1. **019 Chapter #011**

Consider the following balanced redox reaction
$Mn^{2+}(aq) + S_2O_8^{2-}(aq) + 2H_2O(l) \rightarrow MnO_2(s) + 4H^+(aq) + 2SO_4^{2-}(aq)$.
Which of the following statements is true?

Student Response
a. $Mn^{2+}(aq)$ is the oxidizing agent and is reduced.
b. $Mn^{2+}(aq)$ is the oxidizing agent and is oxidized.
c. $Mn^{2+}(aq)$ is the reducing agent and is oxidized.
d. $Mn^{2+}(aq)$ is the reducing agent and is reduced.
e. Manganese does not change its oxidation number in this reaction.

2. **019 Chapter #050**

A voltaic cell consists of a Cd/Cd^{2+} electrode ($E°$ = -0.40 V) and a Fe/Fe^{2+} electrode ($E°$= -0.44 V). If E_{cell} = 0 and the temperature is 25°C, what is the ratio $[Fe^{2+}]/[Cd^{2+}]$?

Student Response
a. 2×10^1
b. 1×10^1
c. 1
d. 1×10^{-1}
e. 5×10^{-2}

3. **019 Chapter #001**

Complete and balance the following redox equation. When properly balanced using the smallest whole-number coefficients, the coefficient of S is:
$H_2S + HNO_3 \rightarrow S + NO$ (acidic solution)

Student

	Response
a.	1.
b.	2.
c.	3.
d.	5.
e.	6.

4. **019 Chapter #017**

What is the name given to the apparatus where reduction occurs in a cell where electricity flows?

	Student Response
a.	cathode
b.	electrode
c.	galvanic cell
d.	anode
e.	voltaic cell

5. **019 Chapter #065**

What product forms at the cathode during the electrolysis of molten lithium iodide?

	Student Response
a.	$Li^+(l)$
b.	$Li(l)$
c.	$I^-(l)$
d.	$I_2(g)$
e.	$I_3^-(l)$

6. **019 Chapter #026**

A cell can be prepared from copper and tin. What is the $E°_{cell}$ for the cell that forms from the following half-reactions?
$Cu^{2+}(aq) + 2e^- \rightleftharpoons Cu(s)$; $E° = 0.34$ V
$Sn^{4+}(aq) + 2e^- \rightleftharpoons Sn^{2+}(aq)$; $E° = 0.13$ V

	Student Response
a.	0.47 V
b.	0.21 V
c.	-0.21 V
d.	-0.47 V
e.	0.42 V

7. **019 Chapter #042**

Consider the reaction of iodine with manganese dioxide
$3I_2(s) + 2MnO_2(s) + 8OH^-(aq) \rightleftharpoons 6I^-(aq) + 2MnO_4^-(aq) + 4H_2O(l)$
The equilibrium constant for the overall reaction is 8.30×10^{-7}. Calculate $E°_{cell}$ for the reaction at 25°C.

	Student Response
a.	-0.36 V
b.	-0.18 V
c.	-0.12 V
d.	-0.060 V
e.	None of these choices is correct.

8. **019 Chapter #033**

Examine the following half-reactions and select the strongest reducing agent among the species listed.
$PbI_2(s) + 2e^- \rightleftharpoons Pb(s) + 2I^-(aq)$; $E° = -0.365$ V
$Ca^{2+}(aq) + 2e^- \rightleftharpoons Ca(s)$; $E° = -2.868$ V
$Pt^{2+}(aq) + 2e^- \rightleftharpoons Pt(s)$; $E° = 1.18$ V
$Br_2(l) + 2e^- \rightleftharpoons 2Br^-(aq)$; $E° = 1.066$ V

	Student Response

a. Pb(*s*)
b. Ca(*s*)
c. Pt(*s*)
d. $Br^-(aq)$
e. $Pt^{2+}(aq)$

9. **019 Chapter #061**

Predict the *products* obtained from electrolysis of a 1 M AlBr3 solution. Note that
$2H_2O(l) + 2e^- \rightarrow H_2(g) + 2OH^-(aq)$, E° = -0.83 V, and
$O_2(g) + 4H^+(aq) + 4e^- \rightarrow 2H_2O(l)$, E° = +1.23 V
$Br_2(l) + 2e^- \rightarrow 2Br^-(aq)$ E^o = 1.08V
$Al^{2+}(aq) + 3e^- \rightarrow Al(s)$ E^o = -1.66

Student Response
a. Al and Br_2
b. Al and O_2
c. H_2 and O_2
d. H_2 and Br_2
e. Al and H_2

10. **019 Chapter #075**

Given the following
$Cu^{2+}(aq) + 2e^- \rightarrow Cu(s)$ E^o = 0.337V
$Al^{3+}(aq) + 3\ e^- \rightarrow Al(s)$ E^o = -1.66V
$Na^+(aq) + 1e^- \rightarrow Na(s)$ E^o = -2.714V
Which of the following reactions will occur?

Student Response
a. $2Na(aq) + Cu(s) \rightarrow Cu^{2+}(aq) + 2Na(s)$ E^o_{cell} = -3.051V
b. $Al(s) + 3Na^+(aq) \rightarrow Al(aq) + 3Na(s)$ E^o_{cell} = -1.054V
c. $2Na(s) + Cu^{2+}(aq) \rightarrow Cu(s) + 2Na(aq)$ E^o_{cell} = 3.051V
d. $2Al(aq) + 3Cu(s) \rightarrow 3Cu^{2+}(aq) + 2Al(s)$ E^o_{cell} = -1.991V
e. $2Al(aq) + 3Cu(s) \rightarrow 3Cu^{2+}(aq) + 2Al(s)$ E^o_{cell} = 1.991V