Oxidation Numbers Quiz Answer Key PDF

Oxidation Numbers Quiz Answer Key PDF

Disclaimer: The oxidation numbers quiz answer key pdf was generated with the help of StudyBlaze AI. Please be aware that AI can make mistakes. Please consult your teacher if you're unsure about your solution or think there might have been a mistake. Or reach out directly to the StudyBlaze team at max@studyblaze.io.

What is the oxidation number of an element in its elemental form?

A. +1
B. 0 ✓
C. -1
D. +2

Which elements can have multiple oxidation states? (Select all that apply)

A. Iron ✓
B. Oxygen
C. Copper ✓
D. Sodium

Which of the following elements always has an oxidation number of +1 in compounds?

A. Oxygen
B. Hydrogen
C. Sodium ✓
D. Chlorine

Which of the following statements about oxidation numbers is true? (Select all that apply)

A. The sum of oxidation numbers in a neutral compound is zero. ✓
B. The oxidation number of hydrogen is always +1.
C. The oxidation number of a monatomic ion is equal to its charge. ✓
D. Oxygen always has an oxidation number of -2.

What is the typical oxidation number of oxygen in most compounds?

A. +1
B. 0
C. -1
D. -2 ✓

What is the oxidation number of sulfur in SO_4^{2-}?

A. +2
B. +4
C. +6 ✓
D. -2

Which of the following compounds contains oxygen with an oxidation number of -1?

A. H_2O
B. CO_2
C. Na_2O_2 ✓
D. O_2

In the compound $KMnO_4$, what is the oxidation number of manganese (Mn)?

A. +2
B. +4
C. +7 ✓
D. +5

What is the oxidation number of chlorine in Cl_2?

A. +1
B. 0 ✓
C. -1
D. +2

Which of the following elements typically have a fixed oxidation number in compounds? (Select all that apply)

A. Sodium ✓
B. Oxygen

C. Chlorine

D. Potassium ✓

In which of the following compounds does oxygen have an oxidation number different from -2? (Select all that apply)

A. H_2O

B. H_2O_2 ✓

C. Na_2O_2 ✓

D. CO_2

In which compound does hydrogen have an oxidation number of -1?

A. H_2O

B. HCl

C. NaH ✓

D. NH_3

Explain why the oxidation number of oxygen is typically -2 in compounds, but -1 in peroxides.

Oxygen is typically -2 due to its high electronegativity, but in peroxides, each oxygen is bonded to another oxygen, sharing electrons equally, resulting in a -1 oxidation state.

Describe the process of determining the oxidation number of an element in a compound.

Assign known oxidation numbers based on rules, use algebra to solve for unknowns, ensuring the sum matches the compound's charge.

How do oxidation numbers help in balancing redox reactions? Provide an example.

They identify oxidized and reduced species, allowing for the balancing of electron transfer. Example: Balancing MnO_4^- + Fe^{2+} → Mn^{2+} + Fe^{3+}.

Why do transition metals often have multiple oxidation states? Give an example of a transition metal and its oxidation states.

Transition metals have d orbitals that allow for various electron configurations. Example: Iron can be +2 or +3.

Discuss the significance of oxidation numbers in identifying oxidizing and reducing agents in a chemical reaction.

Oxidation numbers indicate electron transfer; the substance whose oxidation number decreases is reduced (oxidizing agent), and vice versa.

Explain how the oxidation number of an element in a polyatomic ion is determined, using sulfate (SO_4^{2-}) as an example.

Assign known oxidation numbers (O = -2), solve for the unknown (S), ensuring the sum equals the ion's charge. For SO_4^{2-}, S is +6.

Which of the following compounds contain hydrogen with an oxidation number of +1? (Select all that apply)

A. H_2O ✓

B. CH_4 ✓

C. NaH

D. HCl ✓

In which of the following ions is the sum of oxidation numbers equal to the charge of the ion? (Select all that apply)

A. NH_4^+ ✓

B. SO_4^{2-} ✓

C. NO_3^- ✓

D. ClO_4^- ✓