $\left|\frac{2\ mol\ HNO_3}{2\ mol\ H_2O}\right| \frac{}{37.7 \times 10^{-3}\ L} = \frac{0.105\ mol\ HNO_3}{L}$

2. (12 Pts) For the following reactions, write the total ionic equation and the net ionic equation.

a. $2Al(s) + 6HNO_3(aq) \rightarrow 2Al(NO_3)_3(aq) + 3H_2(g)$

total ionic eq: $2Al(s) + 6H^+ + 6NO_3^- \rightarrow 2Al^{3+} + 6NO_3^- + 3H_2(g)$

net ionic eq: $2Al(s) + 6H^+ \rightarrow 2Al^{3+} + 3H_2(g)$

b. $HBr(aq) + AgNO_3 \rightarrow AgBr(s) + HNO_3(aq)$

total ionic eq: $H^+ + Br^- + Ag^+ + NO_3^- \rightarrow AgBr(s) + H^+ + NO_3^-$

net ionic eq: $Ag^+ + Br^- \rightarrow AgBr(s)$

c. $HCH_3COO(aq) + NaOH(aq) \rightarrow NaCH_3COO(aq) + H_2O(l)$

total ionic eq: $HCH_3COO + Na^+ + OH^- \rightarrow Na^+ + CH_3COO^- + H_2O(l)$

net ionic eq: $HCH_3COO + OH^- \rightarrow CH_3COO^- + H_2O(l)$

3. (5 Pts) Give formulas for the following:

a. two strong bases _____ _____

b. one weak acid _____

c. two strong acids. _____ _____