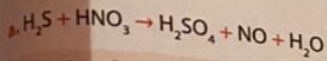


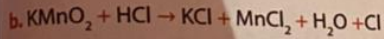
1. Balancea por óxido-reducción las siguientes ecuaciones químicas, teniendo en cuenta los números de oxidación y plantea semirreacciones para cada una, indica quien se oxida y quien se reduce.



$$\begin{aligned} \text{H} &= 3 \times 2 + 2 \times 1 = 8 & \text{H} &= 4 \times 2 = 8 \\ \text{S} &= 3 \times 1 = 3 & \text{S} &= 3 \times 1 = 3 \\ \text{N} &= 2 \times 1 = 2 & \text{N} &= 2 \times 1 = 2 \\ \text{O} &= 2 \times 3 = 6 & \text{O} &= 2 \times 1 + 4 \times 1 = 6 \end{aligned}$$

$$3 \times 0 + 2 \times 0 = 3 \times 0 + 2 \times 0 + 4 \times 0$$

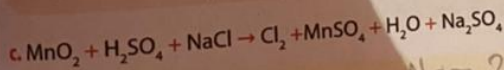
$$0 = 0 \quad 3\text{H}_2\text{S} + 2\text{HNO}_3 \rightarrow 2\text{NO} + 3\text{S} + 4\text{H}_2\text{O}$$



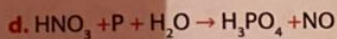
$$\begin{aligned} \text{K} &= 1 \times 1 = 1 & \text{K} &= 1 \times 1 = 1 \\ \text{Mn} &= 1 \times 1 = 1 & \text{Mn} &= 1 \times 1 = 1 \\ \text{O} &= 1 \times 2 = 2 & \text{O} &= 2 \times 1 = 2 \\ \text{H} &= 4 \times 1 = 4 & \text{H} &= 2 \times 2 = 4 \\ \text{Cl} &= 4 \times 1 = 4 & \text{Cl} &= 1 \times 1 + 1 \times 2 + 1 \times 1 = 4 \end{aligned}$$

$$1 \times 0 + 4 \times 0 = 1 \times 0 + 1 \times 0 + 1 \times 0$$

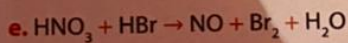
$$0 = 0 \quad \text{KMnO}_2 + 4\text{HCl} \rightarrow \text{KCl} + \text{MnCl}_2 + 2\text{H}_2\text{O} + \text{Cl}$$



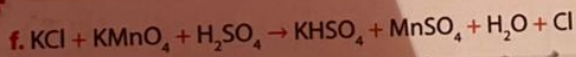
$$\begin{aligned} \text{Na} &= 4 \times 1 = 4 & \text{Na} &= 2 \times 2 = 4 & \text{Mn} &= 1 \times 1 = 1 & \text{Mn} &= 1 \times 1 = 1 \\ \text{Cl} &= 4 \times 1 = 4 & \text{Cl} &= 2 \times 2 = 4 & \text{O} &= 1 \times 4 + 2 \times 1 + 2 \times 4 + 1 \times 1 = 15 & \text{O} &= 1 \times 4 + 2 \times 1 + 2 \times 4 + 1 \times 1 = 15 \\ \text{Mn} &= 1 \times 1 = 1 & \text{Mn} &= 1 \times 1 = 1 & \text{H} &= 2 \times 2 + 1 \times 2 & \text{H} &= 2 \times 2 + 1 \times 2 \\ \text{O} &= 1 \times 3 + 3 \times 4 = 15 & \text{O} &= 1 \times 3 + 3 \times 4 = 15 & \text{S} &= 1 \times 1 + 2 \times 1 = 3 & \text{S} &= 1 \times 1 + 2 \times 1 = 3 \\ \text{H} &= 3 \times 2 = 6 & \text{H} &= 3 \times 2 = 6 & \text{Cl}_2 &= 2 \times 0 + 2 \times 0 + 2 \times 0 + 2 \times 0 & \text{Cl}_2 &= 2 \times 0 + 2 \times 0 + 2 \times 0 + 2 \times 0 \\ \text{S} &= 3 \times 1 = 3 & \text{S} &= 3 \times 1 = 3 & \text{H}_2\text{O} &= 2 \times 0 + 2 \times 0 + 2 \times 0 + 2 \times 0 & \text{H}_2\text{O} &= 2 \times 0 + 2 \times 0 + 2 \times 0 + 2 \times 0 \\ \text{O} &= 0 & \text{O} &= 0 & \text{Na}_2\text{SO}_4 &= 2 \times 0 + 2 \times 0 + 2 \times 0 + 2 \times 0 & \text{Na}_2\text{SO}_4 &= 2 \times 0 + 2 \times 0 + 2 \times 0 + 2 \times 0 \end{aligned}$$



