

$$28/ \left[\begin{array}{l} 0,4 \text{ L} \\ 1,125 \text{ g/ml} \\ 25,22\% \\ \text{HCl} \end{array} \right] + \left[\begin{array}{l} 100 \text{ cm}^3 \\ 1,165 \text{ g/ml} \\ 33,16\% \\ \text{HCl} \end{array} \right]$$

$$a) \% \text{ pes} = \frac{\text{masa HCl}}{\text{masa ds}}$$

$$b) M = \frac{\text{mol HCl}}{\text{L ds}}$$

$$0,4 \text{ L ds} \cdot \frac{1000 \text{ ml ds}}{1 \text{ L ds}} \cdot \frac{1,125 \text{ g ds}}{1 \text{ ml ds}} = 450 \text{ g ds} \cdot \frac{25,22 \text{ g HCl}}{100 \text{ g ds}} = 113,49 \text{ g HCl}$$

$$100 \text{ cm}^3 \text{ ds} \cdot \frac{1,165 \text{ g ds}}{1 \text{ ml ds}} = 116,5 \text{ g ds} \cdot \frac{33,16 \text{ g HCl}}{100 \text{ g ds}} = 38,6314 \text{ g HCl}$$

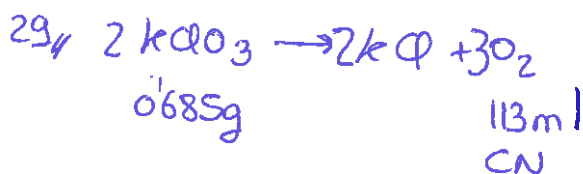
$$\text{g ds} = 450 + 116,5 = 566,5 \text{ g ds}$$

$$\text{g HCl} = 113,49 + 38,6314 = 152,12 \text{ g HCl}$$

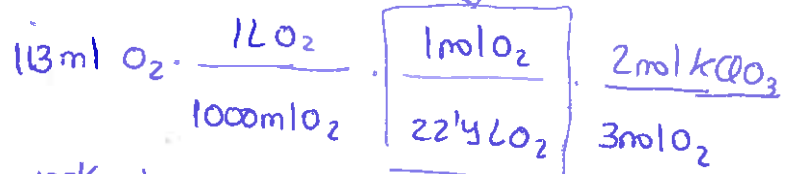
$$\% = \frac{152,12}{566,5} \cdot 100 = 26,85\%$$

$$152,12 \text{ g HCl} \cdot \frac{1 \text{ mol HCl}}{36,5 \text{ g HCl}} = 4,168 \text{ mol HCl}$$

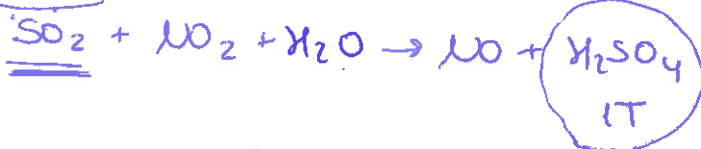
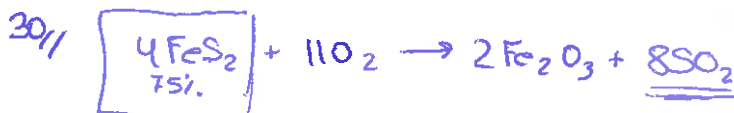
$$M = \frac{4,168 \text{ mol}}{0,4 + 0,1} = 8,34 \text{ M}$$



$$\% = \frac{0,412}{0,685} \cdot 100 = 60,19\%$$



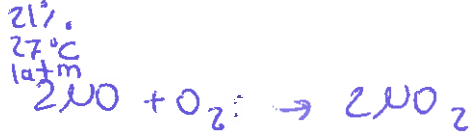
$$= \frac{1226 \text{ g KClO}_3}{1 \text{ mol KClO}_3} = 0,412 \text{ g KClO}_3 \text{ purs}$$



$$\text{IT H}_2\text{SO}_4 \cdot \frac{1000000 \text{ g H}_2\text{SO}_4}{1 \text{ T H}_2\text{SO}_4} \cdot \frac{1 \text{ mol H}_2\text{SO}_4}{98 \text{ g H}_2\text{SO}_4} \cdot \frac{1 \text{ mol SO}_2}{1 \text{ mol H}_2\text{SO}_4} \cdot \frac{1 \text{ mol SO}_2}{1 \text{ mol SO}_2}$$

$$\frac{4 \text{ mol FeS}_2}{8 \text{ mol SO}_2} \cdot \frac{119,85 \text{ g FeS}_2}{1 \text{ mol FeS}_2} \cdot \frac{1000 \text{ g FeS}_2}{75 \text{ g FeS}_2} \cdot \frac{1 \text{ kg}}{1000 \text{ g}} = 815,3 \text{ kg FeS}_2$$

