1. Decomposition of water

$2H_2O_{(l)} \longrightarrow 2H_{2(g)} + O_{2(g)}$

moles of water = 0.033 moles.

mole ration of $H_2O : O_2$

2 : 1

0.033 → ?

$\left(\frac{0.033 \times 1}{2}\right)$ moles.

moles of O_2 = 0.0165 moles

grams of oxygen produced = (0.0165 moles × 18 g/mole)

= 0.297 g of O_2 produced

2. $2Na_{(s)} + 2H_2O_{(l)} \longrightarrow NaOH_{(aq)} + H_{2(g)}$

moles of Na. = $\frac{20.0\text{g}}{23\text{g/mole}}$ = 0.87 moles of Na.

mole ratio NaOH : Na

1 : 2.

X 0.87

$\left(\frac{0.87 \times 1}{2}\right)$ moles

moles of NaOH = 0.435 moles

mass of NaOH = (0.435 moles × 40 g/mole)

= 17.4 g of NaOH produced

3. Preparation of Oxygen gas.

$2KClO_{3(s)} + \text{heat} \rightarrow 2KCl_{(s)} + 3O_{2(g)}$

mole ratio of $KClO_3 : O_2$

2 : 3

moles of $KClO_3$ = 3.0 moles

moles of O_2 = $\left(\frac{3\text{moles} \times 3}{2}\right)$ = 4.5 moles.

moles of O_2 formed = 4.5 moles.

4. $Zn_{(s)} + 2HCl_{(aq)} \longrightarrow ZnCl_2 + H_2$

$ZnCl_2$	:	HCL
1	:	2

7.50moles

moles of HCL $= \left(\frac{7.5\text{moles} \times 2}{1}\right) = 15$ moles of HCL.

moles of HCL = 15moles.

5. $Cu_{(s)} + 2AgNO_{3(aq)} \longrightarrow 2Ag_{(s)} + Cu(NO_2)_{3(s)}$

moles of Ag $= \left(\frac{250g}{g/mole.}\right)$

mole ratio of Ag : Cu.

2 : 1.

6. Burning of Alluminium in excess oxygen.

$4AL + 3O_2 \longrightarrow 2AL_2O_3$

mass = AL_2O_3 = 0.75moles

mole ratio of $O_2 : AL_2O_3 = 3 : 2$.

Moles of O_2

$= \left(\frac{3 \times 0.75\text{moles}}{2}\right) = 1.125$moles of O_2.

mass of $O_2 = (1.125\text{moles} \times 16\text{g/mol})$

= 20.25g of Oxygen

7. $2Fe_{(s)} + 3Cl_{2(g)} \longrightarrow 2FeCl_{3(s)}$

$$\frac{31\text{ L } Cl_2}{1} \times \frac{1\text{ mole } Cl_2}{22.4\text{ L } Cl_2} = 1.384\text{ moles } Cl_2$$

mass of Cl_2 = (1.384 moles × 35.5 g/mole)

= 49.132 g of Cl_2.