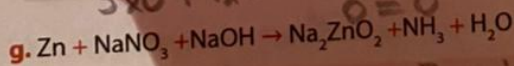
$$\begin{aligned} \text{P} &= 3 \times 1 = 3 & \text{P} &= 3 \times 1 = 3 \\ \text{N} &= 5 \times 1 + 2 \times 2 = 9 & \text{N} &= 3 \times 3 = 9 \\ \text{H} &= 5 \times 1 = 5 & \text{H} &= 5 \times 1 = 5 \\ \text{O} &= 5 \times 3 + 2 \times 1 = 17 & \text{O} &= 3 \times 4 + 5 \times 1 = 17 \\ 3 \times 0 + 5 \times 0 + 2 \times 0 &= 3 \times 0 + 5 \times 0 \\ \text{O} &= 0 & 5\text{HNO}_3 + 3\text{P} + 2\text{H}_2\text{O} &\rightarrow 3\text{H}_3\text{PO}_4 + 5\text{NO} \end{aligned}$$



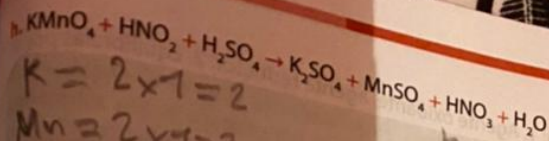
$$\begin{aligned} \text{H} &= 6 \times 1 + 2 \times 1 = 8 & \text{H} &= 4 \times 2 = 8 \\ \text{Br} &= 6 \times 1 = 6 & \text{Br} &= 3 \times 2 = 6 \\ \text{N} &= 2 \times 1 = 2 & \text{N} &= 2 \times 1 = 2 \\ \text{O} &= 2 \times 3 = 6 & \text{O} &= 2 \times 1 + 4 \times 1 = 6 \\ 6 \times 0 + 2 \times 0 &= 3 \times 0 + 2 \times 0 + 4 \times 0 \\ \text{O} &= 0 & 2\text{HNO}_3 + 6\text{HBr} &\rightarrow 2\text{NO} + 3\text{Br}_2 + 4\text{H}_2\text{O} \end{aligned}$$



$$\begin{aligned} \text{K} &= 5 \times 1 + 1 \times 1 = 6 & \text{K} &= 6 \times 1 = 6 & 5\text{KCl} + \text{KMnO}_4 + \\ \text{Cl} &= 5 \times 1 = 5 & \text{Cl} &= 5 \times 1 = 5 & 7\text{H}_2\text{SO}_4 \rightarrow 6\text{KHSO}_4 \\ \text{Mn} &= 1 \times 1 = 1 & \text{Mn} &= 1 \times 1 = 1 & + \text{MnSO}_4 + 4\text{H}_2\text{O} + 5\text{Cl} \\ \text{S} &= 7 \times 1 = 7 & \text{S} &= 7 \times 1 + 6 \times 1 = 7 \\ \text{H} &= 7 \times 2 = 14 & \text{H} &= 6 \times 1 + 4 \times 2 = 14 \\ \text{O} &= 7 \times 4 + 7 \times 4 = 32 & \text{O} &= 7 \times 4 + 6 \times 4 + 4 \times 1 = 32 \\ 5 \times 0 + 1 \times 0 + 7 \times 0 &= 5 \times 0 + 1 \times 0 + 6 \times 0 + 4 \times 0 \\ \text{O} &= 0 & & & \end{aligned}$$



