electrochemistry - the study of ______-related applications of ______

oxidation numbers -

- numbers assigned to the ______ in a chemical ______
 that give the ______ charge of the ______.
- In ionic compounds oxidation # = _____
- In molecular compounds oxidation # is based on _____
- Oxidation #'s are written with the _____ first and then the _____.

Rules For Assigning Oxidation Numbers:

situation	oxidation #		
elements in a compound:			

Example:

2 NaCl + MgO \rightarrow Na₂O + MgCl₂

CuSO₄

 $Mg(NO_3)_2$

An	re	eaction (reaction) is any reaction
in which atoms or io	ons undergo a		in	·
Is this a redox read	ction? 2	Na + ($ z_2 \rightarrow$	2 NaCl
When an or	in a read	ction has ar	າ	in
number, it has unde 1 c	ergone the proce or more	ess ot		by
The oxidation # of	Na went from	to	, so N	la was
When an or	in a read	ction has a		in
number, it has unde	ergone the proce	ess of		by
1 c The oxidation # of	or more Cl went from _	to	 , so Cl	was
	I	FO savs	GFR	
	K			
electrons		-		electrons
Chemistry Assignm that are oxidized a	ent #3: On Ass nd squares arou	signment # nd those tl	2, draw c hat are r	circles around the reactants educed.
Chemistry Assignm that are oxidized a #1 Electron excha	ent #3: On Ass nd squares arou 3 Types nge happens	signment # Ind those tl S of Redox	2, draw c nat are r Reactio	circles around the reactants educed. ns: the chemicals come in
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Chemistry Assignment that are oxidized a #1 Electron excha #2 Electron excha #3 The chemicals occurs only wh Chemistry Quiz: 1	ent #3: On Ass nd squares arou 3 Types nge happens ange is forced, u ange is forced, u are are CR 1 _ 2	signment # ind those the s of Redox using is move thr 3 3	2, draw c nat are r Reactio , as , as	eircles around the reactants educed. ns: the chemicals come in This is called This is called exchang exchang

Worksheet: Chemistry Assignment 1-Episode 1401

Name_____

Assign an oxidation number to each element:

- 1. H₂
- 2. H₂O
- 3. NaF
- 4. Cl₂
- 5. H₂SO₄
- 6. KClO₃
- 7. NH₃
- 8. Ba(OH)₂
- 9. AlBr₃
- 10. Mg

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Name_

1. Give the oxidation numbers of all the elements in the following molecules and ions:

a. SO_{1} , SO_{2} , SO_{3} , SO_{3}^{2-} , SO_{4}^{2-}

- b. CIO_2 , CIO^- , CIO_2^- , CIO_3^- , CIO_4^-
- $c. \ N_2O, \quad NO, \quad NO_2, \quad N_2O_4, \quad N_2O_5, \quad NO_2^-, \quad NO_3^-$
- 2. Determine the oxidation number of the sulfur atom:

a. H_2S b. S c. H_2SO_4 d. S^{2-} e. HS^{-} f. SO_2 g. SO_3

3. Indicate the oxidation number of phosphorus in each of the following compounds:

a. HPO₃	 d. H ₃ PO ₄
b. H₃PO₂	 e. H ₄ P ₂ O ₇
c. H₃PO₃	 f. H ₅ P ₃ O ₁₀

4. Give oxidation numbers for the underlined atoms in these molecules and ions:

α.	<u>Cs</u> 2O	f.	<u>CI</u> F ₃	k.	<u>Mo</u> O4 ²⁻
b.	<u>Pt</u> Cl ₆ ²⁻	g.	H ₃ <u>As</u> O ₃	I.	<u>Mn</u> O4 ⁻
c.	<u>Ca</u> I ₂	h.	<u>Sb</u> F ₆ ⁻	m.	<u>Pt</u> Cl ₄ ²⁻
d.	<u>Sn</u> F ₂	i.	<u>Ti</u> O₂	n.	<u>O</u> 2
e.	<u>Al</u> ₂ O ₃	j.	<u>P</u> ₄	0.	<u>O</u> 3

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Worksheet: Chemistry Assignment 2— Episode 1401

Determine if each of the following are redox reactions. To do this, assign oxidation numbers to each element. Remember that redox reactions are any reaction where an element ______.

Name____

1. $2 \text{ KNO}_3 \rightarrow 2 \text{ KNO}_2 + O_2$ 2. H_2 + CuO \rightarrow Cu + H_2O 3. $NaOH + HCI \rightarrow NaCI + H_2O$ 4. H_2 + $Cl_2 \rightarrow$ 2 HCl 5. $SO_3 + H_2O \rightarrow H_2SO_4$

- The purpose of assigning oxidation numbers is to keep track of the loss and gain of ______ in redox reactions. Fill in these blanks about oxidation numbers:
 - a. The oxidation number of an element in its **atomic** state is _____.
 - b. The oxidation number of an ion is its _____.
 - c. In a compound, the total of all the oxidation numbers of the elements is
 - d. In a polyatomic ion, the total of all the oxidation numbers of the elements is
 - e. In a compound, the oxidation number of H is usually _____ and of O is usually _____.
 - f. In a compound, the oxidation number of elements in group I of the periodic table is _____ and of elements in Group II is _____.
- 2. Give the oxidation number of sulfur in each of the following:
 - H_2S SO_2 $(SO_4)^{-2}$ S K_2SO_3
- 3. Assign an oxidation number to each element in these equations: (The equations are balanced, but the coefficients do not affect oxidation numbers.)
 - a.) 2 Al + 3 $Cu_2O \rightarrow 6 Cu + Al_2O_3$
 - b) HBr + NaOH \rightarrow NaBr + H₂O
- 4. Which of the equations above represents a redox reaction? ______ How can you tell?
- 5. When an element is oxidized, it (gains, loses) electrons, and its oxidation number (increases, decreases).
- 6. When an element is reduced, it (gains, loses) electrons, and its oxidation number (increases, decreases).

- 7. In this reaction: $4 K + O_2 \rightarrow 2 K_2 O$ ______ is oxidized and ______ is reduced.
- 8. There are three types of redox reactions. From these descriptions, choose the type direct exchange of electrons when chemicals come in contact forced exchange of electrons using electric current indirect exchange of electrons through a wire
 - a. A copper wire is placed in a solution of AgNO₃. Silver comes out of solution, and the solution turns blue, showing that Cu is going into solution.
 - b. A battery is an example of this type of redox reaction.
 - c. When a strip of aluminum is placed in a solution of magnesium chloride, no reaction takes place. But when the aluminum is attached to the negative pole of a battery, a strip of magnesium is attached to the + pole, and the strips are placed in the solution, a reaction occurs.
- 9. The forced exchange of electrons using electric current is called