CHEMISTRY
REDOX REACTION ASSIGNMENT

➢ Write reaction equations and observations for each of the following metal oxidation and reduction reactions. Your answers must be placed on the answer sheets provided, which are designed to ensure appropriate set out!

1. A piece of Nickel metal is dropped into a beaker of concentrated Nitric Acid.

2. A piece of Copper metal is dipped into a Silver Nitrate solution.

3. A piece of Aluminium is dipped into a solution of 6M HCl.

4. A piece of Potassium metal is dipped into a beaker of water.

5. A piece of Zinc is ignited and dipped into a gas jar full of gaseous Chlorine.

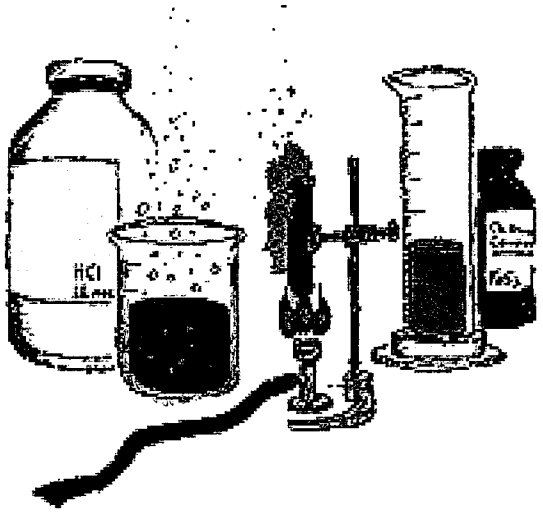
6. A piece of Aluminium is heated sufficiently in air to ignite despite its protective oxide layer.

7. A piece of Iron is dropped into Hydrochloric Acid.

8. A piece of Silver is dropped into a beaker of concentrated Sulphuric Acid.

9. A piece of Iron is placed into a solution of Lead (II) Nitrate and left to stand overnight.

10. Chlorine gas is bubbled through a solution of sodium iodide.



Redox Reactions (Answers)

1 $Ni_{(s)} + 2HNO_{3(aq)} \rightarrow Ni(NO_3)_{2(aq)} + H_{2(g)}$

nett $Ni_{(s)} + 2H^+_{(aq)} \rightarrow Ni^{2+}_{(aq)} + H_{2(g)}$

a silvery metal is added to a colourless soln. Upon addition there is an immediate effervescence of a colourless, odourless gas, the metal dissolves and the solution turns green.

2 $Cu_{(s)} + 2AgNO_{3(aq)} \rightarrow Cu(NO_3)_{2(aq)} + 2Ag_{(s)}$

nett $Cu_{(s)} + 2Ag^+_{(aq)} \rightarrow Cu^{2+}_{(aq)} + 2Ag_{(s)}$

a salmon pink metal is added to a colourless soln. Upon addition the metal dissolves, the soln turn blue and a black metal deposit forms.

3 $2Al_{(s)} + 6HCl_{(aq)} \rightarrow 2AlCl_{3(aq)} + 3H_{2(g)}$

nett $2Al_{(s)} + 6H^+_{(aq)} \rightarrow 2Al^{3+}_{(aq)} + 3H_{2(g)}$

Same obs as Q1 except soln remain colourless.

4 $2K_{(s)} + 2H_2O_{(l)} \rightarrow 2KOH_{(aq)} + H_{2(g)}$

nett $2K_{(s)} + 2H_2O_{(l)} \rightarrow 2K^+_{(aq)} + 2OH^-_{(aq)} + H_{2(g)}$

Same obs as Q3.

5 $Zn_{(s)} + Cl_{2(g)} \rightarrow ZnCl_{2(s)}$ nett same.

a silvery metal is added to a greenish-yellow pungent gas. The silvery metal dissolves as gas forms a white solid.

6 $4Al_{(s)} + 3O_{2(g)} \rightarrow 2Al_2O_{3(s)}$

a silvery metal is heated to produce a white light.

The metal disappears as a white solid is produced.

7 $Fe_{(s)} + 2HCl_{(aq)} \rightarrow FeCl_{2(aq)} + H_{2(g)}$

nett $Fe_{(s)} + 2H^+_{(aq)} \rightarrow Fe^{2+}_{(aq)} + H_{2(g)}$

obs same as Q1 except soln turns pale green.

8 $Ag_{(s)} + H_2SO_4 \rightarrow$ NVR.

$Ag \rightarrow Ag^+ + e^-$ E° -0.80.

$2H^+ + 2e^- \rightarrow H_{2(g)}$ $E^\circ = 0$

-ve so not spontaneous.

9 (metal displacement)

$Pb^{2+} + 2e^- \rightarrow Pb_{(s)}$ $E^\circ = -0.13$ V.

$Fe_{(s)} \rightarrow Fe^{2+} + 2e^-$ $E^\circ = +0.44$ V

$Pb^{2+}_{(aq)} + Fe_{(s)} \rightarrow Fe^{2+}_{(aq)} + Pb_{(s)}$ nett E° +0.31

a silvery metal is added to a colourless soln. upon addition the metal dissolves to form a pale green soln and a black ppt forms.

10 (Halogen displacement)

$Cl_{2(g)} + 2NaI_{(aq)} \rightarrow NaCl_{(aq)} + I_{2(aq)}$

$Cl_{2(g)} + 2I^-_{(aq)} \rightarrow 2Cl^-_{(aq)} + I_{2(aq)}$

a pungent greenish-yellow gas is bubbled through a colourless soln. The gas dissolves and the solution turns brown.