1. Given the reaction:

$$2\ Fe^{3+} + Sn^{2+} \rightarrow 2\ Fe^{2+} + Sn^{4+}$$

Which species is reduced?

A) $Fe^{3+}$ B) $Sn^{2+}$ C) $Fe^{2+}$ D) $Sn^{4+}$

2. Which half-reaction correctly represents reduction?

A) $Al(s) \rightarrow Al^{3+}(aq) + 3e^-$
B) $H_2(g) + 2e^- \rightarrow 2\ H^+(aq)$
C) $I_2(s) \rightarrow 2\ I^-(aq) + 2e^-$
D) $Cu^{2+}(aq) + 2e^- \rightarrow Cu(s)$

3. In the reaction

$$Zn + Cu^{2+} \rightarrow Zn^{2+} + Cu,$$

the $Cu^{2+}$

A) gains protons B) loses electrons
C) is reduced D) is oxidized

4. Which half-reaction correctly represents reduction?

A) $Cr^3 + 3e^- \rightarrow Cr(s)$
B) $Cr^{3+} \rightarrow Cr(s) + 3e^-$
C) $Cr(s) \rightarrow Cr^{3+} + 3e^-$
D) $Cr(s) + 3e^- \rightarrow Cr^{3+}$

5. Which occurs in the half-reaction $Na(s) \rightarrow Na^+ + e^-$?

A) Na(s) is reduced.
B) Na(s) is oxidized.
C) Na(s) gains electrons.
D) $Na^+$ is oxidized.

6. In the reaction:

$$2\ Fe^{3+}(aq) + 2\ I^-(aq) \rightarrow 2\ Fe^{2+}(aq) + I_2(s)$$

What is reduced?

A) $Fe^{2+}$ (aq) B) $Fe^{3+}$ (aq)
C) $I^-$ (aq) D) $I_2(s)$

7. Which half-reaction equation represents the reduction of an iron(II) ion?

A) $Fe^{2+} \rightarrow Fe^{3+} + e^-$ B) $Fe^{2+} + 2e^- \rightarrow Fe$
C) $Fe^{3+} + e^- \rightarrow Fe^{2+}$ D) $Fe \rightarrow Fe^{2+} + 2e^-$

8. Given the balanced equation representing a redox reaction:

$$2Al + 3Cu^{2+} \rightarrow 2Al^{3+} + 3Cu$$

Which statement is true about this reaction?

A) Each Al loses $2e^-$ and each $Cu^{2+}$ gains $3e^-$.
B) Each Al loses $3e^-$ and each $Cu^{2+}$ gains $2e^-$.
C) Each $Al^{3+}$ gains $2e^-$ and each Cu loses $3e^-$.
D) Each $Al^{3+}$ gains $3e^-$ and each Cu loses $2e^-$.

9. Given the equation:

$$2\ Al + 3\ Cu^{2+} \rightarrow 2\ Al^{3+} + 3\ Cu$$

The reduction half-reaction is

A) $Al \rightarrow Al^{3+} + 3e^-$ B) $Cu^{2+} + 2e^- \rightarrow Cu$
C) $Al + 3e^- \rightarrow Al^{3+}$ D) $Cu^{2+} \rightarrow Cu + 2e^-$

10. Which type of reaction involves the transfer of electrons?

A) alpha decay
B) double replacement
C) neutralization
D) oxidation-reduction

11. In an oxidation-reduction reaction, the number of electrons lost is

A) equal to the number of electrons gained
B) equal to the number of protons gained
C) less than the number of electrons gained
D) less than the number of protons gained

12. Given the balanced ionic equation representing a reaction:

$$2\ Al^{3+}(aq) + 3\ Mg(s) \rightarrow 3\ Mg^{2+}(aq) + 2\ Al(s)$$

In this reaction, electrons are transferred from

A) Al to $Mg^{2+}$ B) $Al^{3+}$ to Mg
C) Mg to $Al^{3+}$ D) $Mg^{2+}$ to Al

13. In the reaction:

$$Pb + 2\ Ag^{+} \rightarrow Pb^{2+} + 2\ Ag,$$

the $Ag^{+}$ is

A) reduced, and the oxidation number changes from +1 to 0
B) reduced, and the oxidation number changes from +2 to 0
C) oxidized, and the oxidation number changes from 0 to +1
D) oxidized, and the oxidation number changes from +1 to 0

14. For a redox reaction to occur, there must be a transfer of

A) protons B) neutrons
C) electrons D) ions

15. Given the reaction:

$$3\ Ag + Au^{3+} \rightarrow 3\ Ag^{+} + Au$$

Which equation correctly represents the oxidation half-reaction?

A) $3Ag + 3e^{-} \rightarrow 3Ag^{+}$
B) $3Ag \rightarrow 3Ag^{+} + 3e^{-}$
C) $Au^{3+} + 3e^{-} \rightarrow Au$
D) $Au^{3+} \rightarrow Au + 3e^{-}$

16. Which is true when an $Sn^{2+}$ ion is reduced?

A) Its oxidation number increases.
B) It gains electrons.
C) Its mass decreases.
D) It acts as a reducing agent.

17. When the equation

$$\_\_\ Pb^{2} + \_\_\ Au^{3+} \rightarrow \_\_\ Pb^{4+} + \_\_\ Au$$

is correctly balanced using the smallest whole number coefficients, the coefficient of the $Pb^{2+}$ will be

A) 1 B) 2 C) 3 D) 4

18. Given the reaction:

$$\_\_\ Mg + \_\_\ Cr^{3+} \rightarrow \_\_\ Mg2+ + \_\_\ Cr$$

When the equation is correctly balanced using smallest whole numbers, the sum of the coefficients will be

A) 10 B) 7 C) 5 D) 4

19. The chemical process in which electrons are gained by an atom or an ion is called

A) addition B) oxidation
C) reduction D) substitution

20. In which type of chemical reaction are electrons transferred?

A) organic addition
B) oxidation-reduction
C) double replacement
D) acid-base neutralization