31/



$$5 \text{T NH}_3 \cdot \frac{10^6 \text{ g NH}_3}{17 \text{ g NH}_3} \cdot \frac{1 \text{ mol NH}_3}{17 \text{ g NH}_3} \cdot \frac{5 \text{ mol O}_2}{4 \text{ mol NH}_3} = 367647 \text{ mol O}_2$$

$$5 \text{T NH}_3 \cdot \frac{10^6 \text{ g NH}_3}{17 \text{ g NH}_3} \cdot \frac{1 \text{ mol NH}_3}{17 \text{ g NH}_3} \cdot \frac{4 \text{ mol NO}}{4 \text{ mol NH}_3} \cdot \frac{1 \text{ mol O}_2}{2 \text{ mol NO}} = 147058 \text{ mol O}_2$$

$$514706 \text{ mol O}_2$$

$$PV = nRT \Rightarrow 1 \cdot V = 514706 \cdot 0.082 \cdot (27 + 273)$$

$$V = \frac{12661763100}{21} = 6 \cdot 10^7 \text{ L aire}$$

32/



12 kg CN 21%
12 kg CN 21%
12 kg CN 21%
12 kg CN 21%

13 O₂ 0.8atm 20°C
13 O₂ 0.8atm 20°C
13 O₂ 0.8atm 20°C
13 O₂ 0.8atm 20°C

8 CO₂ g??
8 CO₂ g??
8 CO₂ g??
8 CO₂ g??

$$12 \text{ kg C}_4\text{H}_{10} \cdot \frac{10000 \text{ g C}_4\text{H}_{10}}{10000 \text{ kg}} \cdot \frac{1 \text{ mol C}_4\text{H}_{10}}{58 \text{ g C}_4\text{H}_{10}} \cdot \frac{13 \text{ mol O}_2}{2 \text{ mol C}_4\text{H}_{10}} \cdot \frac{22.4 \text{ L O}_2}{1 \text{ mol O}_2} \cdot \frac{100 \text{ L aire}}{21 \text{ L O}_2} =$$

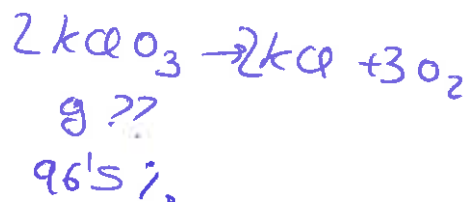
$$= 143448 \text{ L aire} = 143.4 \text{ m}^3$$

$$\frac{8 \text{ mol CO}_2}{2 \text{ mol C}_4\text{H}_{10}} = 827.6 \text{ mol}$$

$PV = nRT$
 $V = 24855 \text{ L}$

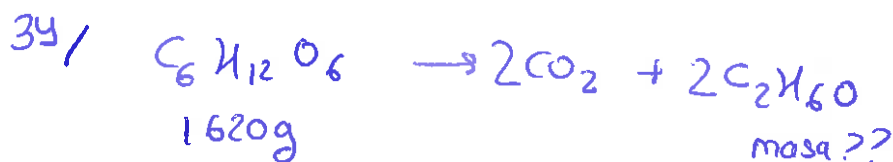
$$\frac{10 \text{ mol H}_2\text{O}}{2 \text{ mol C}_4\text{H}_{10}} \cdot \frac{18 \text{ g H}_2\text{O}}{1 \text{ mol H}_2\text{O}} = 18621 \text{ g H}_2\text{O}$$

