**SS 2 CHEMISTRY**

***Lecture 2***

**TOPIC: REDUCTION AND OXIDATION REACTION.**

***Correction of previous assignment:***

1. S2O32-

The sum of the charges of the elements is -2

So, $S\_{2}O\_{3}^{2-}=-2$

$$2S+3(O)=-2$$

$$2S+3(-2)=-2$$

$$2S-6=-2$$

$$2S=-2+6$$

$$2S=4$$

$$S=\frac{4}{2}$$

$$S=+2$$

The IUPAC name is trioxodisulphate (ii) ion

1. Na2PO4

The sum of the oxidation number of the elements is 0 (zero) because the substance is not charged. The oxidation number of Na is +1 because it’s in group 1 in the periodic table.

So, $Na\_{3}PO\_{4}=0$

$$3Na+P+4(O)=0$$

$$3(1)+P+4(-2)=0$$

$$3+P-8=0$$

$$P=+8-3$$

$$P=+5$$

The IUPAC name is sodiumtetraoxophosphate (v).

It is not an ***ion*** because there is no charge on it.

**DEFINITIONS OF OXIDATION AND REDUCTION REACTION**

1. ***In terms of oxygen transfer***

Oxidation is the addition of oxygen while reduction is the removal of oxygen



From this equation, you can see that Zn lost oxygen to C. So can say C underwent oxidation while Zn underwent reduction.

1. ***In terms of hydrogen transfer***

Oxidation is the removal of hydrogen while reduction the addition of hydrogen.



Here, S lost hydrogen to Cl. Therefore, S underwent oxidation while Cl underwent reduction.

1. ***In terms of transfer of metals and non-metals***

Oxidation is the addition of non-metals while reduction is the addition of metals.



You will remember that chlorine is a non-metal while sodium is a metal.

1. ***In terms of oxidation number***

Oxidation is the increase in oxidation number while reduction is the decrease in oxidation number.









1. ***In terms of electron loss***

Oxidation is the loss of electrons while reduction is the gain of electrons

This is because change in oxidation number is due to loss or gain of electron. The more electron loss, the more positive the substance becomes and the higher the oxidation number.

**NOTE: *during oxidation and reduction reaction, the number of electrons lost during the oxidation half reaction must be equal to the number of electrons gained during the reduction half reaction.***

***Remember that oxidation is a half reaction so as reduction. Oxidation and reduction combine is a whole reaction.***

**OXIDIZING AND REDUCING AGENTS**

An oxidizing agent is the substance that undergoes reduction during redox reaction.

It called an oxidizing agent because causes its co-reactant to oxidize during its reduction. In other words, it accepts electrons from its co-reactant and its oxidation state reduces.

On the other hand, a reducing agent is the substance that undergoes oxidation during redox reaction.

Unlike oxidizing agent, reducing agent loses electrons during redox reaction and it causes its co-reactant to undergo reduction.



From the above equation, you will notice that Cl- lost its electron to Fe3+ to become Cl2 and that is oxidation reaction, so Cl- it is a ***reducing agent***. Therefore, Fe3+ which gained an electron from Cl- to become Fe2+ and hence undergo reduction is an ***oxidizing agent.***

***ASSIGNMENT***

Using ‘***O.A’*** for oxidizing agent and ***‘R.A*** for reducing agent identify the reactants in the following equations of reaction.

1. 2 Mg(s)+ O2(g)  2MgO(s)
2. Al(s) + Zn2+(aq) Al3+(aq) + Zn(s)
3. Mg(s)+ Cl2(g)  Mg2+(aq) + 2Cl-(aq)
4. Cr2O2-(aq) + 14H+(aq) + 6Fe2+(aq) 2Cr3+(aq)

 + 6Fe3+(aq) + 7H2O(l)

1. 2MnO4-(aq) + 5SO2(g) + 2H2O(l) 2Mn2+(aq)

 + 5