

Géscar Silveira / 1189619

## Gases

5.20

1  $P = 5.3 \text{ atm}$

$$T = 96^\circ\text{C} \rightarrow 319.15 \text{ K}$$

$$PV = nRT$$

$$V = 1$$

2  $P = ?$

$$V = 10.10 = 0.90$$

$$P_1 V_1 = P_2 V_2$$

$$T = 319.15$$

$$\frac{P_1 V_1}{V_2} = P_2 \rightarrow \frac{(5.3 \text{ atm})(1)}{0.90} = 5.89 \text{ atm}$$

f

5.21

Ponte

$$PV = nRT$$

0.

f.

$$\underline{P_1 = \underline{n}} = \underline{T_2}$$

$$y = 9.66$$

$$V = 3.4 \text{ L}$$

$$\underline{V_1} = \underline{V_2}$$

$$T = 88^\circ\text{C} = 361.15$$

$$T = ?$$

$$\frac{T_1 V_1}{V_1} = T_2 \rightarrow \frac{361.15(3.4)}{9.6} = 127.9 \text{ K}$$

$T_2 = 127.9 \text{ K}$  f

5.32

$$n_{CO} = 6.9$$

$$V = 30.4 \text{ L}$$

$$P = ?$$

$$T = 62^\circ\text{C} \Rightarrow 335.15$$

$$PV = nRT$$

$$P = \frac{nRT}{V} = \frac{(6.9)(0.0821)(335.15)}{30.4} \text{ kPa}$$

$$P = 6.14 \text{ atm} +$$

~~mit K (mit K)~~

5.35

$$T_1 = 25^\circ\text{C} \rightarrow 298.15 \text{ K}$$

$$P_1 = 1.2 \text{ atm}$$

$$V_1 = 2.5 \text{ L}$$

$$T_2 = -23^\circ\text{C} \rightarrow 250.15 \text{ K}$$

$$P_2 = 3 \times 10^3 \text{ atm}$$

$$V_2 = ?$$

$$PV = nRT$$

$$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2} \Rightarrow \frac{P_1 V_1 T_2}{T_1 P_2} = V_2 \Rightarrow V_2 = \frac{(1.2)(2.5)(250.15)}{(298.15)(3 \times 10^3)}$$

$$V_2 = 839 \text{ L} \quad \text{+}$$

5.46

$V = ?$

$$m = 88.4 \text{ g } \text{CO}_2$$

$$PV = nRT$$

$T_{\text{PE}}$

$$\frac{P}{RT} = \frac{n}{V} \Rightarrow \frac{MP}{RT} = \frac{m}{V}$$

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

$$T = 273.15 \text{ K}$$

$$V = 884 / (44.01)(1)$$

$$M_{\text{CO}_2} = 44.01$$

$$(0.0821)(273.15)$$

$$\frac{2}{\left( \frac{\text{g/mol} \cdot \text{atm}}{\text{mol} \cdot \text{K}} \right)} = \frac{2}{c} = L \quad V = 45.06 \text{ L} \quad +$$

5.47

$$P = 741 \text{ Torr} \rightarrow 0.976 \text{ atm}$$

$$T = 44^\circ \text{C} \rightarrow 317.15 \text{ K}$$

$$\frac{MP}{RT} = \frac{m}{V}$$

$$m = 7.10 \text{ g}$$

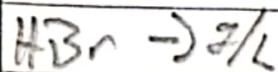
$$M = \frac{mRT}{VP} \Rightarrow \frac{7.10(0.0821)(317.15)}{(5.41)(0.976)}$$

$$\frac{2 \left( \frac{\text{g/mol}}{\text{mol} \cdot \text{K}} \right) K}{K \text{ atm}} = 2 \text{ mol}$$

$$M = 35.11 \text{ g/mol} \quad +$$

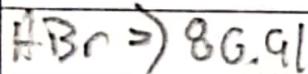
5.48

$$f = \frac{m}{v}$$



$$P = 733 \text{ mm Hg} \rightarrow 0.96$$

$$T = 46^\circ\text{C} \rightarrow 319.15 \quad \frac{MP}{RT} = f \Rightarrow P = \frac{(0.96)}{\frac{0.0821}{(0.0821)(319.15)}} = 2.962 \text{ L/mol}$$



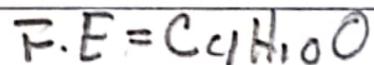
5.49

$$\text{C} = 64.9\% \rightarrow 64.92 / 12.01 = 5.40 \text{ mol C} / 1.35 = 4$$

$$\text{H} = 13.6\% \rightarrow 13.62 / 1.01 = 13.37 \text{ mol H} / 1.35 = 10$$

$$\text{O} = 21.6\% \rightarrow 21.62 / 16 = 1.35 \text{ mol O} / 1.35 = 1$$

$$T = 120^\circ\text{C} \rightarrow 393.15 \text{ K}$$



$$760 \text{ mm Hg} \rightarrow 0.987 \text{ atm}$$

$$MR = 75.22 \text{ g/mol}$$

$$V = 1 \text{ L}$$

$$\frac{MP}{RT} = \frac{m}{v} \Rightarrow M = \frac{mRT}{PV} = \frac{2.30(0.0821)(393.15)}{0.987 \times 1} = 75.222 \text{ g/mol}$$

$$\text{C} = 4 \times 12.01 = 48.04$$

$$\text{H} = 10 \times 1.01 = 10.1$$

$$\text{O} = 1 \times 16 = \frac{16}{75.222}$$

$$n = \frac{75.22}{75.22} = 1 \Rightarrow \text{FM} = \text{C}_4\text{H}_{10}\text{O}$$

