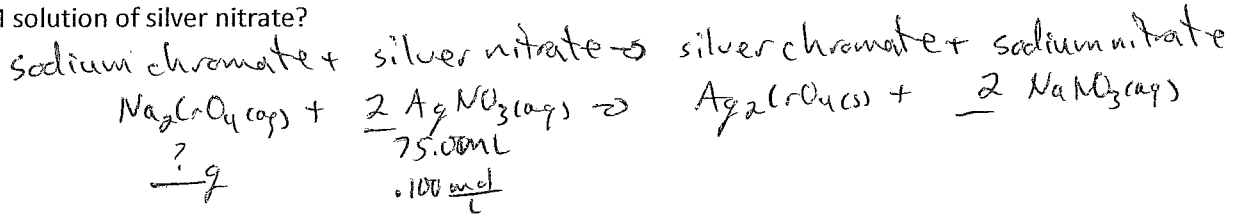


60 pts

Solution Stoichiometry

Directions: Think! Do all 10 stpes.

1. What mass of sodium chromate is required to precipitate all the silver ions from 75.0 mL of a 0.100 M solution of silver nitrate?

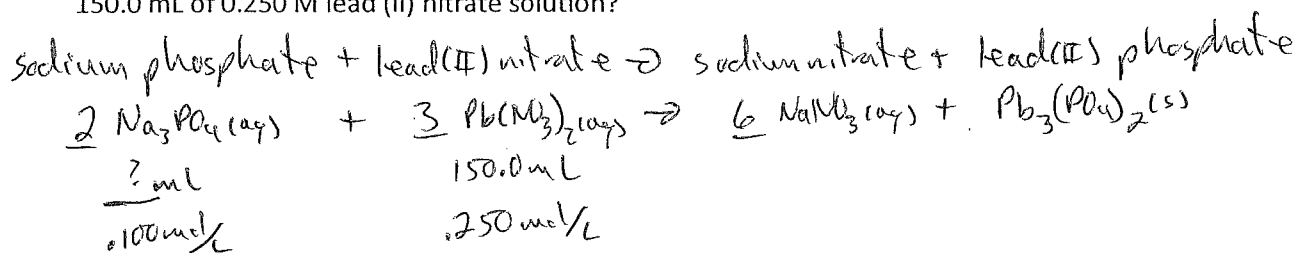


$$M = \frac{\text{mol}}{L}$$

$$75.0\text{mL} \times \frac{1\text{L}}{1000\text{mL}} \times \frac{0.100\text{mol AgNO}_3}{L} \times \frac{1\text{mol Na}_2\text{CrO}_4}{2\text{mol AgNO}_3} \times \frac{162.0\text{g Na}_2\text{CrO}_4}{1\text{mol Na}_2\text{CrO}_4} = 0.608\text{g Na}_2\text{CrO}_4$$

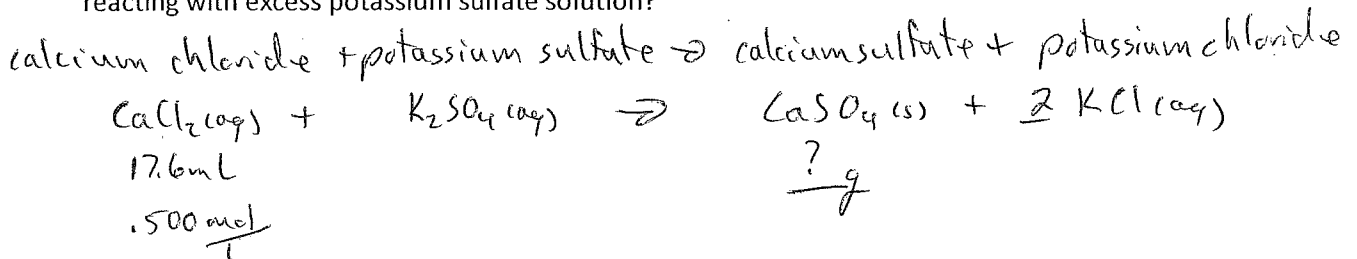
$$\text{mol} = L \times M$$

2. What volume of 0.100 M sodium phosphate is required to precipitate all the lead (II) ions from 150.0 mL of 0.250 M lead (II) nitrate solution?



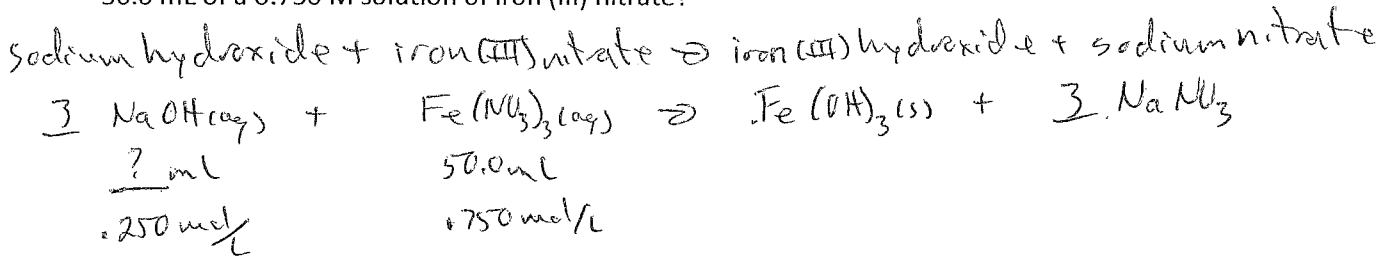
$$150.0\text{ mL} \times \frac{0.250\text{mol Pb}(\text{NO}_3)_2}{L} \times \frac{2\text{mol Na}_3\text{PO}_4}{3\text{mol Pb}(\text{NO}_3)_2} \times \frac{1\text{L}}{0.100\text{mol Na}_3\text{PO}_4} = 250.0\text{ mL}$$

3. What mass of calcium sulfate can be produced from 17.6 mL of a 0.500 M calcium chloride solution reacting with excess potassium sulfate solution?



