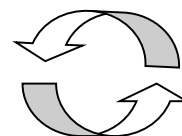


- Give the oxidation number of the following ions:
  - $\text{H}^+$
  - $\text{Cl}^-$
  - $\text{Ag}^+$
  - $\text{S}^{2-}$
  - $\text{Mg}^{2+}$
  - $\text{Mn}^{4+}$
  - $\text{Sr}^{2+}$
  - $\text{Al}^{3+}$
  - $\text{K}^+$
  - $\text{F}^-$
- By referring to your periodic table, predict the oxidation number of these elements when they form ions:
  - I
  - Sn
  - C
  - Li
  - B
  - O
  - Ba
  - Rb
  - Si
  - Br
  - Be
- Examine each of the following reactions and decide which are 'redox' reactions. Explain your choice:
  - $\text{Cu (s)} + \text{Cl}_2 \text{ (g)} \rightarrow \text{CuCl}_2 \text{ (s)}$
  - $\text{NaOH (aq)} + \text{HNO}_3 \text{ (aq)} \rightarrow \text{NaNO}_3 \text{ (aq)} + \text{H}_2\text{O (l)}$
  - $\text{MnO}_2 \text{ (s)} + 4\text{HCl (aq)} \rightarrow \text{MnCl}_2 \text{ (aq)} + 2\text{H}_2\text{O (l)} + \text{Cl}_2 \text{ (aq)}$
  - $\text{CuO (s)} + \text{H}_2\text{SO}_4 \text{ (l)} \rightarrow \text{CuSO}_4 \text{ (aq)} + \text{H}_2\text{O (l)}$
  - $2\text{C}_2\text{H}_2 \text{ (g)} + 5\text{O}_2 \text{ (g)} \rightarrow 4\text{CO}_2 \text{ (g)} + 2\text{H}_2\text{O (g)}$
- Work out the oxidation number of the first element in each of the following compounds:
  - $\text{PbO}_2$
  - $\text{ZnO}$
  - $\text{SF}_6$
  - $\text{Fe}_2\text{O}_3$
  - $\text{MnO}$
  - $\text{Cr}(\text{NO}_3)_3$
  - $\text{NiCO}_3$
  - $\text{PCl}_3$
  - $\text{Cu}_2\text{SO}_4$
  - $\text{V}_2\text{O}_5$
  - $\text{N}_2\text{O}$
  - $\text{FeS}$
  - $\text{SiCl}_4$
  - $\text{Hg}_2\text{S}$
- There are 3 metals in the above problems that showed *variable valency* (or more than one oxidation number other than zero). Find them and give their oxidation states. Where are they positioned in the periodic table?
- Complete these sentences:
 

Oxidation is \_\_\_\_\_ of electrons, while \_\_\_\_\_ is gain (OILRIG). When carbon is burnt in oxygen, the carbon is \_\_\_\_\_ and the oxygen is \_\_\_\_\_.

Carbon's O.N. (oxidation number) changes from \_\_\_\_\_ to \_\_\_\_\_, while oxygen's changes from \_\_\_\_\_ to \_\_\_\_\_. Because oxygen is doing the oxidising, we call it the \_\_\_\_\_ agent. Carbon is therefore the \_\_\_\_\_ agent.



1. Give the oxidation number of the following ions:

a. +1   b. -1   c. +1   d. -2   e. +2   f. +4   g. +2   h. +3   i. +1   j. -1

2. By referring to your periodic table, predict the oxidation number of these elements when they form ions:

a. -1   b. +4   c. +4   d. +1   e. +3   f. -2   g. +2   h. +1   i. +4   j. -1   k. +2

3. Examine each of the following reactions and decide which are 'redox' reactions. Explain your choice:

a. Cu changes to  $\text{Cu}^{2+}$  & Cl changes to  $\text{Cl}^-$

b. No changes in oxidation numbers – not a redox reaction.

c.  $\text{O}^-$  changes to  $\text{O}^{2-}$  &  $\text{Cl}^-$  changes to Cl

d. No changes in oxidation numbers – not a redox reaction.

e. O changes to  $\text{O}^{2-}$  &  $\text{C}^-$  changes to  $\text{C}^{4+}$

4. Work out the oxidation number of the first element in each of the following compounds:

a. 2+   b. 2+   c. 6+   d. 3+   e. 2+   f. 3+   g. 2+

h. 3+   i. 1+   j. 5+   k. 1+   l. 2+   m. 4+   n. 1+

5. Fe 3+, Fe 2+,   Cu 2+, Cu 1+,   Mn 4+, Mn 2+,   All transition metals

6. Complete these sentences:

*Oxidation is loss of electrons, while reduction is gain (OILRIG). When carbon is burnt in oxygen, the carbon is oxidised and the oxygen is reduced.*

*Carbon's oxidation number changes from 0 to +4, while oxygen's changes from 0 to -2. Because oxygen is doing the oxidising, we call it the oxidising agent. Carbon is therefore the reducing agent.*