5.50 SF<sub>4</sub>

$$T = 20 \rightarrow 293.15 \text{ K}$$

$$m = 0.1 \text{ g}$$

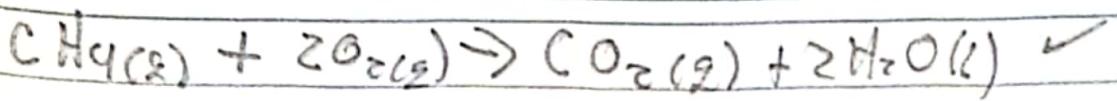
$$V = 0.0221 \text{ L}$$

$$P = 1.02 \text{ atm}$$

$$M = \frac{mRT}{PV} = \frac{(0.1)(0.0821)(293.15)}{(1.02)(0.0221)} = 106.77$$

FM = SF<sub>4</sub>

5.B4



$$MCH_4 = 16$$

$$MCO_2 = ?$$

$$T = 296.15$$

$$P = 0.983 \text{ atm}$$

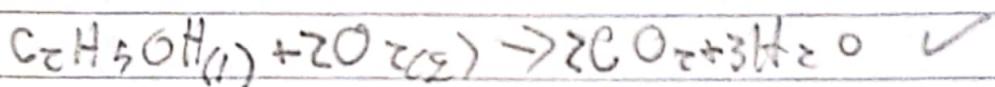
$$16 \text{ CH}_4 \left( \frac{1 \text{ mol } CO_2}{1 \text{ mol } CH_4} \right) = 16 \text{ mol } CO_2$$

$$PV = nRT$$

$$V_{CO_2} = \frac{16(0.0821)(296.15)}{0.983}$$

$$V_{CO_2} = 37.026 \text{ L} \quad \checkmark$$

5.B5



$$V_{O_2} = ?$$

$$T = 308.15 \text{ K}$$

$$P = 1.0 \text{ atm}$$

$$C_2H_5OH = 22.7 \text{ g}$$

$$22.7 \left( \frac{1 \text{ mol}}{52.06 \text{ g}} \right) \left( \frac{2 \text{ mol } O_2}{1 \text{ mol }} \right) = 8.34 \text{ mol } O_2$$

$$PV = nRT$$

$$V_{O_2} = \frac{8.34(0.0821)(308.15)}{1.0 \text{ atm}} = 201.29 \text{ V}_{O_2} \quad \checkmark$$

5.68

$$V = 2.5 \text{ L}$$

$$9. P_{T_0} = 1.201 \text{ atm} \quad X_{He} = \frac{0.15}{129} = 0.4$$

$$T = 288.15$$

$$P_{T_f} = 0.92 \text{ atm}$$

$$P_{Ne} = 0.32 \text{ atm}$$

$$X_{Ne} = \frac{0.12}{129} = 0.39$$

$$P_{He} = 0.3 \text{ atm} \quad \underline{P_{T_0}V_0 = P_f V_f}$$

$$P_{Ne} = 0.12 \text{ atm}$$

$$\frac{(0.42)(2.5)}{288.15} = \frac{V_f}{273.6} \Rightarrow V_f = 218 \text{ L} \quad \checkmark$$

B.70

$$T = 28^\circ\text{C}$$

$$P = 745 \text{ mm Hg}$$

$$P_{\text{He}} = 368 \text{ mm Hg}$$

Vapor agua

$$28^\circ\text{C} = 28.3 \text{ mm Hg}$$

$$P_{\text{TOT}} = \sum P_i$$

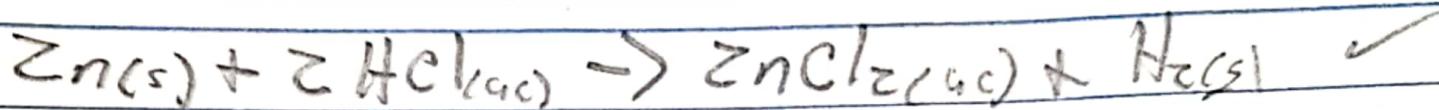
$$P_{\text{TOT}} = P_{\text{Ne}} + P_{\text{He}} + P_{\text{H}_2\text{O}}$$

$$745 = P_{\text{Ne}} + 368 + 28.3$$

$$P_{\text{Ne}} = 348.7 \text{ mm Hg}$$

Or Arimany.