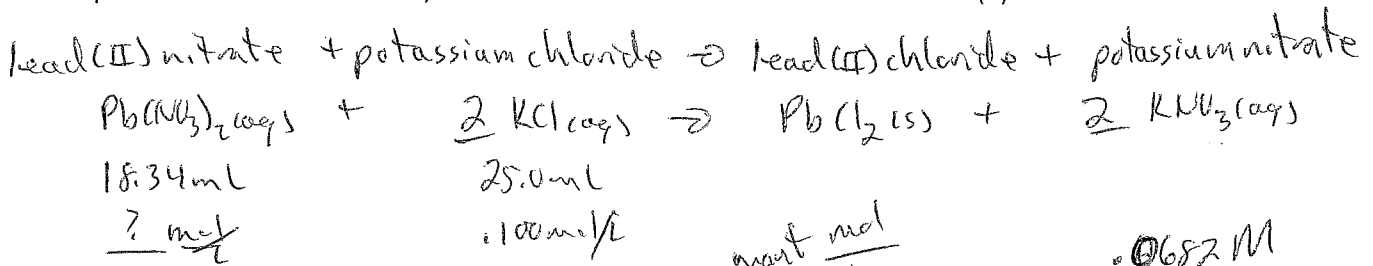
$$17.6\text{mL} \times \frac{1\text{L}}{1000\text{mL}} \times \frac{0.500\text{mol CaCl}_2}{L} \times \frac{1\text{mol CaSO}_4}{1\text{mol CaCl}_2} \times \frac{136.1\text{g CaSO}_4}{1\text{mol CaSO}_4} = 1.20\text{g CaSO}_4$$

4. How many milliliters of 0.250 M sodium hydroxide solution are needed to completely react with 50.0 mL of a 0.750 M solution of iron (III) nitrate?



$$50.0 \text{ mL} \times \frac{0.750 \text{ mol Fe(NO}_3\text{)}_3}{1 \text{ L}} \times \frac{3 \text{ mol NaOH}}{1 \text{ mol Fe(NO}_3\text{)}_3} \times \frac{1 \text{ L}}{0.250 \text{ mol NaOH}} = 450. \text{ mL}$$

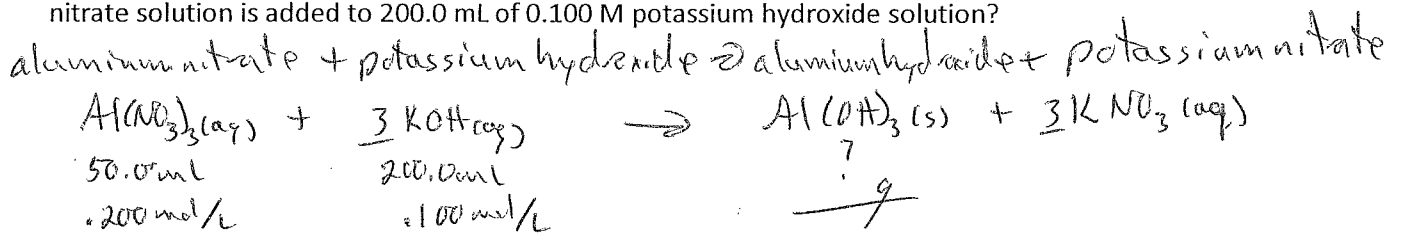
5. If 18.34 mL of lead (II) nitrate solution is needed to completely react with 25.0 mL of a 0.100 M potassium chloride solution, then what was the concentration of the lead (II) nitrate solution?



$$25.0 \text{ mL} \times \frac{0.100 \text{ mol KCl}}{1 \text{ L}} \times \frac{1 \text{ mol Pb(NO}_3\text{)}_2}{2 \text{ mol KCl}} \times \frac{1}{18.34 \text{ mL}} = \frac{0.0682 \text{ mol Pb(NO}_3\text{)}_2}{\text{L}}$$

0.0682 M
or
0.0682 mol Pb(NO₃)₂/L

6. What mass of solid aluminum hydroxide can be produced when 50.0 mL of 0.200 M aluminum nitrate solution is added to 200.0 mL of 0.100 M potassium hydroxide solution?



$$50.0 \text{ mL} \times \frac{1 \text{ L}}{1000 \text{ mL}} \times \frac{0.200 \text{ mol Al(NO}_3\text{)}_3}{1 \text{ L}} \times \frac{1 \text{ mol Al(OH)}_3}{1 \text{ mol Al(NO}_3\text{)}_3} \times \frac{78.00 \text{ g Al(OH)}_3}{1 \text{ mol Al(OH)}_3} = \cancel{0.78 \text{ g Al(OH)}_3}$$

$$200.0 \text{ mL} \times \frac{1 \text{ L}}{1000 \text{ mL}} \times \frac{0.100 \text{ mol KOH}}{1 \text{ L}} \times \frac{1 \text{ mol Al(OH)}_3}{3 \text{ mol KOH}} \times \frac{78.00 \text{ g Al(OH)}_3}{1 \text{ mol Al(OH)}_3} = \underline{0.52 \text{ g Al(OH)}_3}$$