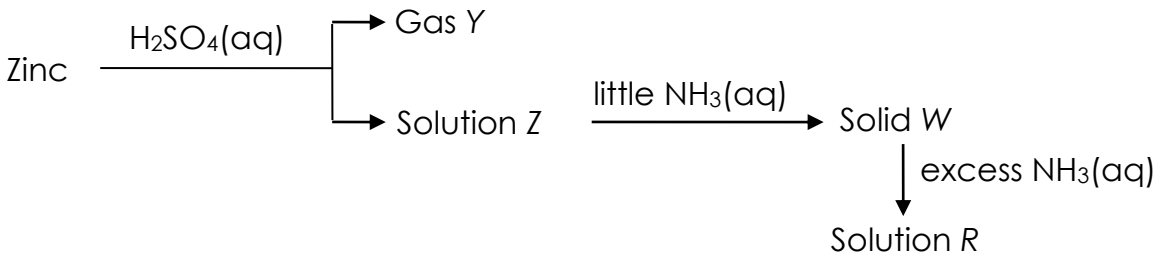
S4 Chemistry Quiz
Reaction of Alkali 2

1. For each of the following reactions,
   (i) state ONE observable change and
   (ii) write an ionic equation for the reaction involved.

   (a) aluminium sulphate solution + excess ammonia solution
   (b) iron(II) chloride solution + excess sodium hydroxide solution
   (c) lead(II) nitrate solution + excess sodium hydroxide solution
   (d) copper(II) sulphate solution + excess ammonia solution

2. The following flow diagram shows a series of reactions of zinc.



   (a) (i) Name gas *Y*.
   (ii) Suggest a chemical test for gas *Y*.

   (b) Write the equation for the reaction between solution *Z* and $NH_3(aq)$.

   (c) State an expected observation when an aluminium foil is added to solution *Z*.

   (d) (i) Write the equation for the reaction between solid *W* and excess $NH_3(aq)$.
   (ii) State the colour of solution *R*.

Suggested Answer

1. (a) A white precipitate forms.
$Al^{3+}(aq) + 3OH^-(aq) \longrightarrow Al(OH)_3(s)$

(b) A green precipitate forms.
$Fe^{2+}(aq) + 2OH^-(aq) \longrightarrow Fe(OH)_2(s)$

(b) A white precipitate forms and then re-dissolves to form a colourless solution.
$Pb^{2+}(aq) + 2OH^-(aq) \longrightarrow Pb(OH)_2(s)$
$Pb(OH)_2(s) + 4NH_3(aq) \longrightarrow [Pb(NH_3)_4]^{2+}(aq) + 2OH^-(aq)$

(c) A blue precipitate forms and then re-dissolves to form a deep blue solution.
$Cu^{2+}(aq) + 2OH^-(aq) \longrightarrow Cu(OH)_2(s)$
$Cu(OH)_2(s) + 2OH^-(aq) \longrightarrow [Cu(OH)_4]^{2-}(aq)$

2. (a) (i) Hydrogen
(ii) Test it with a burning splint.
It burns with a 'pop' sound.

(b) $Zn^{2+}(aq) + 2OH^-(aq) \longrightarrow Zn(OH)_2(s)$

(c) Shiny silvery deposits form on the surface of the aluminium foil.

(d) (i) $Zn(OH)_2(s) + 4NH_3(aq) \longrightarrow [Zn(NH_3)_4]^{2+}(aq) + 2OH^-(aq)$
(ii) Colourless