

Practice Quiz - Electrochemistry

Name _____

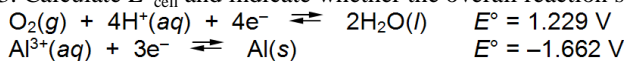
1. A voltaic cell prepared using aluminum and nickel has the following cell notation: $\text{Al}(s) | \text{Al}^{3+}(aq) || \text{Ni}^{2+}(aq) | \text{Ni}(s)$
Which of the following reactions occurs at the anode?

- A. $\text{Al}(s) \rightarrow \text{Al}^{3+}(aq) + 3e^-$ B. $\text{Al}^{3+}(aq) + 3e^- \rightarrow \text{Al}(s)$ C. $\text{Ni}(s) \rightarrow \text{Ni}^{2+}(aq) + 2e^-$
D. $\text{Ni}^{2+}(aq) + 2e^- \rightarrow \text{Ni}(s)$ E. None of these choices is correct.

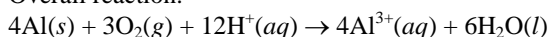
2. Which of the following solids is commonly used as an inactive electrode in electrochemical cells?

- A. zinc B. graphite C. copper D. iron E. sodium

3. Calculate E°_{cell} and indicate whether the overall reaction shown is spontaneous or nonspontaneous.

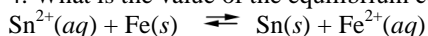


Overall reaction:



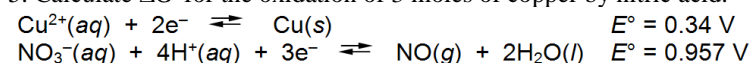
- A. $E^\circ_{\text{cell}} = -2.891 \text{ V}$, nonspontaneous B. $E^\circ_{\text{cell}} = -2.891 \text{ V}$, spontaneous C. $E^\circ_{\text{cell}} = 2.891 \text{ V}$, nonspontaneous
D. $E^\circ_{\text{cell}} = 2.891 \text{ V}$, spontaneous E. Spontaneous, but none of the values of E°_{cell} is correct.

4. What is the value of the equilibrium constant for the cell reaction below at 25°C ? $E^\circ_{\text{cell}} = 0.30 \text{ V}$



- A. 1.2×10^5 B. 1.4×10^{10} C. 8.6×10^{-6} D. 7.1×10^{-11} E. 2.3×10^{23}

5. Calculate ΔG° for the oxidation of 3 moles of copper by nitric acid.

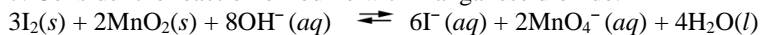


- A. -120 kJ B. -180 kJ C. -240 kJ D. -300 kJ E. -360 kJ

6. What mass of copper will be deposited when 18.2 A are passed through a CuSO_4 solution for 45.0 minutes?

- A. 16.2 g B. 33.4 g C. 40.6 g D. 81.3 g E. 163 g

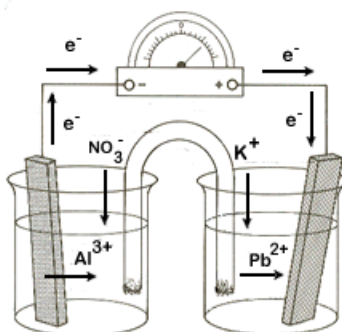
7. Consider the reaction of iodine with manganese dioxide:



The equilibrium constant for the overall reaction is 8.30×10^{-7} . Calculate ΔG° for the reaction at 25°C .

- A. -15.1 kJ B. -34.7 kJ C. 15.1 kJ D. 34.7 kJ E. None of these choices is correct.

Use the following diagram of a voltaic cell for questions 8, 9 and 10.



8. Label the anode and the cathode.

9. Write the half-reactions.

10. Write the overall cell reaction.