Exam #8 Objectives

CHEM 1100 General Chemistry II

Text Reading

Chapter 19: sections 1-8
(I do not expect you to memorize the specific battery reactions in section 6)

Homework Assignment

McGraw-Hill LearnSmart and Connect online assignments.

Concepts

1. Explain what is needed to have an oxidation-reduction reaction.
2. Assign oxidation numbers for chemical species.
3. Determine the species that has been oxidized and reduced along with the oxidizing and reducing agents.
4. Balance reactions using the ion-electron method, in acidic solutions, and in basic solutions.
5. Draw and diagram both galvanic and electrolytic electrochemical cells while identifying the anode, the cathode, the direction of the flow of electrons, the positively charged electrode, and the negatively charged electrode.
6. Demonstrate the ability the convert between mass, volts, time, and current for electrochemical cell calculations.
7. Discuss the necessity of a salt bridge in a galvanic cell.
8. Write properly balanced cell reactions from half-reactions.
9. Using a table of standard reduction potentials, calculate the standard cell potential.
10. Based on the calculated standard cell potential, predict the spontaneity of the redox reaction.
11. Calculate the standard free energy change using a standard cell potential.
12. Calculate the effect of concentration on the cell potential using the Nernst equation.
13. Demonstrate a working vocabulary of the following terms:

ampere	electrolytic cell	oxidation number
anode	electroplating	oxidizing agent
cathode	emf	reducing agent
cell potential	Faraday constant	reduction
E^{o}	galvanic cell	reduction potential
E^{0}_{cell}	half-cell	salt bridge
electrochemistry	half-reaction	standard cell potential
electrode	Nernst equation	volt
electrolysis	oxidation	

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14. Memorize and demonstrate the ability to use the following equation(s):

$$\Delta G° = -nFE^{o}_{cell}$$

15. Recognize and demonstrate the ability to use the following equation(s) (you will be given these equations):

$$E_{cell} = E^{o}_{cell} - \left(\frac{0.0592\ V}{n}\right)\log(Q) \qquad E^{o}_{cell} = \left(\frac{0.0592\ V}{n}\right)\log(K)$$