AP Chem Name _____

Date _____ Per ___

Oxidation Reduction Practice Quiz (Chapter 4.9 and 4.10)

1. In which of the following does nitrogen have an oxidation state of +4?

a) HNO_3 b) NO_2 c) N_2O d) NH_4Cl e) $NaNO_2$

2. Which of the following statements is *not* true?

a) When a metal reacts with a nonmetal, an ionic compound is formed.
b) A metal-nonmetal reaction can always be assumed to be an oxidation-reduction reaction.
c) Two nonmetals can undergo an oxidation-reduction reaction.
d) When two monmetals react, the compound formed is ionic.
e) A metal-nonmetal reaction involves electron transfer.

3. In the reaction $2Ca(s) + O_2(g) \rightarrow 2CaO(s)$, which species is oxidized?
a) O_2
b) O^{2-}
c) Ca
d) Ca^{2+}
e) none of these

4. In the reaction $2Cs(s) + Cl_2(g) \rightarrow 2CsCl(s)$, Cl_2 is
a) the reducing agent.
b) the oxidizing agent.

5. In the reaction $N_2(g) + H_2(g) \rightarrow 2NH_3(g)$, N_2 is
a) oxidized.
b) reduced.

6. In the reaction $P_4(s) + 10\ Cl_2(g) \rightarrow 4PCl_5(s)$, the reducing agent is
a) chlorine
b) PCl_5
c) phosphorus
d) Cl^-
e) none of these

7. In the reaction $C(s) + O_2(g) \rightarrow CO_2(g)$ carbon is ___.
a) the reducing agent
b) the electron acceptor
c) reduced
d) the oxidizing agent
e) more than one of these

8. Consider the following oxidation-reduction reaction:

$$Fe^{3+} + I^- \rightarrow Fe^{2+} + I_2$$

In the balanced equation, the coefficient of Fe^{2+} is
a) 1. b) 2. c) 3. d) 4. e) none of these

9. Given the following reaction in acidic media:

$$Fe^{2+} + Cr_2O_7^{2-} \rightarrow Fe^{3+} + Cr^{3+}$$

The coefficient for water in the balanced reaction is
a) 1. b) 3. c) 5. d) 7. e) none of these

10. The following unbalanced equation represents a reaction that occurs in basic solution:

$$MnO_4^{2-} + C_2O_4^{2-} \rightarrow MnO_2 + CO_3^{2-}$$

How many moles of MnO_4^{2-} are required to produce 1 mole of CO_3^{2-}?
a) 4. b) 3. c) 2. d) 1. e) none of these

11. When the following reaction is balanced in acidic solution, what is the coefficient of I_2?

$$IO_3^- + I^- \rightarrow I_2$$

a) 1 b) 2 c) 3 d) 4 e) 5

12. The MnO_4^- ion is often used to analyze for the Fe^{2+} content of an aqueous solution via the reaction of

$$MnO_4^- + Fe^{2+} \rightarrow Fe^{3+} + Mn^{2+}$$ in acidic solution.

What is the ratio of MnO_4^- : Fe^{2+} in the balanced equation?
a) 1: 1 b) 1: 2 c) 1: 3 d) 1: 4 e) 1: 5

13. Balance the following oxidation-reduction reaction:

$$Cr_2O_7^{2-} + I_2 \rightarrow Cr^{3+} + IO_3^-$$

In the balanced equation, the coefficient of water is:
a) 4 b) 17 c) 11 d) 7 e) 6

Balance each of the following equations:

14. $C_3H_5(NO_3)_3 \rightarrow N_2 + CO_2 + H_2O + O_2$

15. $KI + HNO_3 \rightarrow KNO_3 + NO + I_2 + H_2O$

16. $Cr_2O_7^{2-} + I^- \rightarrow Cr^{3+} + IO_3^-$ (acid)

17. $Zn + As_2O_3 \rightarrow AsH_3 + Zn^{2+}$ (acid)

18. $MnO_4^- + Br^- \rightarrow MnO_2 + BrO_3^-$ (base)

19. $Bi(OH)_3 + SnO_2^{2-} \rightarrow Bi + SnO_3^{2-}$ (base)

Answers

1. b
2. d
3. c
4. b
5. b
6. c
7. a
8. b
9. d
10. e
11. c
12. e
13. b
14. 4, $\rightarrow$ 6, 12, 10, 1
15. 6, 8, $\rightarrow$ 6, 2, 3, 4
16. $8H^+$, 1, 1, $\rightarrow$ 2, 1, $4H_2O$
17. $12H^+$, 6, 1, $\rightarrow$ 2, 6, $3H_2O$
18. H_2O, 2, 1, $\rightarrow$ 2, 1, $2OH^-$
19. 2, 3, $\rightarrow$ 2, 3, $3H_2O$