

1. Which balanced equation represents a redox reaction?
- A) $\text{Mg} + \text{Cl}_2 \rightarrow \text{MgCl}_2$
 B) $\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca(OH)}_2$
 C) $\text{HNO}_3 + \text{NaOH} \rightarrow \text{NaNO}_3 + \text{H}_2\text{O}$
 D) $\text{NaCl} + \text{AgNO}_3 \rightarrow \text{AgCl} + \text{NaNO}_3$
2. Which equation represents an oxidation-reduction reaction?
- A) $\text{H}^+ + \text{OH}^- \rightarrow \text{H}_2\text{O}$
 B) ${}^{238}_{92}\text{U} \rightarrow {}^{234}_{90}\text{Th} + {}^4_2\text{He}$
 C) $\text{Zn} + \text{Sn}^{4+} \rightarrow \text{Zn}^{2+} + \text{Sn}^{2+}$
 D) $3\text{AgNO}_3 + \text{Li}_3\text{PO}_4 \rightarrow \text{Ag}_3\text{PO}_4 + 3\text{LiNO}_3$
3. Which balanced equation represents an oxidation-reduction reaction?
- A) $\text{Ba(NO}_3)_2 + \text{Na}_2\text{SO}_4 \rightarrow \text{BaSO}_4 + 2\text{NaNO}_3$
 B) $\text{H}_3\text{PO}_4 + 3\text{KOH} \rightarrow \text{K}_3\text{PO}_4 + 3\text{H}_2\text{O}$
 C) $\text{Fe(s)} + \text{S(s)} \rightarrow \text{FeS(s)}$
 D) $\text{NH}_3(\text{g}) + \text{HCl(g)} \rightarrow \text{NH}_4\text{Cl(s)}$
4. Which balanced equation represents a redox reaction?
- A) $\text{AgNO}_3(\text{aq}) + \text{NaCl(aq)} \rightarrow \text{AgCl(s)} + \text{NaNO}_3(\text{aq})$
 B) $\text{H}_2\text{CO}_3(\text{aq}) \rightarrow \text{H}_2\text{O}(\ell) + \text{CO}_2(\text{g})$
 C) $\text{NaOH(aq)} + \text{HCl(aq)} \rightarrow \text{NaCl(aq)} + \text{H}_2\text{O}(\ell)$
 D) $\text{Mg(s)} + 2\text{HCl(aq)} \rightarrow \text{MgCl}_2(\text{aq}) + \text{H}_2(\text{g})$
5. Which balanced equation represents a redox reaction?
- A) $\text{PCl}_5 \rightarrow \text{PCl}_3 + \text{Cl}_2$
 B) $\text{KOH} + \text{HCl} \rightarrow \text{KCl} + \text{H}_2\text{O}$
 C) $\text{LiBr} \rightarrow \text{Li}^+ + \text{Br}^-$
 D) $\text{Ca}^{2+} + \text{SO}_4^{2-} \rightarrow \text{CaSO}_4$
6. Which equation represents an oxidation-reduction reaction?
- A) $\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$
 B) $\text{H}_2\text{SO}_4 + \text{Ca(OH)}_2 \rightarrow \text{CaSO}_4 + 2\text{H}_2\text{O}$
 C) $\text{MgCrO}_4 + \text{BaCl}_2 \rightarrow \text{MgCl}_2 + \text{BaCrO}_4$
 D) $\text{Zn(NO}_3)_2 + \text{Na}_2\text{CO}_3 \rightarrow 2\text{NaNO}_3 + \text{ZnCO}_3$
7. In which reaction are electrons transferred from one reactant to another reactant?
- A) $2\text{Ca(s)} + \text{O}_2(\text{g}) \rightarrow 2\text{CaO(s)}$
 B) $\text{AgNO}_3(\text{aq}) + \text{KCl(aq)} \rightarrow \text{AgCl(s)} + \text{KNO}_3(\text{aq})$
 C) $\text{HCl(aq)} + \text{NaOH(aq)} \rightarrow \text{NaCl(aq)} + \text{H}_2\text{O}(\ell)$
 D) $\text{H}_3\text{O}^+(\text{aq}) + \text{OH}^-(\text{aq}) \rightarrow 2\text{H}_2\text{O}(\ell)$
8. Which balanced equation represents a redox reaction?
- A) $\text{AgNO}_3 + \text{NaCl} \rightarrow \text{AgCl} + \text{NaNO}_3$
 B) $\text{BaCl}_2 + \text{K}_2\text{CO}_3 \rightarrow \text{BaCO}_3 + 2\text{KCl}$
 C) $\text{CuO} + \text{CO} \rightarrow \text{Cu} + \text{CO}_2$
 D) $\text{HCl} + \text{KOH} \rightarrow \text{KCl} + \text{H}_2\text{O}$
9. Which reaction is an example of an oxidation-reduction reaction?
- A) $\text{AgNO}_3 + \text{KI} \rightarrow \text{AgI} + \text{KNO}_3$
 B) $\text{Cu} + 2\text{AgNO}_3 \rightarrow \text{Cu(NO}_3)_2 + 2\text{Ag}$
 C) $2\text{KOH} + \text{H}_2\text{SO}_4 \rightarrow \text{K}_2\text{SO}_4 + 2\text{H}_2\text{O}$
 D) $\text{Ba(OH)}_2 + 2\text{HCl} \rightarrow \text{BaCl}_2 + 2\text{H}_2\text{O}$
10. Which reaction is an example of oxidation-reduction?
- A) $\text{KOH} + \text{HCl} \rightarrow \text{KCl} + \text{H}_2\text{O}$
 B) $2\text{KCl} \rightarrow 2\text{K} + \text{Cl}_2$
 C) $\text{BaCl}_2 + \text{K}_2\text{SO}_4 \rightarrow 2\text{KCl} + \text{BaSO}_4$
 D) $\text{KCl} + \text{AgNO}_3 \rightarrow \text{AgCl} + \text{KNO}_3$
11. In the reaction:
- $$2\text{CrO}_4^{2-}(\text{aq}) + 2\text{H}^+(\text{aq}) \rightarrow \text{Cr}_2\text{O}_7^{2-}(\text{aq}) + \text{H}_2\text{O}(\ell),$$
- the oxidation number of chromium
- A) decreases B) increases
 C) remains the same
12. Which equation represents an oxidation-reduction reaction?
- A) $\text{HCl} + \text{KOH} \rightarrow \text{KCl} + \text{H}_2\text{O}$
 B) $4\text{HCl} + \text{MnO}_2 \rightarrow \text{MnCl}_2 + 2\text{H}_2\text{O} + \text{Cl}_2$
 C) $2\text{HCl} + \text{CaCO}_3 \rightarrow \text{CaCl}_2 + \text{H}_2\text{O} + \text{CO}_2$
 D) $2\text{HCl} + \text{FeS} \rightarrow \text{FeCl}_2 + \text{H}_2\text{S}$

