Name ____________________________________________ **Redox Practice**

**Part I:** Choose the *best* answer for questions 1 – 11.

1. During which process does an atom gain one or more electrons?
   (1) transmutation (2) reduction (3) oxidation (4) neutralization

2. Which balanced equation represents a redox reaction?
   (1) $PCl_5 \rightarrow PCl_3 + Cl_2$ (2) $KOH + HCl \rightarrow KCl + H_2O$
   (3) $LiBr \rightarrow Li^+ + Br^-$ (4) $Ca^{2+} + SO_4^{2-} \rightarrow CaSO_4$

3. Which half-reaction correctly represents reduction?
   (1) $Mn^{4+} \rightarrow Mn^{3+} + e^-$ (2) $Mn^{4+} \rightarrow Mn^{7+} + 3e^-$
   (3) $Mn^{4+} + e^- \rightarrow Mn^{3+}$ (4) $Mn^{4+} + 3e^- \rightarrow Mn^{7+}$

4. Given the balanced equation representing a reaction:
   $2KClO_3(s) \rightarrow 2KCl(s) + 3O_2(g)$
   The oxidation state of chlorine in this reaction changes from
   (1) –1 to +1 (2) –1 to +5 (3) +1 to –1 (4) +5 to –1

5. Which half-reaction equation represents the reduction of a potassium ion?
   (1) $K^+ + e^- \rightarrow K$ (2) $K + e^- \rightarrow K^+$ (3) $K^+ \rightarrow K + e^-$ (4) $K \rightarrow K^+ + e^-$

6. In a redox reaction, the total number of electrons lost is
   (1) less than the total number of electrons gained
   (2) greater than the total number of electrons gained
   (3) equal to the total number of electrons gained
   (4) equal to the total number of protons gained

7. Which balanced equation represents a redox reaction?
   (1) $CuCO_3(s) \rightarrow CuO(s) + CO_2(g)$
   (2) $2KClO_3(s) \rightarrow 2KCl(s) + 3O_2(g)$
   (3) $AgNO_3(aq) + KCl(aq) \rightarrow AgCl(s) + KNO_3(aq)$
   (4) $H_2SO_4(aq) + 2KOH(aq) \rightarrow K_2SO_4(aq) + 2H_2O(l)$

8. Which changes occur when $Pt^{2+}$ is reduced?
   (1) The $Pt^{2+}$ gains electrons and its oxidation number increases.
   (2) The $Pt^{2+}$ gains electrons and its oxidation number decreases.
   (3) The $Pt^{2+}$ loses electrons and its oxidation number increases.
   (4) The $Pt^{2+}$ loses electrons and its oxidation number decreases.

9. Given the balanced ionic equation representing a reaction:
   $2Al^{3+}(aq) + 3Mg(s) \rightarrow 3Mg^{2+}(aq) + 2Al(s)$
   In this reaction, electrons are transferred from
   (1) Al to $Mg^{2+}$ (2) $Al^{3+}$ to Mg (3) Mg to $Al^{3+}$ (4) $Mg^{2+}$ to Al

10. What is the oxidation number of chromium in the chromate ion, $CrO_4^{2-}$?
    (1) +6 (2) +2 (3) +3 (4) +8

11. Given the balanced equation representing a redox reaction:
    $2Al + 3Cu^{2+} \rightarrow 2Al^{3+} + 3Cu$
    Which statement is true about this reaction?
    (1) Each Al loses 2e– and each Cu2+ gains 3e–. (2) Each Al loses 3e– and each Cu2+ gains 2e–.
    (3) Each Al3+ gains 2e– and each Cu loses 3e–. (4) Each Al3+ gains 3e– and each Cu loses 2e–.

**Part II:** For each reaction, write out the oxidation and reduction half reactions.

12. $2Ca(s) + O_2(g) \rightarrow 2CaO(s)$

13. $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$

14. $Cd(s) + NiO_2(s) + H_2O(l) \rightarrow Cd(OH)_2(s) + Ni(OH)_2(s)$

15. $N_2(g) + O_2(g) \rightarrow 2NO(g)$

16. $2H_2(g) + O_2(g) \rightarrow 2H_2O(l)$

17. $4Fe(s) + 3O_2(g) \rightarrow 2Fe_2O_3$

18. $KClO_3(s) \rightarrow KCl(s) + O_2(g)$

19. $Fe(s) + 2HNO_3(aq) \rightarrow Fe(NO_3)_2(aq) + H_2(g)$

## Redox Practice – Answer Key

1. (2)
2. (1)
3. (3)
4. (4)
5. (1)
6. (3)
7. (2)
8. (2)
9. (3)
10. (1)
11. (2)

12. Red: $O_2^0 + 4e^- \rightarrow 2O^{2-}$
    Ox: $2Ca^0 + \rightarrow 2Ca^{2+} + 2e^-$

13. Red: $N_2^0 + 6e^- \rightarrow 2N^{3-}$
    Ox: $3H_2^0 + \rightarrow 6H^+ + 6e^-$

14. Red: $Ni^{4+} + 2e^- \rightarrow Ni^{2+}$
    Ox: $Cd^0 + \rightarrow C^{2+} + 2e^-$

15. Red: $O_2^0 + 4e^- \rightarrow 2O^{2-}$
    Ox: $N_2^0 + \rightarrow 2N^{2+} + 4e^-$

16. Red: $O_2^0 + 4e^- \rightarrow 2O^{2-}$
    Ox: $2H_2^0 + \rightarrow 4H^{2+} + 4e^-$

17. Red: $3O_2^0 + 12e^- \rightarrow 6O^{2-}$
    Ox: $4Fe^0 + \rightarrow 4Fe^{3+} + 12e^-$

18. Red: $2Cl^{5+} + 12e^- \rightarrow 2Cl^-$
    Ox: $6O^{2-} + \rightarrow 3O_2^0 + 12e^-$

19. Red: $2H^{+1} + 2e^- \rightarrow H_2^0$
    Ox: $Fe^0 + \rightarrow Fe^{2+} + 2e^-$