

CHAPTER 9 SELF-QUIZ

(Page 725)

1. True
2. False: ~~Reduction~~ *Oxidation* is a process in which electrons are lost or donated by an atom or ion in a redox reaction.
3. True
4. False: The strongest oxidizing agent in a galvanic cell is above the strongest reducing agent in the redox table producing a cell potential that is ~~negative~~ *positive*.
5. False: The ~~cathode~~ *anode* of a cell is the electrode where electrons are lost or given up by the reducing agent.
6. True
7. False: The cell potential of a standard lead–nickel cell is ~~-0.39~~ *+0.13 V*.
8. True
9. True
10. (a)
11. (d)
12. (c)
13. (a)
14. (b)
15. (d)
16. (c)
17. (c)
18. (b)

CHAPTER 9 REVIEW

(Page 726)

Understanding Concepts

1. (a) Oxidation is a chemical process involving a loss of electrons and an increase in oxidation number.
(b) Reduction is a chemical process involving a gain of electrons and a decrease in oxidation number.
(c) A redox reaction is the transfer of electrons from a reducing agent to an oxidizing agent.
2. (a) $\text{Fe}_{(\text{aq})}^{3+} + \text{e}^{-} \rightarrow \text{Fe}_{(\text{aq})}^{2+}$ (reduction)
 $\text{Ni}_{(\text{s})} \rightarrow \text{Ni}_{(\text{aq})}^{2+} + 2 \text{e}^{-}$ (oxidation)
(b) $\text{Br}_{2(\text{aq})} + 2 \text{e}^{-} \rightarrow 2 \text{Br}_{(\text{aq})}^{-}$ (reduction)
 $2 \text{I}_{(\text{aq})}^{-} \rightarrow \text{I}_{2(\text{s})} + 2 \text{e}^{-}$ (oxidation)
(c) $\text{Pd}_{(\text{aq})}^{2+} + 2 \text{e}^{-} \rightarrow \text{Pd}_{(\text{s})}$ (reduction)
 $\text{Sn}_{(\text{aq})}^{2+} \rightarrow \text{Sn}_{(\text{aq})}^{4+} + 2 \text{e}^{-}$ (oxidation)
3. (a) 0
(b) -1
(c) +1
(d) +1
(e) -1
4. (a)
$$\begin{array}{ccccccc} 0 & +3 & -2 & & 0 & +3 & -2 \\ 2 \text{Al}_{(\text{s})} & + & \text{Fe}_2\text{O}_{3(\text{s})} & \rightarrow & 2 \text{Fe}_{(\text{s})} & + & \text{Al}_2\text{O}_{3(\text{s})} \end{array}$$

 $\text{Al}_{(\text{s})}$ is oxidized, $\text{Fe}_{(\text{s})}^{3+}$ is reduced
(b)
$$\begin{array}{ccccccc} 0 & & +1 & & +3 & & 0 \\ \text{In}_{(\text{s})} & + & 3 \text{Tl}_{(\text{aq})}^{+} & \rightarrow & \text{In}_{(\text{aq})}^{3+} & + & 3 \text{Tl}_{(\text{s})} \end{array}$$

 $\text{In}_{(\text{s})}$ is oxidized, $\text{Tl}_{(\text{aq})}^{+}$ is reduced