ELECTROCHEMISTRY LESSON-6 QUIZ: **PREDICTING REDOX REACTIONS**

Write the net redox reaction that will occur when chlorine gas, $Cl_2(g)$, is bubbled through an aqueous solution of iron(II) sulfate, $FeSO_4(aq)$. You must clearly show your process.

ANSWER

The species present are $Cl_2(g)$, $Fe^{2+}(aq)$, $SO_4^{2-}(aq)$, $H_2O(l)$.

The strongest oxidizing agent is $Cl_2(g)$.

The strongest reducing agent is $Fe^{2+}(aq)$.

The reaction is spontaneous [$Fe^{2+}(aq)$ is lower than $Cl_2(g)$ in the redox table].

SOA: $Cl_2(g) + 2\,e^- \rightarrow 2\,Cl^-(aq)$

SRA: $Fe^{2+}(aq) \rightarrow Fe^{3+}(aq) + e^-$

Balance the charge transfer.

SOA × 1 = $Cl_2(g) + \cancel{2e^-} \rightarrow 2\,Cl^-(aq)$

SRA × 2 = $2\,Fe^{2+}(aq) \rightarrow 2\,Fe^{3+}(aq) + \cancel{2e^-}$

$$Cl_2(g) + 2\,Fe^{2+}(aq) \rightarrow 2\,Cl^-(aq) + 2\,Fe^{3+}(aq)$$