

HOJA 08



a)  $PV = nRT \rightarrow$  1 mol de Na produce  $\frac{1}{2}$  mol de  $\text{H}_2$   
 $V = \frac{nRT}{P}$   $\left. \begin{array}{l} 23 \text{ g de Na} \rightarrow \frac{1}{2} \text{ mol de H}_2 \\ 115 \text{ g de Na} \rightarrow x \text{ moles de H}_2 \end{array} \right\} x = 0'025 \text{ moles de H}_2$

$V(\text{H}_2) = \frac{0'025 \cdot 0'082 \cdot 290}{0'84} = \boxed{0'71 \text{ L de H}_2}$

b) 1 mol de Na produce 1 mol de NaOH  
 $\left. \begin{array}{l} 23 \text{ g de Na} \rightarrow 1 \text{ mol de NaOH} \\ 115 \text{ g de Na} \rightarrow x \text{ moles de NaOH} \end{array} \right\} x = 0'05 \text{ moles de NaOH}$

$M = \frac{m}{V(L)} = \frac{0'05}{4} = \boxed{0'05 \text{ mol/L}}$   $n = \frac{m}{Mr} \rightarrow m = n \cdot Mr \rightarrow m = 0'05 \cdot 40 = \boxed{2 \text{ g de NaOH}}$

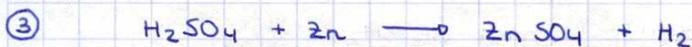


a)  $PV = nRT \rightarrow$  1 mol de  $\text{CaCO}_3$  produce 1 mol de  $\text{CO}_2$   
 $V = \frac{nRT}{P}$   $\left. \begin{array}{l} 100 \text{ g de CaCO}_3 \rightarrow 1 \text{ mol de CO}_2 \\ 8 \text{ g de CaCO}_3 \rightarrow x \text{ moles de CO}_2 \end{array} \right\} x = 0'08 \text{ moles de CO}_2$

$V(\text{CO}_2) = \frac{0'08 \cdot 0'082 \cdot 300}{1} = \boxed{1'968 \text{ L de CO}_2}$

b) 1 mol de  $\text{CaCO}_3$  produce 1 mol de  $\text{CaCl}_2$   
 $\left. \begin{array}{l} 100 \text{ g de CaCO}_3 \rightarrow 111 \text{ g de CaCl}_2 \\ 8 \text{ g de CaCO}_3 \rightarrow x \text{ g de CaCl}_2 \end{array} \right\} x = \boxed{8'88 \text{ g de CaCl}_2}$

c) 1 mol de  $\text{CaCO}_3$  produce 1 mol de  $\text{H}_2\text{O}$   
 $\left. \begin{array}{l} 100 \text{ g de CaCO}_3 \rightarrow 18 \text{ g de H}_2\text{O} \\ 8 \text{ g de CaCO}_3 \rightarrow x \text{ g de H}_2\text{O} \end{array} \right\} x = \boxed{1'44 \text{ g de H}_2\text{O}}$



a) 1 mol de  $\text{H}_2\text{SO}_4$  reacciona con 1 mol de Zn  
 $\left. \begin{array}{l} 98 \text{ g de H}_2\text{SO}_4 \rightarrow 65'4 \text{ g de Zn} \\ 2'08 \text{ g de H}_2\text{SO}_4 \rightarrow x \text{ g de Zn} \end{array} \right\} x = 1'39 \text{ g de Zn}$

1 mol de  $\text{H}_2\text{SO}_4$  reacciona con 1 mol de Zn  
 $\left. \begin{array}{l} 98 \text{ g de H}_2\text{SO}_4 \rightarrow 65'4 \text{ g de Zn} \\ x \text{ g de H}_2\text{SO}_4 \rightarrow 1'02 \text{ g de Zn} \end{array} \right\} x = 1'53 \text{ g de H}_2\text{SO}_4$

