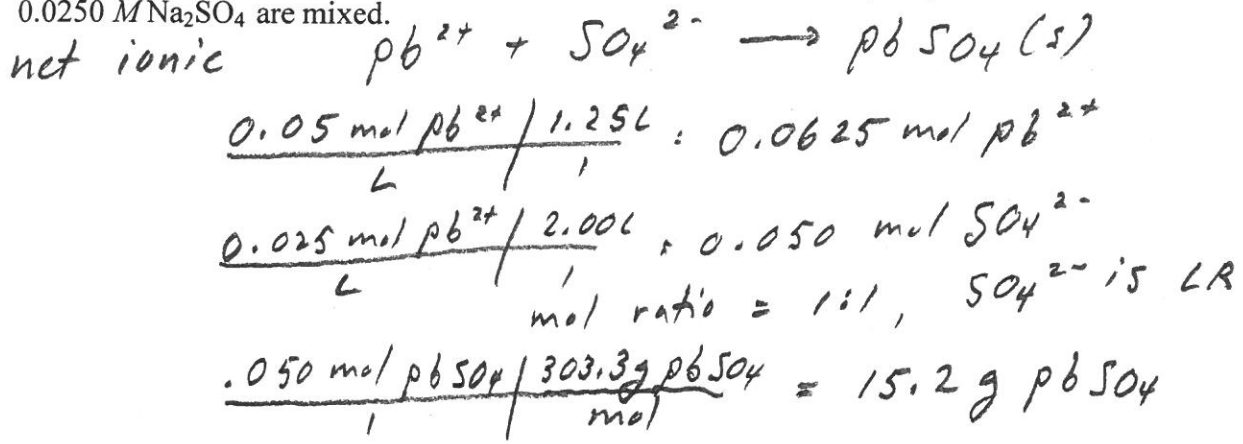


Key

AP Practice - Reactions

Exercise 11

When aqueous solutions of  $\text{Na}_2\text{SO}_4$  and  $\text{Pb}(\text{NO}_3)_2$  are mixed,  $\text{PbSO}_4$  precipitates. Calculate the mass of  $\text{PbSO}_4$  formed when 1.25 L of 0.0500 M  $\text{Pb}(\text{NO}_3)_2$  and 2.00 L of 0.0250 M  $\text{Na}_2\text{SO}_4$  are mixed.



Exercise 12

What volume of a 0.100 M HCl solution is needed to neutralize 25.0 mL of 0.350 M NaOH?

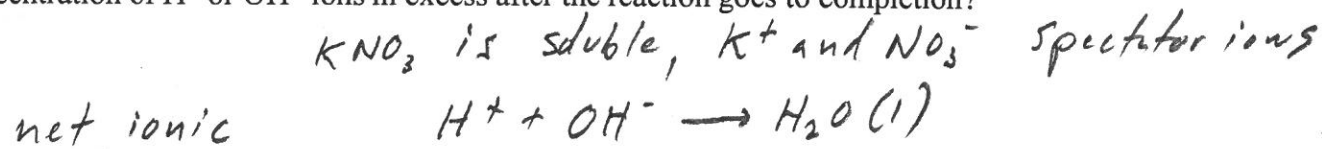
$$M_1 V_1 n_1 = M_2 V_2 n_2$$

$$(0.1)(V_1)(1) = (0.35)(25)(1)$$

$$V_1 = 87.5 \text{ mL HCl}$$

Exercise 13

In a certain experiment, 28.0 mL of 0.250 M  $\text{HNO}_3$  and 53.0 mL of 0.320 M  $\text{KOH}$  are mixed. Calculate the amount of water formed in the resulting reaction. What is the concentration of  $\text{H}^+$  or  $\text{OH}^-$  ions in excess after the reaction goes to completion?



$$\frac{0.25 \text{ mol H}^+}{\text{L HNO}_3} \bigg/ \frac{0.028 \text{ L}}{1} = 7.00 \times 10^{-3} \text{ mol H}^+$$

$$\frac{0.32 \text{ mol OH}^-}{\text{L KOH}} \bigg/ \frac{0.053 \text{ L}}{1} = 1.70 \times 10^{-2} \text{ mol OH}^-$$

mol ratio = 1:1,  $\text{H}^+$  is LR

amt of  $\text{H}_2\text{O}$  produced =  $7.00 \times 10^{-3} \text{ mol} \times \frac{18 \text{ g}}{\text{mol}} = 0.126 \text{ g H}_2\text{O}$

excess  $\text{OH}^- = 1.70 \times 10^{-2} - 7.00 \times 10^{-3} = 1.00 \times 10^{-2} \text{ mol OH}^-$

$$1.00 \times 10^{-2} = 8.10 \times 10^{-2} \text{ L} = 0.123 \text{ M} = [\text{OH}^-]$$