Exercise :2 A

1. (a) What: is a chemical reaction ?
(b) State the conditions necessary for a chemical change or reaction.

Solution:

a) A chemical reaction is a process of breaking chemical bonds of the reactants(reacting substances) to form new bonds and substances(products).

b) Conditions necessary for a chemical change or reaction are
• Evolution of gas
• Change of colour
• Formation of precipitate
• Change of state

2. Define the following terms
(a) Chemical change
(b) Chemical bond
(c) Effervescence
(d) Precipitate

Solution:

a) Chemical change is defined as a permanent change in the composition of a substance which results in the formation of substance with different chemical compositions and properties.

b) A chemical bond is a force which holds the atoms of a molecule in a compound

c) Effervescence is the formation of gas bubbles in a liquid by a chemical reaction.

d) Precipitate is the insoluble solid substance formed due to chemical reaction.

3. Give an example of a reaction where the following are involved
(a) Heat (b) Light (c) Electricity (d) Close contact (e) Solution (f) Pressure (g) Catalyst

Solution:

a) $2Pb(NO_3)_2 \xrightarrow{\Delta} 2PbO + \$NO_2 + O_2$
b) $H2 + Cl2 \xrightarrow{\text{sunlight}} 2HCl$
c) $2NaCl \xrightarrow{\text{electricity}} 2Na + Cl_2$
d) $PbNO_3 + 2KI \longrightarrow 2KNO_3 + PbI_2$
e) $NaCl(aq) + AgNO_{39aq)} \quad AgCl\downarrow + NaNO_3(aq)$ (white ppt)
f) $N2 + 3H2 \leftrightarrows 2NH3$ (Above 200 atm)
g) $C2H2 \xrightarrow[\text{energy}]{\text{Sound}} 2C + H2$

4. Define :
(a) Photochemical reaction (b) Electrochemical reaction. Give one example in each case.

Solution:

a) Reaction that occurs with absorption of light is called as photochemical reaction

Ex: Photosynthesis: $6CO_2 + 12\ H_2O \xrightarrow[\text{Sunlight}]{\text{chlorophyll}} C6H12O6 + 6H2O + 6O2$

b) Reaction that occurs with absorption of electrical energy is called as electrochemical reaction .
Ex: Acidulated water breaks into hydrogen and oxygen

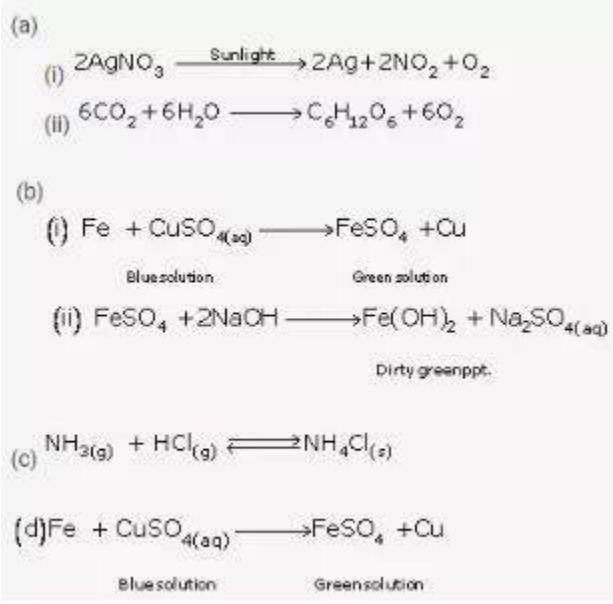
$2H_2O \xrightarrow{\text{electric current}} 2H_2+O_2$

5. Give an example of each of the following chemical changes.
(a) A photochemical reaction involving
(i) silver salt (ii) water

(b) A reaction involving
(i) blue solution
(ii) formation of dirty green precipitate

(c) Two gases combine to form a white solid.
(d) Two solids combine to form a liquid.
(e) A reaction where color change is noticed.

Solution:



6. Write the chemical reaction where the following changes observed.
a) Gas is evolved
b) Colour change is noticed
c) Precipitate is formed
d) Physical state is changed

Solution:

a) $Zn + H_2SO_4 \longrightarrow ZnSO_4 + H_2$

b) $Fe + CuSO_4\ (aq) \longrightarrow FeSO_4 + Cu$
(blue Solution) (green Solution)

c) $NaCl(s) + AgNO_3 \longrightarrow AgCl\downarrow + NaNO_3\ (aq)$

d) $NH_{3\ (g)} + HCL_{(g)} \leftrightarrows NH_4Cl$

7. Give reason for the following :
a) Silver nitrate solution is kept in coloured bottles.
(b) Molybdenum is used in the manufacture of ammonia.
(c) Blue solution of copper sulphate changes to green when a piece of iron is added to this solution.
(d) Colourless concentrated sulphuric acid in a test tube changes to blue on adding a small piece of copper to it.

Solution:

a) Silver nitrate solution is kept in brown bottles in the laboratory because it decomposes in the presence of light.
b) Molybdenum increases the efficiency of the catalyst iron used in the manufacture of ammonia.
c) This is because the blue colour of the copper sulphate solution fades and eventually turns into light green due to the formation of ferrous sulphate.
d) Colourless concentrated sulphuric acid in a test tube changes to blue on adding a small piece of copper to it because copper displaces hydrogen from sulphuric acid and forms blue colored copper sulphate.