Reac. exceso  $\text{H}_2\text{SO}_4$ :  $2'08 \text{ g} - 1'53 \text{ g} = \boxed{0'55 \text{ g sin reaccionar}}$

b)  $PV = nRT \rightarrow$  1 mol de Zn produce 1 mol de  $\text{H}_2$   
 $V = \frac{nRT}{P}$   $\left. \begin{array}{l} 65'4 \text{ g de Zn} \rightarrow 1 \text{ mol de H}_2 \\ 1'02 \text{ g de Zn} \rightarrow x \text{ moles de H}_2 \end{array} \right\} x = 0'0156 \text{ moles de H}_2$

$V(\text{H}_2) = \frac{0'0156 \cdot 0'082 \cdot 310}{0'98} = \boxed{0'405 \text{ L de H}_2}$



a) 1 mol de  $\text{CaCO}_3$  reacciona con 2 moles de  $\text{HCl}$

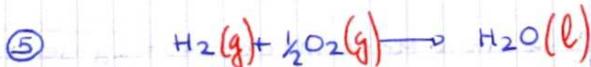
$$\begin{array}{l} 100 \text{ g de } \text{CaCO}_3 \text{ — } 73 \text{ g de } \text{HCl} \\ 10 \text{ g de } \text{CaCO}_3 \text{ — } x \text{ g de } \text{HCl} \end{array} \quad \left. \vphantom{\begin{array}{l} 100 \text{ g de } \text{CaCO}_3 \\ 10 \text{ g de } \text{CaCO}_3 \end{array}} \right\} x = 7.3 \text{ g de } \text{HCl}$$

$M = \frac{n}{V} \Rightarrow 5 = \frac{n}{0.07} \Rightarrow n = 0.35$  1 mol  $\text{HCl} = 36.5 \text{ g}$  }  $x = 12.775 \text{ g}$  }  $12.775 - 7.3 = 5.475 \text{ g HCl}$

b) 1 mol de  $\text{CaCO}_3$  produce 1 mol de  $\text{CaCl}_2$

$$\begin{array}{l} 100 \text{ g de } \text{CaCO}_3 \text{ — } 111 \text{ g de } \text{CaCl}_2 \\ 10 \text{ g de } \text{CaCO}_3 \text{ — } x \text{ g de } \text{CaCl}_2 \end{array} \quad \left. \vphantom{\begin{array}{l} 100 \text{ g de } \text{CaCO}_3 \\ 10 \text{ g de } \text{CaCO}_3 \end{array}} \right\} x = 11.1 \text{ g de } \text{CaCl}_2$$

c)  $\begin{array}{l} 11.1 \text{ g de } \text{CaCl}_2 \text{ — } 100\% \text{ rendimiento} \\ 9.6 \text{ g de } \text{CaCl}_2 \text{ — } x\% \text{ rendimiento} \end{array} \left. \vphantom{\begin{array}{l} 11.1 \text{ g de } \text{CaCl}_2 \\ 9.6 \text{ g de } \text{CaCl}_2 \end{array}} \right\} x = 86.49\% \text{ rendimiento}$



a) 1 mol de  $\text{H}_2$  produce 1 mol de  $\text{H}_2\text{O}$  }  $x = 0.5 \text{ moles de } \text{H}_2\text{O}$

b) 1 mol de  $\text{H}_2$  reacciona con  $\frac{1}{2}$  mol de  $\text{O}_2$  }  $x = 0.25 \text{ moles de } \text{O}_2$

Reac. limitante =  $\text{H}_2$ . Sin reaccionar ( $\text{O}_2$ ) =  $0.5 - 0.25 = 0.25 \text{ moles de } \text{O}_2$

c)  $PV = nRT \rightarrow P = \frac{nRT}{V}$

$P = \frac{0.5 \cdot 0.082 \cdot 273}{1} = 11.143 \text{ atm}$   
~~11.143 atm~~  
 5.6 atm

