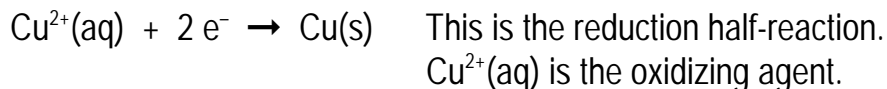
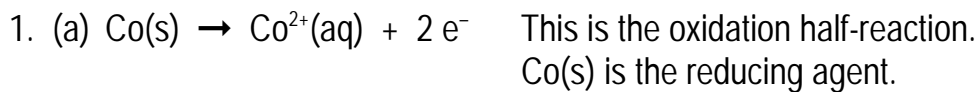
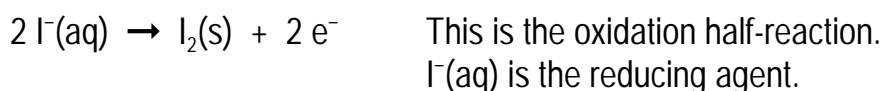
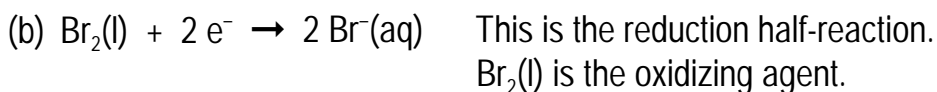


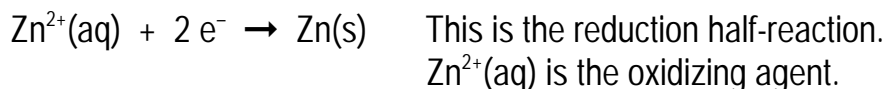
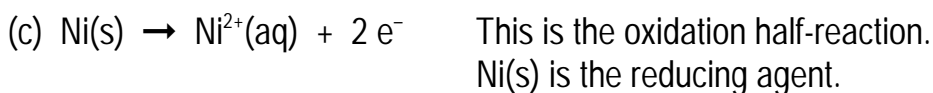
ANSWERS



The reducing agent [Co(s)] is lower in the redox table than the oxidizing agent [Cu²⁺(aq)].
Therefore, the reaction is spontaneous.



The reducing agent [I⁻(aq)] is lower in the redox table than the oxidizing agent [Br₂(l)].
Therefore, the reaction is spontaneous.



The reducing agent [Ni(s)] is higher in the redox table than the oxidizing agent [Cu²⁺(aq)].
Therefore, the reaction is not spontaneous.

2. The species present are Cu(s), H⁺(aq), Cl⁻(aq), H₂O(l).

The strongest oxidizing agent is H⁺(aq).

The strongest reducing agent is Cu(s).

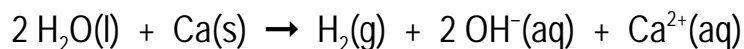
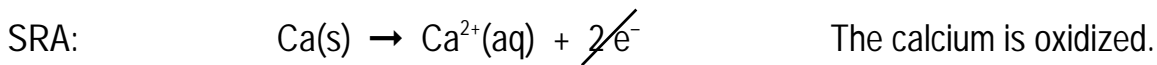
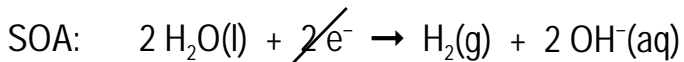
The reaction is not spontaneous [Cu(s) is higher than H⁺(aq) in the redox table].

3. The species present are Ca(s) , $\text{H}_2\text{O(l)}$.

The strongest oxidizing agent is $\text{H}_2\text{O(l)}$.

The strongest reducing agent is Ca(s) .

The reaction is spontaneous [Ca(s) is lower than $\text{H}_2\text{O(l)}$ in the redox table].



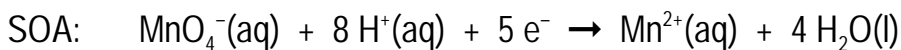
4. The species present are $\text{K}^+\text{(aq)}$, $\text{MnO}_4^-\text{(aq)}$, $\text{Cr}^{2+}\text{(aq)}$, $\text{SO}_4^{2-}\text{(aq)}$, $\text{H}_2\text{O(l)}$, $\text{H}^+\text{(aq)}$.

The strongest oxidizing agent is $\text{MnO}_4^-\text{(aq)} + \text{H}^+\text{(aq)}$.

"under acidic conditions"

The strongest reducing agent is $\text{Cr}^{2+}\text{(aq)}$.

The reaction is spontaneous [$\text{Cr}^{2+}\text{(aq)}$ is lower than $\text{MnO}_4^-\text{(aq)} + \text{H}^+\text{(aq)}$ in the redox table].



Balance the charge transfer.

