Which redox reaction is balanced?

(a) 
$$Fe^{3+} + 2Ni \cdot 6 Fe^{2+} + 2Ni^{2+}$$

(b) 
$$2Fe^{3+} + Ni + 62Fe^{2+} + Ni^{2+}$$

(c) 
$$Fe^{3+} + Ni \cdot 6 Fe^{2+} + Ni^{2+}$$

(d) 
$$3Fe^{3+} + 2Ni + 6 3Fe^{2+} + 2Ni^{2+}$$

According to *Reference Table N*, which species is the weakest reducing agent?

(a) Au(s)

(c)  $F_2(g)$ 

(b) Li<sup>+</sup>

(d) F

Which is the oxidizing agent in the reaction:

$$2Fe^{2+} + Cl_2 6 2Fe^{3+} + 2Cl^{-1}$$

(a)  $Fe^{2+}$ 

(c)  $Fe^{3+}$ 

(b) Cl<sub>2</sub>

(d) Cl<sup>-</sup>

Which ion can be both an oxidizing agent and a reducing agent?

(a) Sn<sup>2+</sup>

(b) Cu<sup>2+</sup>

(c) Al<sup>3+</sup>
(d) Fe<sup>3+</sup>

Which reaction will take place spontaneously?

(a) 
$$Cu + 2H^+ 6 Cu^{2+} + H_2$$

(b) 
$$2Au + 6H^{+} 6 2Au^{3+} + 3H_{2}$$

(c) 
$$Pb + 2H^+ 6 Pb^{2+} + H_2$$

(d) 
$$2Ag + 2H^{+} 6 2Ag^{+} + H_{2}$$

Given the reaction:

$$\underline{Mn} + \underline{MnO_4} + \underline{H}^+ 6 \underline{Mn^{2+}} + \underline{H}_2O$$

When the equation is completely balanced using smallest whole numbers, the coefficient of the MnO<sub>4</sub><sup>-</sup> will be

(a) 1

(c) 3

(b) 2

(d) 4

Which half-reaction correctly represents reduction?

(a) 
$$Ca^{2+} 6 Ca + 2e^{-}$$

(b) 
$$Ca^{2+} + 2e^{-} 6 Ca$$

(c) 
$$2F^{-} + 2e^{-} 6F_{2}$$

(d) 
$$2F^-6F_2 + 2e^-$$

Given the reaction:

$$Mg + 2H^{+} 6 Mg^{2+} + H_{2}$$

Which particle is the reducing agent?

(a) H<sup>+</sup>

(c)  $Mg^{2+}$ 

(b) Mg

(d)  $H_2$ 

According to Reference Table N, which species can reduce Cr<sup>3+</sup> ions?

(c) A1

(a) Fe<sup>2+</sup>(b) Sn<sup>2+</sup>

(d) Ni

Based of *Reference Table N*, which of the following ions in aqueous solution is most easily oxidized?

(a) I<sup>-</sup>

(c) Cl

(b) Br<sup>-</sup>

(d) F

In the reaction:

$$Cu^0 + 2H_2SO_4 6 CuSO_4 + SO_2 + 2H_2O$$

copper is

- (a) reduced and is the oxidizing agent
- (b) reduced and is the reducing agent
- (c) oxidized and is the oxidizing agent
- (d) oxidized and is the reducing agent

According to *Reference Table N*, which ion will react spontaneously with Ag?

(a) 
$$Mn^{2+}$$

(c) 
$$A1^{3+}$$

(b) 
$$Mg^{2+}$$

Given the reaction:

$$3Ag + Au^{3+} 6 3Ag^{+} + Au$$

Which equation correctly represents the oxidation half-reaction?

(a) 
$$3Ag + 3e^{-} 6 3Ag^{+}$$

(b) 
$$3Ag 6 3Ag^{+} + 3e^{-}$$

(c) 
$$Au^{3+} + 3e^{-} 6 Au$$

(d) 
$$Au^{3+} 6 Au + 3e^{-}$$

According to *Reference Table N*, which molecule is most easily reduced?

(a) Br<sub>2</sub>

(c)  $F_2$ 

(b) Cl<sub>2</sub>

(d)  $I_2$ 

Given the reaction:

$$_{HNO_3} + _{H_3PO_3} 6 _{NO} + _{H_3PO_4} + H_{2O}$$

When the equation is completely balanced using smallest whole numbers, the coefficient of H<sub>3</sub>PO<sub>4</sub> will be

(a) 1

(c) 3

(b) 2

(d) 4

Given the reaction:

$$_{Fe^{2+}} + ClO_{3}^{-} + H^{+} 6 _{Fe^{3+}} + _{Cl^{-}} + H_{2}O$$

When the equation is completely balanced using smallest whole numbers, the coefficient of Fe<sup>2+</sup> will be

(a) 7

(c) 5

(b) 6

(d) 4

According to Reference Table N, which species can reduce Fe<sup>3+</sup> to Fe<sup>2+</sup>?

(a) Au(s)

(c) Br

(b) Ag(s)

(d) I-

Based of *Reference Table N*, which metal will react with water liberating hydrogen gas?

(a) Li

(c) Hg

(b) Ni

(d) Sn