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Lab. Química

11L112

$$2) V_1 = 750 \text{ cm}^3 \rightarrow 750 \text{ ml} \rightarrow 0.75 \text{ L}$$

$$P_1 = 450 \text{ mmHg}$$

$$V_2 = 0.35 \text{ L}$$

$$P_2 = ?$$

$$P_1 V_1 = P_2 V_2$$

$$(450 \text{ mmHg})(0.75 \text{ L}) = P_2 (0.35)$$

$$P_2 = \frac{(450 \text{ mmHg})(0.75 \text{ L})}{0.35 \text{ L}} = 964.28 \text{ mmHg} \left( \frac{1 \text{ atm}}{760 \text{ mmHg}} \right) = 1.27 \text{ atm}$$

$$3) V = 500 \text{ ml} \rightarrow 0.5 \text{ L}$$

$$T = 22^\circ \text{C} \rightarrow 295 \text{ K}$$

$$P = 1 \text{ atm}$$

$$n = ?$$

$$PV = nRT$$

$$n = \frac{PV}{RT} = \frac{(1 \text{ atm})(0.5 \text{ L})}{(0.08206)(295 \text{ K})} = 0.02065 \text{ mol air}$$

$$6) T = 20^\circ \text{C} \rightarrow 293 \text{ K}$$

$$P = 746 \text{ torr} \rightarrow 0.982 \text{ atm}$$

$$\text{g KMnO}_4 = 50 \text{ g}$$

$$50 \text{ g KMnO}_4 \left( \frac{1 \text{ mol KMnO}_4}{158.034 \text{ g}} \right) \left( \frac{5 \text{ mol Cl}_2}{2 \text{ mol KMnO}_4} \right) = 0.79 \text{ mol Cl}_2$$

$$PV = nRT$$

$$V = \frac{nRT}{P} = \frac{(0.79 \text{ mol})(0.08206)(293 \text{ K})}{0.982 \text{ atm}} = 19.34 \text{ L}$$

$$9) \text{Ca(OH)}_2$$

$$\text{Ca} = 40.078 \times 1 = 40.078$$

$$\text{O} = 16 \times 2 = 32$$

$$\text{H} = 2 \times 1 = 2$$

$$\hline 74.078 \text{ umg}$$

$$\frac{32 \text{ g O}}{74.078 \text{ g Ca(OH)}_2} \times 100\% = 43.2\% \text{ O}$$

14)  $40 \text{ ml NaOH} \rightarrow 0.04 \text{ L}$

$\text{HCl } 0.5 \text{ M } 60 \text{ ml} \rightarrow 0.06 \text{ L}$

$$0.5 \text{ M} = \frac{n}{0.06 \text{ L}} \rightarrow n = 0.5 \text{ M} \times 0.06 \text{ L} = 0.03 \text{ mol HCl}$$

$$0.03 \text{ mol HCl} \left( \frac{1 \text{ mol NaOH}}{1 \text{ mol HCl}} \right) = 0.03 \text{ mol NaOH}$$

$$\text{M NaOH} = \frac{0.03 \text{ mol NaOH}}{0.04 \text{ L}} = \underline{0.75 \text{ M}}$$

16)  $50 \text{ g Cu}$   
 $148 \text{ g Ag} \rightarrow \text{real}$

$$50 \text{ g Cu} \left( \frac{1 \text{ mol Cu}}{63.54 \text{ g Cu}} \right) \left( \frac{2 \text{ mol Ag}}{1 \text{ mol Cu}} \right) \left( \frac{107.87 \text{ g Ag}}{1 \text{ mol Ag}} \right) = 169.76 \text{ g Ag teórico}$$

$$\frac{148 \text{ g Ag}}{169.76 \text{ g Ag}} \times 100\% = 87.1\% \quad \underline{\hspace{1cm}}$$

23)  $64 \text{ g O}_2 \mid V = 75 \text{ L}$   
 $84 \text{ g N}_2 \mid T = 30^\circ \text{C} \rightarrow 303 \text{ K}$

$$\frac{64 \text{ g}}{32 \text{ g}} = 2 \text{ mol O}_2$$

$$\frac{84 \text{ g}}{28 \text{ g}} = 3 \text{ mol N}_2$$

$$P = \frac{nRT}{V} = \frac{(5 \text{ mol})(0.08206)(303 \text{ K})}{75 \text{ L}} = \underline{1.66 \text{ atm}}$$

