Oxidation and Reduction

New Regents original practice • Name: _____ Date: _____
Show your work for written answers.

Oxidation is loss of electrons. Reduction is gain of electrons. In a balanced overall redox reaction, the electrons lost equal the electrons gained.

1 Which half reaction shows oxidation?

(1) $Zn \rightarrow Zn^{2+} + 2e^-$

(2) $Cu^{2+} + 2e^- \rightarrow Cu$

(3) $Ag^+ + e^- \rightarrow Ag$

(4) $Fe^{3+} + e^- \rightarrow Fe^{2+}$

2 Explain how you know Cu^{2+} is reduced when it becomes Cu. [1]

Answer and work

_____

_____

3 How many electrons are lost when three Zn atoms become three Zn^{2+} ions in the model? [1]

Answer and work

_____

_____

4 Where do electrons appear in a reduction half reaction?

(1) On the reactant side

(2) On the product side

(3) On both sides in equal number

(4) Only in the name of the substance

Combining Half Reactions

Use the information below to answer the questions.

A reaction model pairs $Zn \rightarrow Zn^{2+} + 2e^-$ with $Ag^+ + e^- \rightarrow Ag$. Combine the halves so the transferred electrons cancel.

Half reaction	Electrons per atom or ion
Zinc half reaction	2 released per Zn
Silver half reaction	1 consumed per Ag^+

5 How many Ag^+ ions can be reduced by the electrons from one Zn atom?

(1) 1

(2) 2

(3) 3

(4) 4

6 Write the overall equation for the transfer. Show why no free electrons appear in the final equation. [1]

Answer and work

7 Which substance is oxidized in the overall equation?

(1) Zn

(2) Ag^+

(3) Zn^{2+}

(4) Ag

8 Use the coefficients to show that total charge is the same before and after the overall reaction. [1]

Answer and work