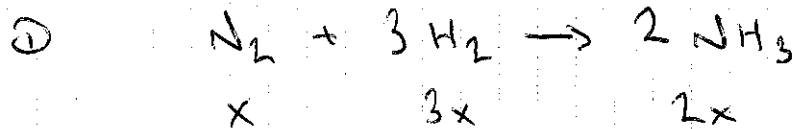


Limiting Reactants WS # 2



$$\text{a) } \text{N}_2 = x = 3.45 \text{ mol}$$

$$\text{NH}_3 = 2x = 2(3.45) = 6.9 \text{ mol}$$

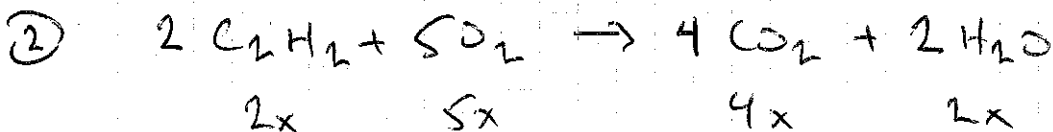
$$\text{H}_2 = 3x = 4.85 \text{ mol}$$

$$x = 1.617 \text{ mol}$$

$$\text{NH}_3 = 2x = 2(1.617) = 3.233 \text{ mol}$$

∴ H_2 is limiting reactant

$$\text{b) } \boxed{3.233 \text{ mol}}$$



$$\text{a) } \text{C}_2\text{H}_2 = 2x = 20 \text{ mol}$$

$$x = 10$$

$$\text{CO}_2 = 4x = 4(10) = 40 \text{ mol}$$

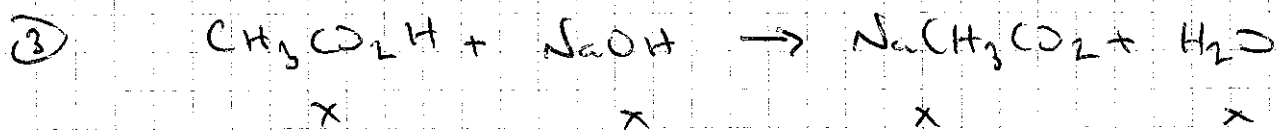
$$\text{O}_2 = 5x = 10 \text{ mol}$$

$$x = 2$$

$$\text{CO}_2 = 4x = 4(2) = 8 \text{ mol}$$

∴ O_2 is limiting reactant

$$\textcircled{2} \quad \text{b) } \text{CO}_2 = \boxed{8 \text{ mol}}$$



$$\text{CH}_3\text{CO}_2\text{H} = x = 2.36 \text{ mol}$$

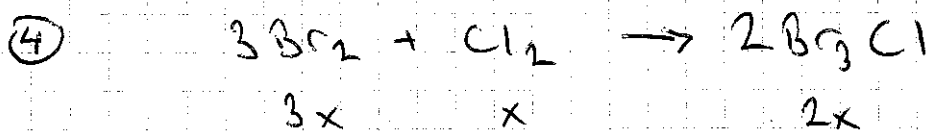
$$\text{H}_2\text{O} = x = 2.36 \text{ mol}$$

$$\text{NaOH} = x = 3.89 \text{ mol}$$

$$\text{H}_2\text{O} = x = 3.89 \text{ mol}$$

∴ $\text{CH}_3\text{CO}_2\text{H}$ is limiting reactant

$\boxed{2.36 \text{ mol}}$ of H_2O will form



$$\text{Br}_2 = 3x = 0.3 \text{ mol}$$

$$x = 0.1$$

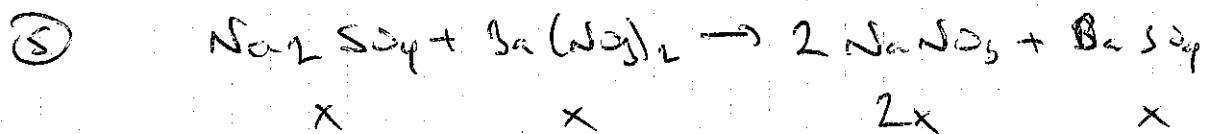
$$\text{Br}_2\text{Cl} = 2x = 2(0.1) = 0.2 \text{ mol}$$