33/ SL O₂
15°C
725 mmHg

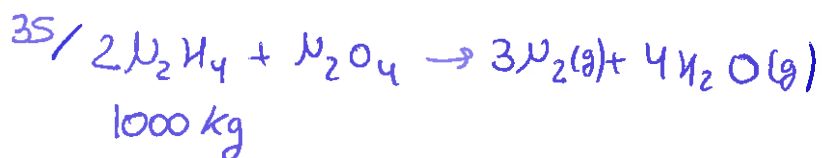


~~Seleo~~ $PV = nRT \rightarrow \frac{725}{760} \cdot V = n \cdot 0'082 \cdot (15 + 273) \rightarrow n = 0'2 \text{ mol}$

$$0'2 \text{ mol O}_2 \cdot \frac{2 \text{ mol KClO}_3}{3 \text{ mol O}_2} \cdot \frac{2 \text{ mol KClO}_3}{3 \text{ mol O}_2} \cdot \frac{122'6 \text{ g KClO}_3}{1 \text{ mol KClO}_3} \cdot \frac{100}{96'5} = 17'1 \text{ g}$$



$$1620 \text{ g C}_6\text{H}_{12}\text{O}_6 \cdot \frac{1 \text{ mol C}_6\text{H}_{12}\text{O}_6}{180 \text{ g C}_6\text{H}_{12}\text{O}_6} \cdot \frac{2 \text{ mol C}_2\text{H}_5\text{O}}{1 \text{ mol glucosa}} \cdot \frac{46 \text{ g etanol}}{1 \text{ mol etanol}} = 828 \text{ g etanol}$$



U gases ??
100°C lat m

$$\text{a) } 1000 \text{ kg N}_2\text{H}_4 \cdot \frac{1000 \text{ g N}_2\text{H}_4}{1 \text{ kg}} \cdot \frac{1 \text{ mol N}_2\text{H}_4}{32 \text{ g N}_2\text{H}_4} \cdot \frac{3 \text{ mol N}_2}{2 \text{ mol N}_2\text{H}_4} = 46875 \text{ mol N}_2$$

$$\frac{4 \text{ mol H}_2\text{O}}{2 \text{ mol N}_2\text{H}_4} = 62500 \text{ mol H}_2\text{O}$$

$$PV = nRT \Rightarrow V = 109375 \cdot 0'082 \cdot (100 + 273)$$

109375 mol totales

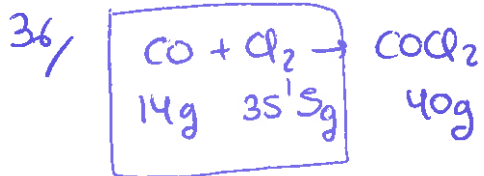
$$V = 3345343 \text{ L} = 3345'34 \text{ m}^3$$

$$\frac{1000 \text{ kg N}_2\text{H}_4}{1437'5 \text{ kg N}_2\text{O}_4} = 0'7$$

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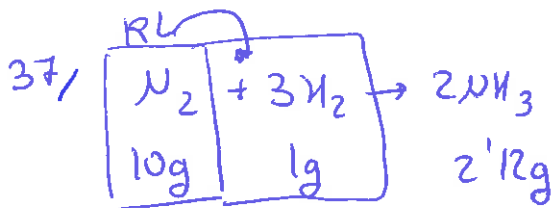
b) 1000 kg N₂H₄ · $\frac{1000 \text{ g N}_2\text{H}_4}{1000 \text{ kg N}_2\text{H}_4} \cdot \frac{1 \text{ mol N}_2\text{H}_4}{32 \text{ g N}_2\text{H}_4} \cdot \frac{1 \text{ mol N}_2\text{O}_4}{2 \text{ mol N}_2\text{H}_4} \cdot \frac{92 \text{ g N}_2\text{O}_4}{1 \text{ mol N}_2\text{O}_4} \cdot \frac{1 \text{ kg}}{1000 \text{ g}} = 1437'5 \text{ kg}$



$$14\text{g CO} \cdot \frac{1\text{mol CO}}{28\text{g CO}} \cdot \frac{1\text{mol Cl}_2}{1\text{mol CO}} \cdot \frac{71\text{g Cl}_2}{1\text{mol Cl}_2} = 35'5\text{g Cl}_2 \text{ reacciona todo de los dos reactivos.}$$

$$14\text{g CO} \cdot \frac{1\text{mol CO}}{28\text{g CO}} \cdot \frac{1\text{mol COCl}_2}{1\text{mol CO}} \cdot \frac{99\text{g COCl}_2}{1\text{mol COCl}_2} = 49'5\text{g COCl}_2$$

