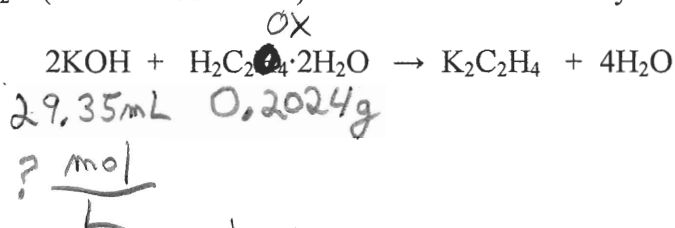


**MOLAR MASSES: Na 22.99, S 32.07, O 16.00**

1. (5 Pts) How many grams of  $\text{Na}_2\text{SO}_4$  are needed to prepare 500 mL of 0.150 M  $\text{Na}_2\text{SO}_4$  solution?

$$\frac{500 \text{ mL}}{1000 \text{ mL}} \times \frac{0.150 \text{ mol}}{1 \text{ mol}} \times 142.05 \text{ g} = 10.7 \text{ g Na}_2\text{SO}_4$$

2. (8 Pts) In a titration, it took 29.35 mL of KOH solution to neutralize 0.2024 g of  $\text{H}_2\text{C}_2\text{O}_4 \cdot 2\text{H}_2\text{O}$  (molar mass 126.07). Determine the molarity of the KOH solution.



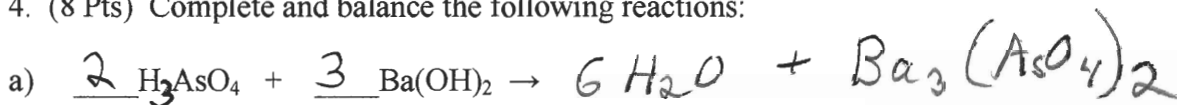
$$\frac{29.35 \times 10^{-3} \text{ L KOH}}{0.2024 \text{ g}} \times \frac{\text{mol}}{\text{mol}} \times \frac{2 \text{ mol KOH}}{1 \text{ mol}} \times \frac{126.07 \text{ g}}{1 \text{ mol}} = 0.1094 \frac{\text{mol KOH}}{\text{L KOH}}$$

3. (4 Pts) How many mL of 4.00 M HCl solution are needed to prepare 600 mL of 0.150 M HCl solution?

$$M_1 V_1 = M_2 V_2$$

$$V_1 = \frac{(0.150 \text{ M})(600 \text{ mL})}{4.00 \text{ M}} = 22.5 \text{ mL}$$

4. (8 Pts) Complete and balance the following reactions:

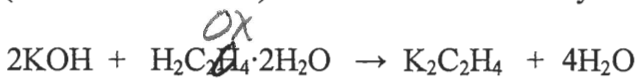


**MOLAR MASSES: Na 22.99, S 32.07, O 16.00**

1. (5 Pts) How many grams of  $\text{Na}_2\text{SO}_4$  are needed to prepare 500 mL of 0.190 M  $\text{Na}_2\text{SO}_4$  solution?

$$\frac{500 \text{ mL} \left| \frac{0.190 \text{ mol}}{1000 \text{ mL}} \right| \frac{142.05 \text{ g}}{\text{mol}}}{1} = 13.5 \text{ g}$$

2. (8 Pts) In a titration, it took 39.35 mL of KOH solution to neutralize 0.2024 g of  $\text{H}_2\text{C}_2\text{O}_4 \cdot 2\text{H}_2\text{O}$  (molar mass 126.07). Determine the molarity of the KOH solution.



$$\frac{39.35 \text{ mL} \quad 0.2024 \text{ g}}{? \text{ mol}}$$

$$\frac{39.35 \times 10^{-3} \text{ L} \left| \frac{0.2024 \text{ g}}{126.07 \text{ g/mol}} \right| \frac{2 \text{ mol KOH}}{1 \text{ mol}}}{1} = 0.08160 \text{ mol/L KOH}$$

3. (4 Pts) How many mL of 6.00 M HCl solution are needed to prepare 600 mL of 0.150 M HCl solution?

$$M_1 V_1 = M_2 V_2$$

$$V_1 = \frac{(0.150 \text{ M})(600 \text{ mL})}{6.00 \text{ M}} = 15.0 \text{ mL}$$

4. (8 Pts) Complete and balance the following reactions:

