

Redox Basics

Name: _____

1) A redox reaction *always* involves

- 1) the formation of ions
- 2) the transfer of protons
- 3) a change of phase
- 4) a change in oxidation number

2) In any oxidation-reduction reaction, the total number of electrons gained is

- 1) less than the total number of electrons lost
- 2) equal to the total number of electrons lost
- 3) greater than the total number of electrons lost
- 4) unrelated to the total number of electrons lost

3) Which quantities are conserved in *all* oxidation-reduction reactions?

- 1) charge, only
- 2) both charge and mass
- 3) mass, only
- 4) neither charge nor mass

4) A redox reaction is a reaction in which

- 1) only reduction occurs
- 2) reduction occurs first and then oxidation occurs
- 3) reduction and oxidation occur at the same time
- 4) only oxidation occurs

5) Which equation represents a redox reaction?

- 1) $\text{OH}^- + \text{H}^+ \rightarrow \text{H}_2\text{O}$
- 2) $\text{O}_2 + 2\text{H}_2 \rightarrow 2\text{H}_2\text{O}$ *one elements*
- 3) $\text{SO}_2 + \text{H}_2\text{O} \rightarrow \text{H}_2\text{SO}_3$
- 4) $\text{SO}_3^{2-} + 2\text{H}^+ \rightarrow \text{H}_2\text{SO}_3$

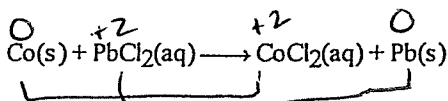
6) Which of the following is a redox reaction?

- 1) $\text{Mg}^{2+}(\text{aq}) + 2\text{OH}^-(\text{aq}) \rightarrow \text{Mg}(\text{OH})_2$
- 2) $\text{Mg} + 2\text{HCl} \rightarrow \text{MgCl}_2 + \text{H}_2$
- 3) $\text{MgCl}_2 + 6\text{H}_2\text{O} \rightarrow \text{MgCl}_2 \cdot 6\text{H}_2\text{O}$
- 4) $\text{Mg}(\text{OH})_2 + 2\text{HCl} \rightarrow \text{MgCl}_2 + 2\text{H}_2\text{O}$

7) The reaction $\text{BaCO}_3 \rightarrow \text{BaO} + \text{CO}_2$ involves

- 1) neither oxidation nor reduction
- 2) reduction, only
- 3) both oxidation and reduction
- 4) oxidation, only

8) Given the redox reaction:



Which of the following statements correctly describes the oxidation and reduction that occur?

- 1) Co(s) is oxidized and Cl⁻(aq) is reduced.
- 2) Co(s) is reduced and Cl⁻(aq) is oxidized.
- 3) Co(s) is reduced and Pb²⁺(aq) is oxidized.
- 4) Co(s) is oxidized and Pb²⁺(aq) is reduced.

9) Which half-reaction shows both the conservation of mass and the conservation of charge?

- 1) $2\text{Br}^- + 2\text{e}^- \rightarrow \text{Br}_2$
- 2) $\text{Br}^- \rightarrow \text{Br}_2 + 2\text{e}^-$
- 3) $\text{Cl}_2 \rightarrow \text{Cl}^- + 2\text{e}^-$
- 4) $\text{Cl}_2 + 2\text{e}^- \rightarrow 2\text{Cl}^-$

10) An oxide ion is oxidized to an oxygen atom by *LEO*

- 1) gaining protons
- 2) losing electrons
- 3) losing protons
- 4) gaining electrons

11) In the reaction $2\text{Al}(\text{s}) + 3\text{Cu}^{2+}(\text{aq}) \rightarrow 2\text{Al}^{3+}(\text{aq}) + 3\text{Cu}(\text{s})$, the Al(s)

- 1) gains electrons
- 2) loses electrons
- 3) loses protons
- 4) gains protons

12) In the reaction $\text{Ni} + \text{CuSO}_4 \rightarrow \text{Cu} + \text{NiSO}_4$, each nickel atom

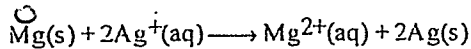
- 1) gains one electron, only
- 2) loses one electron, only
- 3) loses two electrons
- 4) gains two electrons

2) 13) In the reaction $\overset{0}{\text{Mg}} + 2\text{HCl} \longrightarrow \overset{+2}{\text{MgCl}_2} + \text{H}_2$, the magnesium

- 1) gains electrons and is reduced
 2) loses electrons and is oxidized

- 3) gains electrons and is oxidized
 4) loses electrons and is reduced

3) 14) Which species undergoes a loss of electrons?

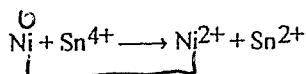


- 1) $\text{Mg}^{2+}(\text{aq})$ 2) $\text{Ag}(\text{s})$

3) $\text{Mg}(\text{s})$

4) $\text{Ag}^+(\text{aq})$

4) 15) Given the redox reaction:



Which species is oxidized?

- 1) Ni^{2+} 2) Sn^{2+}

3) Sn^{4+}

4) Ni

4) 16) In the reaction $\overset{0}{\text{Zn}} + \overset{+2}{\text{Cu}}^{2+} \longrightarrow \overset{+2}{\text{Zn}}^{2+} + \overset{0}{\text{Cu}}$, which species is oxidized?

- 1) Zn^{2+} 2) Cu^{2+}

3) Cu^0

4) Zn^0

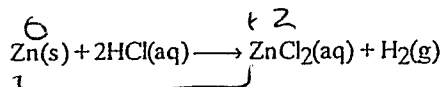
2) 17) In the reaction $2\text{K} + \text{Cl}_2 \longrightarrow 2\text{KCl}$, the species oxidized is

- 1) Cl_2 2) K

3) K^+

4) Cl^-

4) 18) Given the reaction:



Which equation represents the correct oxidation half-reaction?

1) $2\text{Cl}^- \longrightarrow \text{Cl}_2(\text{g}) + 2\text{e}^-$

3) $2\text{H}^+ + 2\text{e}^- \longrightarrow \text{H}_2(\text{g})$

2) $\text{Zn}^{2+} + 2\text{e}^- \longrightarrow \text{Zn}(\text{s})$

4) $\text{Zn}(\text{s}) \longrightarrow \text{Zn}^{2+} + 2\text{e}^-$

2) 19) Which half-reaction correctly represents the oxidation which occurs in the reaction $\text{Cl}_2 + 2\text{Br}^-(\text{aq}) \longrightarrow 2\text{Cl}^-(\text{aq}) + \text{Br}_2$?

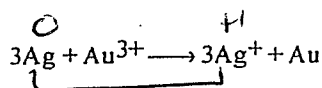
1) $\text{Cl}_2 + 2\text{e}^- \longrightarrow 2\text{Cl}^-$

3) $\text{Cl}_2 \longrightarrow 2\text{Cl}^- + 2\text{e}^-$

2) $2\text{Br}^- \longrightarrow \text{Br}_2 + 2\text{e}^-$

4) $2\text{Br}^- + 2\text{e}^- \longrightarrow \text{Br}_2$

1) 20) Given the reaction:



Which equation correctly represents the oxidation half-reaction?

1) $3\text{Ag} \longrightarrow 3\text{Ag}^+ + 3\text{e}^-$

3) $3\text{Ag} + 3\text{e}^- \longrightarrow 3\text{Ag}^+$

2) $\text{Au}^{3+} \longrightarrow \text{Au} + 3\text{e}^-$

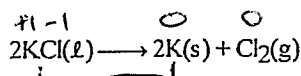
4) $\text{Au}^{3+} + 3\text{e}^- \longrightarrow \text{Au}$

3) 21) In the reaction $\overset{0}{\text{Pb}} + \overset{+2}{\text{Cu}}^{2+} \longrightarrow \overset{+2}{\text{Pb}}^{2+} + \overset{0}{\text{Cu}}$, the Cu^{2+} ions

- 1) loses protons
 2) loses electrons

- 3) gains electrons
 4) gains protons

2) 22) Given the reaction:



In this reaction, the K^+ ions are

- 1) reduced by losing electrons
 2) reduced by gaining electrons

- 3) oxidized by losing electrons
 4) oxidized by gaining electrons