$$\% = \frac{40}{49'5} \cdot 100 = 80'8\%$$

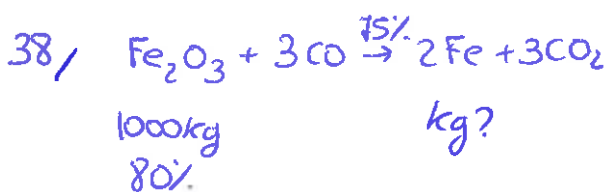


$$10\text{g N}_2 \cdot \frac{1\text{mol N}_2}{28\text{g N}_2} \cdot \frac{3\text{mol H}_2}{1\text{mol N}_2} \cdot \frac{2\text{g H}_2}{1\text{mol H}_2} = 2'14\text{g H}_2 \text{ me falta hidrógeno}$$

para que reaccione todo el N_2
 ↓ (tengo N_2 de sobra).
 Reactivo limitante H_2

$$1\text{g H}_2 \cdot \frac{1\text{mol H}_2}{2\text{g H}_2} \cdot \frac{2\text{mol NH}_3}{3\text{mol H}_2} \cdot \frac{17\text{g NH}_3}{1\text{mol NH}_3} = 5'66\text{g NH}_3$$

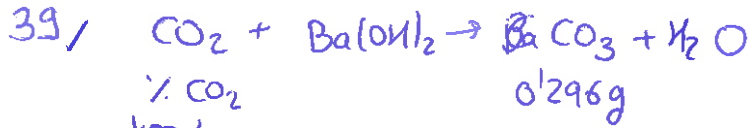
$$R = \frac{2'12}{5'66} \cdot 100 = 37'41\%$$



$$1000\text{kg P} \cdot \frac{1000\text{g P}}{1\text{kg P}} \cdot \frac{80\text{g Fe}_2\text{O}_3}{100\text{g P}} \cdot \frac{1\text{mol Fe}_2\text{O}_3}{159'7\text{g Fe}_2\text{O}_3}$$

$$\cdot \frac{2\text{mol Fe}}{1\text{mol Fe}_2\text{O}_3} \cdot \frac{55'85\text{g Fe}}{1\text{mol Fe}} \cdot \frac{75\text{g reals}}{100\text{g teor.}} \cdot \frac{1\text{kg}}{1000\text{g}}$$

$$= 419'66\text{kg Fe}$$

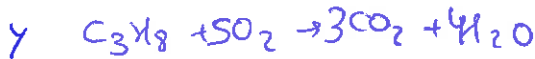


1% CO_2
100 L
20°C 740 mmHg

$$0.296 \text{ g BaCO}_3 \cdot \frac{1 \text{ mol BaCO}_3}{197.327 \text{ g}} \cdot \frac{1 \text{ mol CO}_2}{1 \text{ mol BaCO}_3} = \underline{1.5 \cdot 10^{-3} \text{ mol CO}_2}$$

$$PV = nRT \rightarrow \frac{740}{760} \cdot V = 1.5 \cdot 10^{-3} \cdot 0.082 (20 + 273)$$

$$V = 0.037 \text{ L} \quad \% = \frac{0.037}{100} \cdot 100 = 0.037 \%$$



16g
4°C
25.2 cm³

$$x + y = 16$$

$$0.067x + 0.091y = 0.0011$$

$$\begin{cases} 0.067x + 0.087y = 0.0072 \\ 0.067x + 0.091y = 0.0011 \\ \hline -0.024y = \end{cases}$$

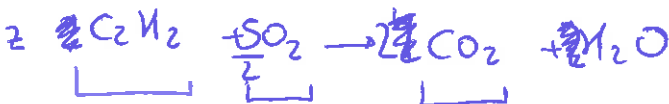
$$PV = nRT$$

$$1 \cdot \frac{25.2}{1000} = n \cdot R \cdot (25 + 273) \rightarrow n = 0.0011 \text{ mol H}_2\text{O}$$

$$x \text{ g C}_4\text{H}_{10} \cdot \frac{1 \text{ mol C}_4\text{H}_{10}}{74 \text{ g C}_4\text{H}_{10}} \cdot \frac{10 \text{ mol H}_2\text{O}}{2 \text{ mol C}_4\text{H}_{10}} = 0.067x \text{ mol H}_2\text{O}$$

$$y \text{ g C}_3\text{H}_8 \cdot \frac{1 \text{ mol C}_3\text{H}_8}{44 \text{ g C}_3\text{H}_8} \cdot \frac{4 \text{ mol H}_2\text{O}}{1 \text{ mol C}_3\text{H}_8} = 0.091y \text{ mol H}_2\text{O}$$

No es pot fer
falta la presió de l'aigua



18.4 cm³ 100 cm³ 85.2 - 31.4 = 53.8 cm³

$$V_{\text{final gasos}} = 85.2 \text{ cm}^3 \xrightarrow{\text{KOH}}$$

$$V_{\text{final}} = 31.4 \text{ cm}^3$$



$$x + y + z = 18.4$$

$$2x + 3y + \frac{5}{2}z = 100$$

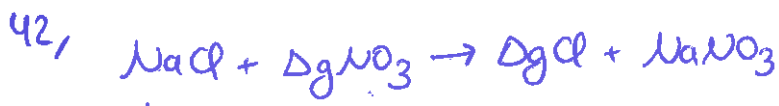
$$x + 2y + 2z = 53.8$$

$$\left(\begin{array}{ccc|c} 1 & 1 & 1 & 18.4 \\ 0 & -1 & -1/2 & -63.2 \\ 0 & -1 & -1 & -35.4 \end{array} \right)$$

$$\left(\begin{array}{ccc|c} 1 & 1 & 1 & 18.4 \\ 0 & -1 & -1/2 & -63.2 \\ 0 & 0 & 1/2 & 0 \end{array} \right)$$

En el examen no





$$\frac{3.8 \text{ g}}{100 \text{ cm}^3}$$

20 cm³ ds

1.722 g

% pureza

~~3.8 g~~
3.85 g

$$1.722 \text{ g AgCl} \cdot \frac{1 \text{ mol AgCl}}{143.3 \text{ g AgCl}}$$

$$\frac{1 \text{ mol NaCl}}{1 \text{ mol AgCl}} \cdot \frac{58.5 \text{ g NaCl}}{1 \text{ mol NaCl}} \cdot \frac{100 \text{ cm}^3}{20 \text{ cm}^3}$$

$$= 3.51 \text{ g puris}$$

$$\% = \frac{3.51}{3.8} \cdot 100 = 92.497\%$$

$$\text{impurezas} = 100 - 92.497 = 7.5\%$$



0.350 g impuris

? % pureza??

83.2 cm³

22°C

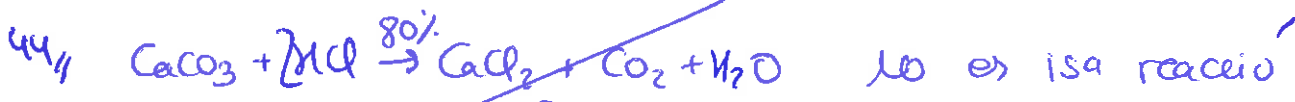
750 mmHg

$$PV = nRT \rightarrow \frac{750}{760} \cdot \frac{83.2}{1000} = n \cdot 0.082 (22 + 273)$$

$$n = 0.0034 \text{ mol CO}_2$$

$$\% = \frac{0.34}{0.350} \cdot 100 = 97\%$$

$$0.0034 \text{ mol CO}_2 \cdot \frac{1 \text{ mol CaCO}_3}{1 \text{ mol CO}_2} \cdot \frac{100 \text{ g CaCO}_3}{1 \text{ mol CaCO}_3} = 0.34 \text{ g puris}$$



1T
90%

xg??

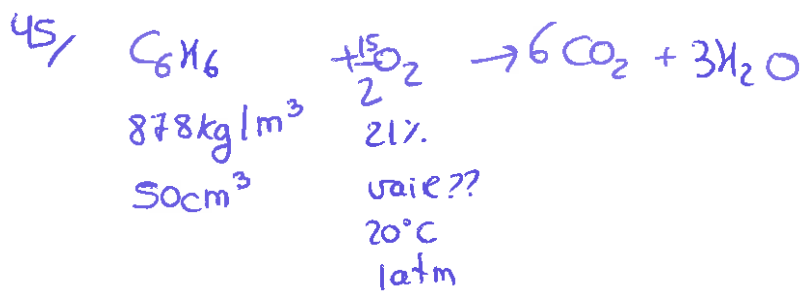
~~$$1T \text{ CaCO}_3 \cdot \frac{10^6 \text{ g CaCO}_3}{1T \text{ CaCO}_3} \cdot \frac{90 \text{ g CaCO}_3}{100 \text{ g}} \cdot \frac{1 \text{ mol CaCO}_3}{100 \text{ g CaCO}_3} \cdot \frac{1 \text{ mol CaCl}_2}{1 \text{ mol CaCO}_3} \cdot \frac{80}{100} \cdot \frac{111 \text{ g CaCl}_2}{1 \text{ mol CaCl}_2}$$~~



1T
90%

g??

$$1T \frac{10^6 \text{ g}}{1T} \cdot \frac{90 \text{ g CaCO}_3}{100 \text{ g}} \cdot \frac{1 \text{ mol CaCO}_3}{100 \text{ g CaCO}_3} \cdot \frac{1 \text{ mol CaO}}{1 \text{ mol CaCO}_3} \cdot \frac{80}{100} \cdot \frac{56 \text{ g CaO}}{1 \text{ mol CaO}} \cdot \frac{1 \text{ kg}}{10^3 \text{ g}} = 4.032 \text{ kg}$$



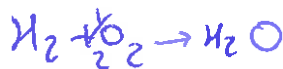
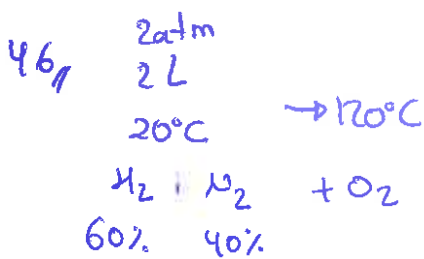
$$50 \text{ cm}^3 \cdot \frac{1 \text{ m}^3}{10^6 \text{ cm}^3} \cdot \frac{878 \text{ kg } C_6H_6}{1 \text{ m}^3} \cdot \frac{10^3 \text{ g } C_6H_6}{10^3 \text{ kg } C_6H_6} \cdot \frac{1 \text{ mol } C_6H_6}{78 \text{ g } C_6H_6} \cdot \frac{15/2 \text{ mol } O_2}{1 \text{ mol } C_6H_6}$$

$$\frac{200 \text{ aire}}{2100 O_2} = 20100 \text{ mol aire}$$

$$PV = nRT$$

$$V = 482 L$$

$$P \cdot V = 20100 \cdot 0.082 (20 + 273)$$



$$PV = nRT$$

$$2 \cdot 2 = n \cdot 0.082 (20 + 273)$$

$$n = 0.166 \text{ moles totales} \cdot \frac{60 \text{ mol } H_2}{100} \cdot \frac{1 \text{ mol } H_2O}{1 \text{ mol } H_2} \cdot \frac{18 \text{ g } H_2O}{1 \text{ mol } H_2O} = 1.8 \text{ g } H_2O$$

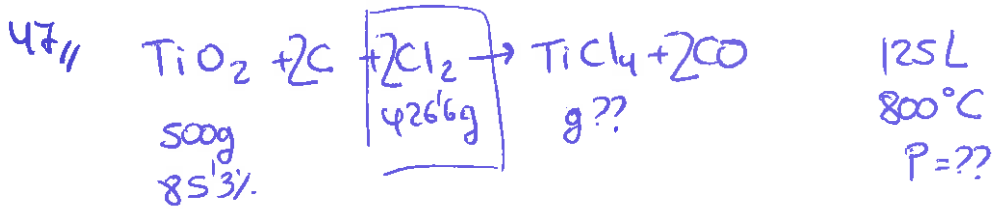
$$0.0996 \text{ mol } H_2O$$

$$0.166 \text{ moles totales} \cdot \frac{40}{100} = 0.0664 \text{ mol } N_2 \quad \left. \begin{array}{l} 0.0996 \text{ mol } H_2O \\ 0.0664 \text{ mol } N_2 \end{array} \right\} 0.166 \text{ mol totales}$$

$$PV = nRT \rightarrow P_T \cdot 2 = 0.166 \cdot 0.082 (120 + 273) \rightarrow P_T = 2.67 \text{ atm}$$

$$P_{N_2} = X_{N_2} \cdot P_T = \frac{0.0664 \text{ mol } N_2}{0.166 \text{ mol totales}} \cdot 2.67 = 1.07 \text{ atm}$$

$$P_{H_2O} = X_{H_2O} \cdot P_T = 1.6 \text{ atm}$$



$$500\text{g} \frac{85.3\text{g TiO}_2}{100\text{g}} \cdot \frac{1\text{mol TiO}_2}{78.67\text{g TiO}_2} \cdot \frac{2\text{mol Cl}_2}{1\text{mol TiO}_2} \cdot \frac{71\text{g Cl}_2}{1\text{mol Cl}_2} = 758.3\text{g Cl}_2$$

No tengo suficiente Cl_2 para que reaccione todo el TiO_2

RL $\rightarrow \text{Cl}_2$ $3\text{mol TiCl}_4 \rightarrow P = nRT \rightarrow P_{\text{TiCl}_4} = 2.11\text{atm}$

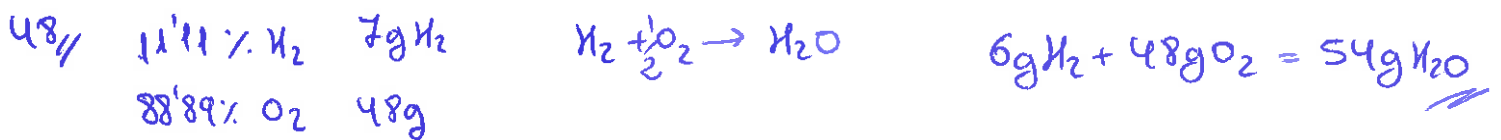
$$426.6\text{g Cl}_2 \cdot \frac{1\text{mol Cl}_2}{71\text{g Cl}_2} \cdot \frac{1\text{mol TiCl}_4}{2\text{mol Cl}_2} \cdot \frac{189.867\text{g TiCl}_4}{1\text{mol TiCl}_4} = 570.4\text{g TiCl}_4$$

$$426.6\text{g Cl}_2 \cdot \frac{1\text{mol Cl}_2}{71\text{g Cl}_2} \cdot \frac{2\text{mol CO}}{2\text{mol Cl}_2} = 6\text{mol CO} \quad P = nRT$$

$$P \cdot 125 = 6 \cdot 0.082 (800 + 273)$$

$$P_{\text{CO}} = 4.23\text{atm}$$

$$P_T = 4.23 + 2.11 = 6.34\text{atm}$$



$$7\text{g H}_2 \cdot \frac{88.89\text{g O}_2}{11.11\text{g H}_2} = 56\text{g O}_2 \quad \text{RL O}_2 \quad 48\text{g O}_2 \cdot \frac{11.11\text{g H}_2}{88.89\text{g O}_2} = 6\text{g H}_2$$



$$\frac{2\text{g}}{58.5\text{g NaCl}} \quad \frac{50\text{ml}}{0.6\text{M}}$$

$$x + y = 2$$

$$28.49x + 22.37y = 50$$

$$28.49x + 28.49y = 56.98$$

$$28.49x + 22.37y = 50$$

$$6.12y = 6.98$$

$$x = 0.86\text{g} \quad y = 1.14\text{g}$$

$$x\text{g NaCl} \cdot \frac{1\text{mol NaCl}}{58.5\text{g NaCl}} \cdot \frac{1\text{mol } \Delta\text{g H}_2\text{O}_3}{1\text{mol NaCl}} \cdot \frac{1\text{L } \Delta\text{g H}_2\text{O}_3}{0.6\text{mol } \Delta\text{g H}_2\text{O}_3} \cdot \frac{1000\text{ml } \Delta\text{g H}_2\text{O}_3}{1\text{L } \Delta\text{g H}_2\text{O}_3} = 28.49x\text{ml } \Delta\text{g H}_2\text{O}_3$$

$$y\text{g KCl} \cdot \frac{1\text{mol KCl}}{74.5\text{g KCl}} \cdot \frac{1\text{mol } \Delta\text{g H}_2\text{O}_3}{1\text{mol KCl}} \cdot \frac{1\text{L}}{0.6\text{mol } \Delta\text{g H}_2\text{O}_3} \cdot \frac{1000\text{ml}}{1\text{L}} = 22.37y\text{ml } \Delta\text{g H}_2\text{O}_3$$



0'156g

114 ml
27°C
725 mmHg

$PV = nRT \rightarrow n = 0'0044 \text{ mol } H_2$



$x + y = 0'156$
 $0'016x + 0'056y = 0'0044$

$x = 0'1084$
 $y = 0'0476$

69'5% Zn
30'5% Al



1'728g

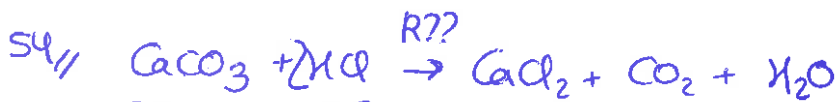
550 ml
750 mmHg
26°C
 $P_{H_2O} = 25'2 \text{ mmHg}$