$$\begin{aligned} \text{Zn} &= 4 \times 1 = 4 & \text{Zn} &= 4 \times 1 = 4 \\ \text{Na} &= 1 \times 1 + 7 \times 1 = 8 & \text{Na} &= 4 \times 2 = 8 \\ \text{N} &= 1 \times 1 = 1 & \text{N} &= 1 \times 1 = 1 \\ \text{H} &= 7 \times 1 = 7 & \text{H} &= 3 \times 1 + 2 \times 2 = 7 \\ \text{O} &= 3 \times 1 + 7 \times 1 = 10 & \text{O} &= 4 \times 2 + 2 \times 1 = 10 \\ 4\text{Zn} + \text{NaNO}_3 + 7\text{NaOH} &\rightarrow 4\text{Na}_2\text{ZnO}_2 + \text{NH}_3 + 2\text{H}_2\text{O} \end{aligned}$$



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

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

$\text{S} = 3 \times 1 = 3$

$\text{N} = 5 \times 1 = 5$

$\text{H} = 5 \times 1 + 3 \times 2 = 11$

$\text{O} = 5 \times 2 + 2 \times 4 + 3 \times 4 = 30$

$5 \times 0 + 2 \times 0 + 3 \times 0 = 5 \times 0 + 2 \times 0 + 2 \times 0 + 3 \times 0$

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

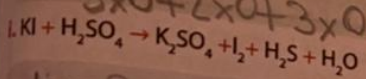
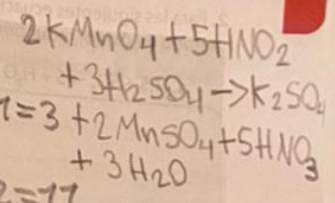
$\text{Mn} = 2 \times 1 = 2$

$\text{S} = 2 \times 1 + 1 \times 1 = 3$

$\text{N} = 5 \times 1 = 5$

$\text{H} = 5 \times 1 + 3 \times 2 = 11$

$\text{O} = 5 \times 3 + 2 \times 4 + 1 \times 4 + 3 \times 1 = 30$



$\text{K} = 8 \times 1 = 8$

$\text{S} = 5 \times 1 = 5$

$\text{I} = 8 \times 1 = 8$

$\text{H} = 5 \times 2 = 10$

$\text{O} = 5 \times 4 = 20$

$8 \times 0 + 5 \times 0 = 4 \times 0 + 1 \times 0 + 4 \times 0 + 4 \times 0$

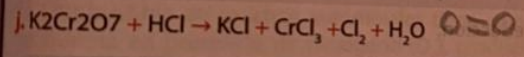
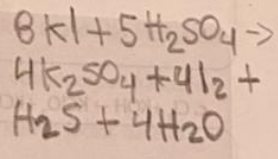
$\text{K} = 4 \times 2 = 8$

$\text{S} = 1 \times 1 + 4 \times 1 = 5$

$\text{I} = 4 \times 2 = 8$

$\text{H} = 1 \times 2 + 4 \times 2 = 10$

$\text{O} = 4 \times 4 + 4 \times 1 = 20$



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

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

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

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

$\text{O} = 1 \times 7 = 7$

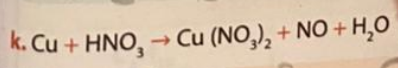
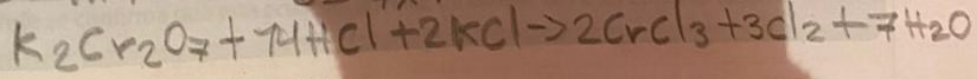
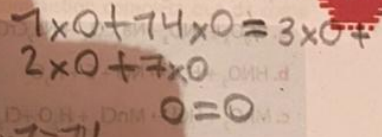
$\text{K} = 2 \times 1 = 2$

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

$\text{Cl} = 3 \times 2 + 2 \times 3 + 2 \times 7 = 14$

$\text{H} = 7 \times 2 = 14$

$\text{O} = 7 \times 1 = 7$



$\text{Cu} = 3 \times 1 = 3$

$\text{N} = 8 \times 1 = 8$

$\text{H} = 8 \times 1 = 8$

$\text{O} = 8 \times 3 = 24$

$\text{Cu} = 3 \times 1 = 3$

$\text{N} = 3 \times 2 + 2 \times 1 = 8$

$\text{H} = 4 \times 2 = 8$

$\text{O} = 3 \times 6 + 2 \times 1 + 4 \times 1 = 24$

