SOLUCIONS : problemes GASOS

$$\boxed{P.V = n.R.T}$$

1

a) $V = 10\ dm^3 \cdot \frac{1\ m^3}{10^3\ dm^3} = 0'01\ m^3$

$T = 250 + 273 = 523\ K$

$P = 10^3\ Pa$

$R = 8'314\ J/K\ mol$

$$n = \frac{PV}{RT} = \frac{10^3 \cdot 0'01}{8'31 \cdot 523} = 2'29 \cdot 10^{-3}\ mol\ N_2$$

$$2'29 \cdot 10^{-3}\ mol\ N_2 \cdot \frac{6'023 \cdot 10^{23}\ molec\ N_2}{1\ mol\ N_2} = 1'385 \cdot 10^{21}\ molec\ N_2$$

b) $2'29 \cdot 10^{-3}\ mol\ N_2 \cdot \frac{28\ g\ N_2}{1\ mol\ N_2} = 0'06412\ g\ N_2$

c) $P.V = nRT$

$P.V = \frac{m}{M} \cdot RT$ ← SI en kg!

$\frac{P.M}{RT} = \frac{m}{V}$

$$\boxed{d = \frac{P.M}{R.T}}$$

N_2 diatòmic!

condicions indicades → $d = \frac{10^3 \cdot (0'014) \cdot 2}{8'314 \cdot 523} = 6'439 \cdot 10^{-3}\ kg/m^3$

condicions normals → $d = \frac{1'013 \cdot 10^5 \cdot (0'014) \cdot 2}{8'314 \cdot 273} = 1'24\ kg/m^3$

$T = 273\ K$

$P = 1'013 \cdot 10^5\ Pa$

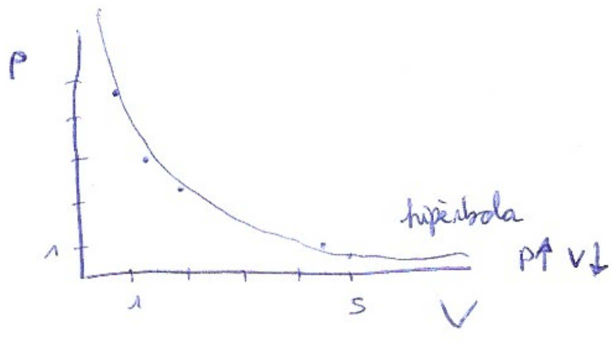
* Una altra manera de plantejar, seria: com que la "R" sempre val igual, podem fer:

$$R = \frac{P.M}{d.T} \qquad \frac{P_1 \cdot M_{N_2}}{d_1 \cdot T_1} = \frac{P_2 \cdot M_{N_2}}{d_2 \cdot T_2}$$

2

a) Sí, sí que la compleix: $\boxed{P.V = k}$ a T constant

V · P	k
1,0 · 4,5 =	4,5
1,5 · 3,0 =	4,5
1,8 · 2,5 =	4,5
4,5 · 1,0 =	4,5
5,0 · 0,9 =	4,5



b) $\boxed{P.V = k} \Rightarrow P = \frac{k}{V} = \frac{4'5}{7} = 0'6428\ atm$

c) $\boxed{P.V = k} \Rightarrow V = \frac{k}{P} = \frac{4'5}{1'5} = 3\ L$

3.-

$$d = 3'509 \frac{g}{L} \cdot \frac{1kg}{1000g} \cdot \frac{1L}{1dm^3} \cdot \frac{1000 dm^3}{1 m^3} = 3'509 \, kg/m^3 \text{ en SI}$$

$T = 0°C = 273K$

$$P = 570 \, mmHg \cdot \frac{1atm}{760 mmHg} \cdot \frac{1'013 \cdot 10^5 Pa}{1atm} = 75.975 \, Pa$$

$R = 8'31 \, J/K\,mol$

Per tant:

$PV = nRT$

$PV = \frac{m}{M} \cdot R \cdot T$

$P \cdot M = \left(\frac{m}{V}\right) \cdot R \cdot T$ ($\frac{m}{V} = d$)

$$M = \frac{d \cdot R \cdot T}{P} = \frac{3'509 \cdot 8'31 \cdot 273}{75.975} = 0'104 \, kg/mol = \underline{104'7 \, g/mol}$$

correspon a SiF_4

4. P del recipient? P_{TOTAL}?

P_{O_2} continua essent 500 mmHg

$O_2 \leftarrow H_2$

D'acord Llei Dalton de les pressions parcials

$P_T = P_{O_2} + P_{H_2}$

$P_i = P_T \cdot X_i$

$$P_{O_2} = P_T \cdot \frac{n_{O_2}}{n_{O_2} + n_{H_2}} \Rightarrow P_T = P_{O_2} / \frac{n_{O_2}}{n_{O_2} + n_{H_2}}$$

$$P_T = \frac{500 \, mmHg}{\frac{\frac{3'2}{32}}{\frac{3'2}{32} + \frac{4'2}{2}}} = 1'1 \cdot 10^4 \, mmHg = \underline{14'47 \, atm}$$

5.- Mescla de gasos

$$\% \text{ volum} = X_{\text{fracció molar}} = \frac{n_i}{n_t}$$

$$P_{N_2} = P_T \cdot X_{N_2} \rightarrow P_{N_2} = 720 \, mmHg \cdot \frac{79}{100} = \underline{568'8 \, mmHg}$$