*0.25, puesto que sólo cuentan las moles (g) el  $\text{H}_2\text{O}(\text{l})$  no cuenta*



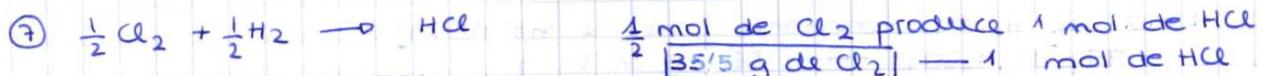
a) 1 mol de  $\text{Zn}$  produce 1 mol de  $\text{ZnCl}_2$

$$\begin{array}{l} 65.4 \text{ g de } \text{Zn} \text{ — } 136.4 \text{ g de } \text{ZnCl}_2 \\ 6.54 \text{ g de } \text{Zn} \text{ — } x \text{ g de } \text{ZnCl}_2 \end{array} \quad \left. \vphantom{\begin{array}{l} 65.4 \text{ g de } \text{Zn} \\ 6.54 \text{ g de } \text{Zn} \end{array}} \right\} x = 13.64 \text{ g de } \text{ZnCl}_2$$

b)  $PV = nRT \Rightarrow V = \frac{nRT}{P}$  1 mol de  $\text{Zn}$  produce 1 mol de  $\text{H}_2$

$$\begin{array}{l} 65.4 \text{ g de } \text{Zn} \text{ — } 1 \text{ mol de } \text{H}_2 \\ 6.54 \text{ g de } \text{Zn} \text{ — } x \text{ moles de } \text{H}_2 \end{array} \quad \left. \vphantom{\begin{array}{l} 65.4 \text{ g de } \text{Zn} \\ 6.54 \text{ g de } \text{Zn} \end{array}} \right\} x = 0.1 \text{ moles de } \text{H}_2$$

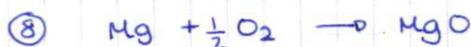
$V(\text{H}_2) = \frac{0.1 \cdot 0.082 \cdot 290}{1} = 2.378 \text{ L de } \text{H}_2$



$\frac{1}{2}$  mol de  $\text{H}_2$  produce 1 mol  $\text{HCl}$   
 $1 \text{ g de } \text{H}_2 \text{ — } 1 \text{ mol HCl}$

a)  $\begin{array}{l} 1 \text{ mol } \text{Cl}_2 \text{ — } 6.022 \cdot 10^{23} \text{ moléculas} \\ 1/2 \text{ mol } \text{Cl}_2 \text{ — } x \text{ moléculas} \end{array} \left. \vphantom{\begin{array}{l} 1 \text{ mol } \text{Cl}_2 \\ 1/2 \text{ mol } \text{Cl}_2 \end{array}} \right\} x = 3.011 \cdot 10^{23} \text{ moléculas } \text{Cl}_2$

b)  $\begin{array}{l} 1 \text{ mol } \text{H}_2 \text{ — } 22.4 \text{ L} \\ 1/2 \text{ mol } \text{H}_2 \text{ — } x \text{ L} \end{array} \left. \vphantom{\begin{array}{l} 1 \text{ mol } \text{H}_2 \\ 1/2 \text{ mol } \text{H}_2 \end{array}} \right\} x = 11.2 \text{ L de } \text{H}_2$



1 mol de  $\text{Mg}$  produce 1 mol de  $\text{MgO}$

$$\begin{array}{l} 24.3 \text{ g de } \text{Mg} \text{ — } 40.3 \text{ g de } \text{MgO} \\ 0.559 \text{ g de } \text{Mg} \text{ — } x \text{ g de } \text{MgO} \end{array} \quad \left. \vphantom{\begin{array}{l} 24.3 \text{ g de } \text{Mg} \\ 0.559 \text{ g de } \text{Mg} \end{array}} \right\} x = 0.927 \text{ g de } \text{MgO}$$