1. Which of the following statement(s) is/are not true about the following

decomposition reaction.

$2KClO3 \rightarrow 2KCl + 3O2$

(i) Potassium is undergoing oxidation

(ii) Chlorine is undergoing oxidation

(iii) Oxygen is reduced

(iv) None of the species is undergoing oxidation or reduction

Solution:

Option (i) and (iv) are the answers.

2. Which method can be used to find out the strength of reductant/oxidant in a solution? Explain with an example.

Strength of a reductant (reducing agent) or oxidant (oxidising agent) can be found out by measuring the relative electrode potential when it's connected in a solution using a cell.

For example, Fe3+/Fe is the element we want to test with the Standard Hydrogen electrode (SHE). The half-cell reaction for Fe and H are given below.

$H+ + e- \rightarrow H2$ $E° = 0.0V$

$Fe3+ + e- \rightarrow Fe2+$ $E° = 0.77V$

When any element needs to be evaluated it is placed as an electrode with SHE. The amount of emf it generates in the cell can be considered as the potential of the element.

$E°cell = 0-0.77$

$E°cell = 0.77$

The above-assumed configuration of Fe being anode can be reversed and hence strength Fe as a reductant can be established. Hence the strength of an oxidant can be determined.

3. Explain redox reactions based on electron transfer. Give suitable examples.

Solution:

In a redox reaction if one species loses electrons it's considered to be undergoing oxidation reaction and acts as oxidizing agent or oxidant, and for species who accepts electrons is said to undergo reduction and behave as reductant.

For example Zinc and HCl reaction

$Zn + 2HCl \rightarrow ZnCl2 + H2$

zinc loses electrons to the electronegative atom Cl with the reaction for oxidation and reduction as follows:

Oxidation: $Zn \rightarrow Zn2+ + 2e-$

Reduction: $2H+ + 2e- \rightarrow H2$

Thus the transfer of electrons causes the redox reaction to occur