$PV = nRT$
 $\frac{750 - 25'2}{760} \cdot \frac{550}{1000} = n \cdot 0'082 \cdot (26 + 273)$

$0'021 \text{ mol } H_2 \cdot \frac{1 \text{ mol Zn}}{1 \text{ mol } H_2} \cdot \frac{65'4 \text{ g Zn}}{1 \text{ mol Zn}} = 1'399 \text{ g Zn}$

$n_{H_2} = 0'021 \text{ mol } H_2$

$\% = \frac{1'399}{1'728} \cdot 100 = 80'9\%$



a) 35g $u??$
1'5M

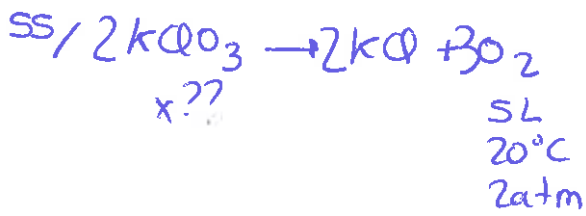
b)

6'95L
1atm
20°C

$35 \text{ g } CaCO_3 \cdot \frac{1 \text{ mol } CaCO_3}{100 \text{ g } CaCO_3} \cdot \frac{2 \text{ mol } HCl}{1 \text{ mol } CaCO_3} \cdot \frac{1 \text{ L } HCl}{15 \text{ mol } HCl} = 0'47 \text{ L } HCl$

$\frac{1 \text{ mol } CO_2}{1 \text{ mol } CaCO_3} = 0'35 \text{ mol } CO_2$

$PV = nRT \rightarrow V = 8'4 \text{ L}$



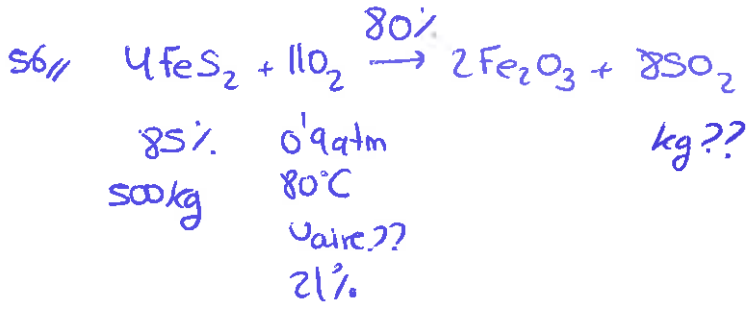
a) $PV = nRT$

$$n_{\text{O}_2} = 0.4162 \text{ mol O}_2 \cdot \frac{2 \text{ mol KClO}_3}{3 \text{ mol O}_2} \cdot \frac{122.5 \text{ g KClO}_3}{1 \text{ mol KClO}_3}$$

$$= 33.99 \text{ g KClO}_3$$

b) 60g
83%

b) $60 \text{ g KClO}_3 \cdot \frac{1 \text{ mol KClO}_3}{122.5 \text{ g KClO}_3} \cdot \frac{83}{100} \cdot \frac{2 \text{ mol KCl}}{2 \text{ mol KClO}_3} \cdot \frac{74.5 \text{ g KCl}}{1 \text{ mol KCl}} = 30.29 \text{ g KCl}$



$$500 \text{ kg} \cdot \frac{85}{100} \cdot \frac{1000 \text{ g}}{1 \text{ kg}} \cdot \frac{1 \text{ mol FeS}_2}{179.85 \text{ g FeS}_2} = 3546$$

$$\cdot \frac{8 \text{ mol SO}_2}{4 \text{ mol FeS}_2} \cdot \frac{\text{g SO}_2}{1 \text{ mol SO}_2} \cdot \frac{1 \text{ kg} \cdot 1000}{1000 \text{ g}} \cdot \frac{80}{100}$$

$$= 363.13 \text{ kg}$$

$$3546 \cdot \frac{11 \text{ mol O}_2}{4 \text{ mol FeS}_2} \cdot \frac{80}{100} = 7801 \text{ mol}$$

$PV = nRT$

$$V = 7801 \cdot \frac{100}{21} = 1.19 \cdot 10^6 \text{ L air}$$