5.72 ↵



$$T = 26^\circ\text{C} \rightarrow 298.15\text{ K}$$

$$V = 7.8\text{ L}$$

$$P = 0.98\text{ atm}$$

vapor de agua

$$26^\circ\text{C} \rightarrow 23.8\text{ mm Hg} \rightarrow P_{\text{vap, H}_2\text{O}} \quad P_{\text{H}_2} = 0.996\text{ atm}$$

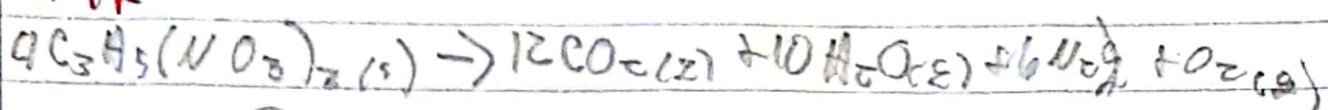
$$\hookrightarrow 0.031\text{ atm}$$

$$P_{\text{H}_2} \cdot V = n_{\text{H}_2} RT \Rightarrow n_{\text{H}_2} = \frac{P_{\text{H}_2} V}{RT}$$

$$n_{\text{H}_2} = \frac{(0.945)(7.8)}{0.0821(298.15)} = 0.3 \text{ mol H}_2$$

$$0.3 \text{ mol H}_2 \left( \frac{1 \text{ mol Zn}}{1 \text{ mol H}_2} \right) \left( \frac{65.395 \text{ g}}{1 \text{ mol Zn}} \right) = 19.62 \text{ g Zn} \checkmark$$

Q. 97



$$P = 1.2 \text{ atm}$$

$$T = 298.15$$

$$2.6 \times 10^3 \text{ g}$$

$$\text{Molar mass} = 227.08$$

$$260 \text{ g Nitro} \left( \frac{1 \text{ mol Nitro}}{227.08 \text{ g}} \right) \left( \frac{12 \text{ mol CO}_2}{4 \text{ mol Nitro}} \right) = 3.43 \text{ mol CO}_2$$

$$\left( \frac{10 \text{ mol H}_2\text{O}}{1 \text{ mol Nitro}} \right) = 2.86 \text{ mol H}_2\text{O}$$

$$\left( \frac{6 \text{ mol N}_2}{4 \text{ mol Nitro}} \right) = 1.72 \text{ mol N}_2$$

$$\left( \frac{1 \text{ mol O}_2}{4 \text{ mol Nitro}} \right) = 0.286 \text{ mol O}_2$$

$$N_T = 8.296$$

$$P_{\text{CO}_2} = \frac{3.43}{8.296} (1.2) = 0.4196 \text{ atm}$$

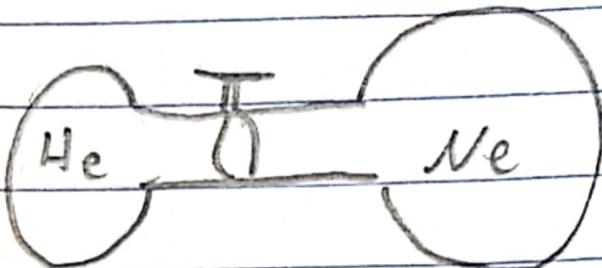
$$P_{\text{H}_2\text{O}} = \frac{2.86}{8.296} (1.2) = 0.91 \text{ atm}$$

$$P_{\text{N}_2} = \frac{1.72}{8.296} (1.2) = 0.25 \text{ atm}$$

$$P_{\text{O}_2} = \frac{0.286}{8.296} (1.2) = 0.041 \text{ atm}$$

(mol He) / (mol Ne)

5,60



$$P_{He} = ?$$

$$P_{Ne} = ?$$

$$T = 16^\circ\text{C} \rightarrow 289,15\text{ K}$$
$$n_{He} \left\{ \begin{array}{l} 1,2\text{ L} \\ 0,63\text{ atm} \end{array} \right.$$
$$3,4\text{ L} \quad \left. \begin{array}{l} \\ n_{Ne} \end{array} \right\}$$
$$2,8\text{ dm}^3 \quad \left. \begin{array}{l} \\ \end{array} \right\}$$

al abrir el vaso

$$PV = nRT$$

$$V = 4,6\text{ L}$$

$$n_{He} = \frac{(0,63)(1,2)}{0,0821 \cdot 289,15} = 0,032 \text{ mol/He}$$

$$T = 289,15\text{ K}$$

$$n_{Ne} = \frac{(2,8)(3,4)}{0,0821 \cdot 289,15} = 0,410 \text{ mol/Ne}$$

$$\underline{P_{TOT} = \frac{n_{TOT} RT}{V}}$$

$$n_{TOT} = 0,43 \text{ moles}$$

$$\underline{P_{TOT} = \frac{(0,43)(0,0821)(289,15)}{4,6}}$$

$$X_{He} = \frac{0,032}{0,43} = 0,074$$

$$P_{TOT} = 2,22 \text{ atm}$$

$$X_{Ne} = \frac{0,410}{0,43} = 0,93$$

$$P_{He} = 0,074(2,22) = 0,1643 \text{ atm}; P_{Ne} = 0,93(2,22) = 2,065 \text{ atm}$$