light green, bluish green, and after a long time red, through absorption of O and formation of ferric oxyhydrate. (*b*). Ferric Salts form no carbonate.

(7). H_2S. in alkaline solution, throws down in every case FeS as a black precip.

The Cupric Salts are easily distinguishable:

(1). H_2S in acidified Solution gives a black precipitate CuS.

(2). $\left.\begin{matrix}NH_4\\H\end{matrix}\right\}S$ the same prec. insoluble in excess.

(3). KOH gives a bright blue precipitate $Cu(OH)_2$ which, upon the application of heat, becomes black,

$(Cu(OH)_2 = CuO + H_2O)$.

(4). K_4FeCy_6 (Potassium Ferrocyanide) gives a reddish brown precipitate Cu_2FeCg_6

(5). Na_3AsO_3 (Trisodic Arsenite) forms a green precipitate, with a Cupric Salt=$CuH\,AsO_3$, known as Scheeles green, if solution be cautiously neutralized with an Alkali.

(6). $NH_4\left\{\begin{matrix}O\\H\end{matrix}\right.\left\{\begin{matrix}\text{forms a blue precipitate Cu}\\(HO)_2\end{matrix}\right.$ which is readily soluble in excess of reagent, forming a deep blue liquid $\left(\begin{matrix}NH_2Cu\\NH_4\end{matrix}\right\{\begin{matrix}SO_4\\\end{matrix}\Big)$

7. Na_2CO_3 gives a green precipitate and is a basic Salt $CuCO_3 + Cu(OH)_2$

Cuprous Salts are not stable, taking up Oxygen from the air and forming the corresponding Cupric Salts.

Cu_2Cl_2 has the property of absorbing large quantities of Carbonic Oxide gas.

The Mercuric Salts corresponding to Mercuric Oxide HgO or Mercuric Sulphide may be distinguished by the following tests:

(1) NH_4HO gives *a white precipitate*,

$HgCl_2 + 2NH_4HO = NH_2HgCl + NH_4Cl + 2H_2O$ $(Hg(NO_3)_2 = NH_2HgNO_3)$

(2) KI gives *a red precipitate*,

$2\,KI + HgCl_2 = HgI_2 + 2\,KCl$.

(3). KOH, gives *a yellow precipitate*,

$HgCl_2 + 2(KOH) = Hg(OH)_2 + 2\,KCl$, but the $Hg(OH)_2$ only exists for a moment, splitting up into H_2O and HgO.

(4). *HCl gives* no *precipitate!!!*

(5), A Mercurous Salt in acid solution gives with H_2S in the beginning *a white precipitate* $= HgCl_2 + HgS$, a double combination, on the addition of more H_2S *black HgS* is precipitated.

The Mercurous Salts corresponding to Mercurous Oxide Hg_2O or Sulphide Hg_2S, may be thus distinguished:—

(1). NH_4HO, gives $\left\{\begin{matrix}NH_2Hg_2Cl\\NH_2Hg_2NO_3\end{matrix}\right\}$ *a black precipitate.*

(2). KI, gives HgI, *a green precipitate.*

(3). KOH, gives $Hg_2(HO)_2 = Hg_2O + H_2O$, *a black precipitate.*

(4). HCl, gives Hg_2Cl_2 *a white precipitate.*

(5). When H_2S is added to an acidified solution of a Mercurous Salt, *a black precipitate immediately* falls.

Q.—8. How much $KClO_3$ is required to furnish enough Oxygen which, when brought into contact with sufficient Nitrogen Dioxide, will form 33 litres of Nitrogen Tetroxide, measured at —1°C and 780 m.m. pressure?

33 litres NO_2 at —1°C, and 780 m. m. pressure, become $(33\times\frac{2}{2}\frac{7}{7}\frac{3}{2}\times\frac{7}{7}\frac{8}{6})$ litres at 0°C and 76 m.m. pressure. But 11.2. litres of NO_2 at 0°C and 760 m. m. weigh 23 grammes, ∴ $(33\times\frac{3}{2}\frac{7}{7}\frac{3}{2}\times\frac{7}{7}\frac{8}{6}\times\frac{1}{1}\frac{0}{1}\frac{}{2}\times\frac{2}{1}\frac{3}{})$ grammes = 69.8. grammes = weight of required Nitrogen Tetroxide.

$NO + O = NO_2$

hence every 46 parts of NO_2 require 16 parts Oxygen, ∴ 69.8 grammes NO_2 require

$\frac{69.8\times16}{46} = 24.27$ grammes of Oxygen.

$2KCLO_3 = 2KCL + 3O_2$

hence, 245 parts $KCLO_3$ yield 96 parts of Oxygen, ∴ 24.27 grammes of Oxygen require

$\frac{24.27\times245}{96} = 61.93$ grammes of Potanic Chlorate.

Q.—9. (*a*). How would you separate Calcium, Barium and Magnesium in solution, (*b*) What decomposition do Silver Chloride