**Practice Quiz for Redox**

**Topics Covered**
**Oxidation Reduction**
**Oxidation Numbers**
**Balancing Redox Reactions Using Half Rxn Method**
**Standard Reduction Potential**
**Spontaneity of Redox Reactions based on Eo**
**Voltaic Cells**
**Oxidizing Agents and Reducing Agents**

1. Consider the following reaction: $Ba(s) + F_2(g)$ -------> $BaF_2$.
   Which of the following statements is *true*?
   a. The barium atom is gaining electrons; therefore, it is oxidized.
   b. The fluorine atom is gaining electrons; therefore, it is oxidized.
   c. The barium atom is losing electrons; therefore, it is oxidized.
   d. The fluorine atom is losing electrons; therefore, it is reduced.
   e. None of these

2. In the reaction $2Ca(s) + O_2(g)$ ------> $2CaO(s)$, calcium is _____
   a. reduced b. electrolyzed c. synthesized d. oxidized e. none of these

3. The oxidation state of selenium in $NaSeO_3$ is
   a. +7 b. +5 c. +3 d. –3 e. –5

4. In which of the following compounds does nitrogen have the most positive oxidation state?
   a. $HNO_3$ b. $NH_4Cl$ c. $N_2O$ d. $NO_2$ e. $NaNO_2$

5. In the reaction $SiO_2(s) + 2C(s)$ -------> $Si(s) + 2CO(g)$, which species is the oxidizing agent?
   a. Si b. C c. O d. $SiO_2$ e. CO

6. In the reaction $N_2(g) + 3H_2(g)$ -------> $2NH_3(g)$, nitrogen is _____.
   a. oxidized b. reduced c. synthesized d. electrolyzed e. none of these

7. Which of the following reactions does *not* involve oxidation-reduction?
   a. $CH_4 + 3O_2$ -----> $2H_2O + CO_4$
   b. $Zn + 2HCl$ ------> $ZnCl_2 + H_2$
   c. $2Na + 2H_2O$ -------> $2NaOH + H_2$
   d. $MnO_2 + 4HCl$ --------> $Cl_2 + 2H_2O + MnCl_2$
   e. All are oxidation-reduction reactions.

8. Which of the following statements is(are) true? Oxidation and reduction
   a. Cannot occur independently of each other
   b. Accompany all chemical changes
   c. Describe the loss and gain of electron(s), respectively
   d. Result in a change in the oxidation states of the species involved
   e. A, C, and D are true

9. In the reaction $Zn + H_2SO_4$ --------> $ZnSO_4 + H_2$, which element, if any, is oxidized?
   a. zinc b. hydrogen c. sulfur d. oxygen e. none is oxidized

The following questions refer to the unbalanced reaction below as it occurs in acidic solution:

____ $Cr_2O_7^{2-}(aq)$ + ____ $I^-(aq)$ ------> ____ $Cr^{3+}(aq)$ + ____ $I_2(s)$

10. Determine the coefficient for the iodide ions.
    a. 1 b. 2 c. 3 d. 6 e. 7

11. Determine the coefficient for the $Cr^{3+}$ ions.
    a. 1 b. 2 c. 3 d. 6 e. 7

12. Determine the coefficient for water in the balanced equation for the reaction.
    a. 1 b. 2 c. 3 d. 6 e. 7

13. Balance the following half-reaction that occurs in acidic solution:
    $MnO_4^-(aq)$ ----> $Mn^{2+}(aq)$

14. Balance the following reaction that takes place in acidic solution:
    $I^-(aq) + IO_3^-(aq)$ -----> $I_3^-(aq)$

15. In the balanced equation for the following redox equation, the sum of the coefficients is ___
    $Fe^{3+} + I^-$ ----> $Fe^{2+} + I_2$
    a. 4 b. 5 c. 6 d. 7 e. 8

16. When a metal corrodes, what is happening chemically?
    a. The metal atoms lose electrons.
    b. The metal atoms gain electrons.
    c. Electrons are not involved.
    d. The metal is combining with nitrogen gas.
    e. None of these

Answer the following questions for a galvanic cell that employs the reaction
$2Na(l) + S(l)$ -----> $Na_2S(s)$

17. What element is oxidized?
18. What element is reduced?
19. What element serves as the anode?
20. What element serves as the cathode?
21. A certain voltaic cell has for its cell reaction:
    $Zn + HgO \leftrightarrow ZnO + Hg$
    Which is the half-reaction occurring at the anode?
    a. $HgO + 2e^- \leftrightarrow Hg + O^{2-}$
    b. $Zn^{2+} + 2e^- \leftrightarrow Zn$
    c. $Zn \leftrightarrow Zn^{2+} + 2e^-$
    d. $ZnO + 2e^- \leftrightarrow Zn$
    e. $ZnO + 2e^- \leftrightarrow Zn$

22. Calculate $E^\circ_{cell}$ for the following reaction: $2Fe^{2+}(aq) + Cd^{2+}(aq) \leftrightarrow 2Fe^{3+}(aq) + Cd(s)$

Answers to Practice Quiz

1. C
2. D
3. B
4. A
5. D
6. B
7. E
8. E
9. A
10. D
11. B
12. E
13. $MnO_4^-(aq) + 5e^- + 8H^+(aq)$ --------> $Mn^{2+}(aq) + 4H_2O(l)$
14. $6H^+(aq) + 8I^-(aq) + IO_3^-(aq)$ ------> $3I_3^-(aq) + 3H_2O(l)$
15. D
16. A
17. Na
18. S
19. Na
20. S
21. C
22. –1.17 V