13. Which is a redox reaction?

- A) $\text{H}^+ + \text{Cl}^- \rightarrow \text{HCl}$
- B) $\text{NaOH} + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O}$
- C) $\text{Fe} + 2 \text{HCl} \rightarrow \text{FeCl}_2 + \text{H}_2$
- D) $\text{MgO} + \text{H}_2\text{SO}_4 \rightarrow \text{MgSO}_4 + \text{H}_2\text{O}$

14. Which is a redox reaction?

- A) $\text{Ba}^{2+} + \text{SO}_4^{2-} \rightarrow \text{BaSO}_4$
- B) $\text{H}^+ + \text{OH}^- \rightarrow \text{H}_2\text{O}$
- C) $\text{Sn}^0 + \text{Sn}^{4+} \rightarrow 2 \text{Sn}^{2+}$
- D) $\text{H}^+ + \text{NH}_3 \rightarrow \text{NH}_4^+$

15. Which is a redox reaction?

- A) $2 \text{KBr} + \text{F}_2 \rightarrow 2 \text{KF} + \text{Br}_2$
- B) $2 \text{HCl} + \text{Mg}(\text{OH})_2 \rightarrow 2 \text{HOH} + \text{MgCl}_2$
- C) $2 \text{NaCl} + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + 2 \text{HCl}$
- D) $\text{Ca}(\text{OH})_2 + \text{Pb}(\text{NO}_3)_2 \rightarrow \text{Ca}(\text{NO}_3)_2 + \text{Pb}(\text{OH})_2$

16. Which equation represents a redox reaction?

- A) $\text{MgO} + \text{H}_2\text{O} \rightarrow \text{Mg}(\text{OH})_2$
- B) $\text{FeS} + 2 \text{HCl} \rightarrow \text{FeCl}_2 + \text{H}_2\text{S}$
- C) $\text{Zn} + \text{CuSO}_4 \rightarrow \text{ZnSO}_4 + \text{Cu}$
- D) $2 \text{O}_3 \rightarrow 3 \text{O}_2$

17. Which equation represents a redox reaction?

- A) $\text{SO}_2 + \text{H}_2\text{O} \rightarrow \text{H}_2\text{SO}_3$
- B) $\text{SO}_3^{2-} + 2 \text{H}^+ \rightarrow \text{H}_2\text{SO}_3$
- C) $\text{O}_2 + 2 \text{H}_2 \rightarrow 2 \text{H}_2\text{O}$
- D) $\text{OH}^- + \text{H}^+ \rightarrow \text{H}_2\text{O}$

18. Which is a redox reaction?

- A) $\text{Mg} + 2 \text{HCl} \rightarrow \text{MgCl}_2 + \text{H}_2$
- B) $\text{Mg}(\text{OH})_2 + 2 \text{HCl} \rightarrow \text{MgCl}_2 + 2 \text{H}_2\text{O}$
- C) $\text{Mg}^{2+}(\text{aq}) + 2 \text{OH}^-(\text{aq}) \rightarrow \text{Mg}(\text{OH})_2$
- D) $\text{MgCl}_2 + 6 \text{H}_2\text{O} \rightarrow \text{MgCl}_2 \cdot 6 \text{H}_2\text{O}$

19. Given the equations *A*, *B*, *C*, and *D*:

- (*A*) $\text{AgNO}_3 + \text{NaCl} \rightarrow \text{AgCl} + \text{NaNO}_3$
- (*B*) $\text{Cl}_2 + \text{H}_2\text{O} \rightarrow \text{HClO} + \text{HCl}$
- (*C*) $\text{CuO} + \text{CO} \rightarrow \text{CO}_2 + \text{Cu}$
- (*D*) $\text{NaOH} + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O}$

Which two equations represent redox reactions?

- A) *A* and *B*
- B) *B* and *C*
- C) *C* and *A*
- D) *D* and *B*

20. Which equation represents a redox reaction?

- A) $2 \text{Na}^+ + \text{S}^{2-} \rightarrow \text{Na}_2\text{S}$
- B) $\text{H}^+ + \text{C}_2\text{H}_3\text{O}_2^- \rightarrow \text{HC}_2\text{H}_3\text{O}_2$
- C) $\text{NH}_3 + \text{H}^+ + \text{Cl}^- \rightarrow \text{NH}_4^+ + \text{Cl}^-$
- D) $\text{Cu} + 2 \text{Ag}^+ + 2 \text{NO}_3^- \rightarrow 2 \text{Ag} + \text{Cu}^{2+} + 2 \text{NO}_3^-$