Oxidation Numbers

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

An element alone has oxidation number 0. A monatomic ion's oxidation number equals its charge. In the compounds here, oxygen has oxidation number −2 and chloride has −1.

1 What is the oxidation number of Fe in elemental Fe(s)?

(1) −2

(2) 0

(3) +2

(4) +3

2 Calculate the oxidation number of iron in Fe_2O_3. Show how the oxidation numbers sum in this neutral formula. [1]

Answer and work

_____

_____

3 What is the oxidation number of iron in $FeCl_2$?

(1) −2

(2) −1

(3) +2

(4) +3

4 In a model, an Fe^{3+} ion becomes Fe^{2+}. State whether the iron is oxidized or reduced and explain using its oxidation number. [1]

Answer and work

_____

_____

Iron Compound Labels

Use the information below to answer the questions.

A set of sample labels lists these neutral iron compounds. Use the indicated oxidation number for the other element in each compound to compare iron.

Sample	**Formula**	**Oxidation number of other element**
P	FeO	O is −2
Q	Fe_2O_3	O is −2
R	$FeCl_3$	Cl is −1

5 Which samples have iron at the same oxidation number?

(1) P and Q
(2) P and R
(3) Q and R
(4) P, Q, and R

6 Show the oxidation-number balance for $FeCl_3$ and state iron’s oxidation number. [1]

Answer and work

7 If iron changes from the state in P to the state in Q, what happens to its oxidation number?

(1) It increases from +2 to +3.
(2) It decreases from +3 to +2.
(3) It stays at +2.
(4) It changes from +2 to zero.

8 A student assigns +6 to each Fe in sample Q. Explain how the formula shows the error. [1]

Answer and work