Empírica  
A)  $\text{CH}_2$

MM

42 g/mol

MMemp

$$\text{C} = 1 \times 12 = 12$$

$$\text{H} = 1 \times 2 = \frac{2}{14 \text{ umg}}$$

$$\frac{42 \text{ umg}}{14 \text{ umg}} = 3$$



B)  $\text{CH}$

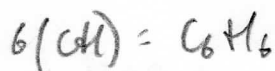
78 g/mol

MMemp

$$\text{C} = 1 \times 12 = 12$$

$$\text{H} = 1 \times 1 = \frac{1}{13 \text{ umg}}$$

$$\frac{78 \text{ umg}}{13 \text{ umg}} = 6$$



C)  $\text{NO}_2$

92 g/mol

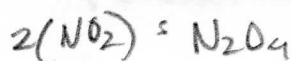
MMemp

$$\text{N} = 1 \times 14 = 14$$

$$\text{O} = 2 \times 16 = 32$$

$$\frac{46 \text{ umg}}$$

$$\frac{92 \text{ umg}}{46 \text{ umg}} = 2$$



8) 50 ml  $H_2C_2O_4$   
 35 ml NaOH 1M  
 ↓  
 0.035 L

$$d_{H_2C_2O_4} = 1.08 \text{ g/ml}$$

MM  $H_2C_2O_4$   
 $H = 2 \times 1 = 2$   
 $C = 2 \times 12 = 24$   
 $O = 4 \times 16 = 64$   
90 umg

$$1M \text{ NaOH} = \frac{n_{\text{NaOH}}}{0.035L} \Rightarrow n = (1M)(0.035L) = 0.035 \text{ mol NaOH}$$

$$0.035 \text{ mol NaOH} \left( \frac{1 \text{ mol } H_2C_2O_4}{2 \text{ mol NaOH}} \right) = 0.0175 \text{ mol } H_2C_2O_4 \left( \frac{90 \text{ g}}{1 \text{ mol } H_2C_2O_4} \right) = 1.575 \text{ g } H_2C_2O_4 \text{ consumidos}$$

$$M_{H_2C_2O_4} = \frac{0.0175 \text{ mol}}{0.05L} = 0.35 M$$

$$50 \text{ ml} \left( \frac{1.08 \text{ g}}{1 \text{ ml}} \right) = 54 \text{ g } H_2C_2O_4 \text{ Hechados}$$

$$\frac{1.575 \text{ g } H_2C_2O_4}{54 \text{ g } H_2C_2O_4} \times 100\% = 2.92\%$$

7) 100g ZnS  
 70g  $O_2$

$$100 \text{ g ZnS} \left( \frac{1 \text{ mol ZnS}}{97.45 \text{ g}} \right) \left( \frac{2 \text{ mol ZnO}}{2 \text{ mol ZnS}} \right) = 1.02 \text{ mol ZnO} \leftarrow \text{limitante}$$

Masa molar ZnS

$$Zn = 1 \times 65.38 = 65.38$$

$$S = 1 \times 32.065 = 32.065$$

97.45 umg

$$70 \text{ g } O_2 \left( \frac{1 \text{ mol } O_2}{32 \text{ g } O_2} \right) \left( \frac{2 \text{ mol ZnO}}{3 \text{ mol } O_2} \right) = 1.46 \text{ mol ZnO}$$

$$1.02 \text{ mol ZnO} \left( \frac{81.38 \text{ g ZnO}}{1 \text{ mol ZnO}} \right) = \underline{83.01 \text{ g ZnO}}$$

ZnO

$$Zn = 1 \times 65.38 = 65.38$$

$$O = 1 \times 16 = 16$$

81.38 umg

$$1.02 \text{ mol ZnO} \left( \frac{3 \text{ mol } O_2}{2 \text{ mol ZnO}} \right) = 1.53 \text{ mol } O_2$$

$$2.18 \text{ mol } O_2 - 1.53 \text{ mol } O_2 = 0.65 \text{ mol } O_2 \text{ sin reaccionar}$$