$$\text{Cl}_2 = x = 0.5 \text{ mol}$$

$$\text{Br}_2\text{Cl} = 2x = 2(0.5) = 1 \text{ mol}$$

∴ Br_2 is limiting reactant

$\boxed{0.2 \text{ mol}}$ Br_2Cl form



$$\text{Na}_2\text{SO}_4: \frac{130 \text{ g}}{142.1 \text{ g/mol}} = 0.704 \text{ mol} = x$$

$$\text{BaSO}_4 = x = 0.704 \text{ mol}$$

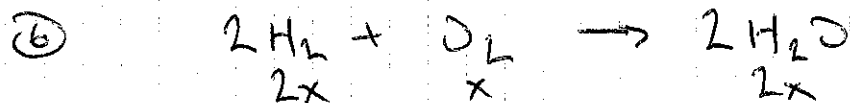
$$\text{Ba}(\text{NO}_3)_2: \frac{50 \text{ g}}{261.3 \text{ g/mol}} = 0.191 \text{ mol} = x$$

$$\text{BaSO}_4 = x = 0.191 \text{ mol}$$

So $\text{Ba}(\text{NO}_3)_2$ is limiting reactant

$$\text{BaSO}_4 = 0.191 \text{ mol}$$

$$0.191 \text{ mol} \times 233.4 \text{ g/mol} = \boxed{44.7 \text{ g}}$$



$$\text{H}_2: \frac{15.5 \text{ g}}{2.02 \text{ g/mol}} = 7.673 \text{ mol}$$

$$2x = 7.673 \text{ mol}$$

$$x = 3.837 \text{ mol}$$

$$\text{H}_2\text{O} = 2x = 2(3.837) = 7.673 \text{ mol}$$

⑥ continued

$$O_2: \frac{30 \text{ g}}{32 \text{ g/mol}} = 0.9375 \text{ mol}$$

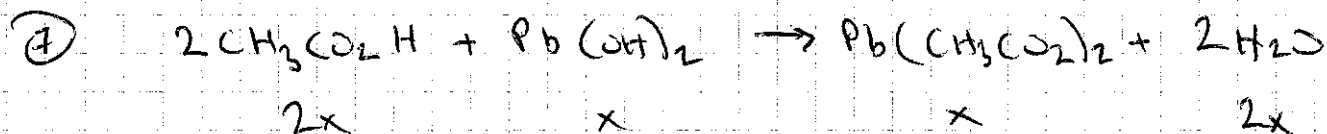
$$x = 0.9375 \text{ mol}$$

$$H_2O = 2x = 2(0.9375) = 1.875 \text{ mol}$$

∴ O_2 is limiting reactant

$$H_2O = 1.875 \text{ mol}$$

$$1.875 \text{ mol} \times 18.02 \text{ g/mol} = \boxed{33.8 \text{ g}}$$



$$\text{a) } \text{CH}_3\text{CO}_2\text{H}: \frac{10 \text{ g}}{60.04 \text{ g/mol}} = 0.167 \text{ mol}$$

$$2x = 0.167 \text{ mol}$$

$$x = 0.0833$$

$$\text{Pb}(\text{CH}_3\text{CO}_2)_2 = x = 0.0833 \text{ mol}$$

$$\text{Pb}(\text{OH})_2: \frac{10 \text{ g}}{241.24 \text{ g/mol}} = 0.0415 \text{ mol} = x$$

$$\text{Pb}(\text{CH}_3\text{CO}_2)_2 = x = 0.0415 \text{ mol}$$

∴ $\text{Pb}(\text{OH})_2$ is limiting reactant
and $\text{CH}_3\text{CO}_2\text{H}$ is excess reactant

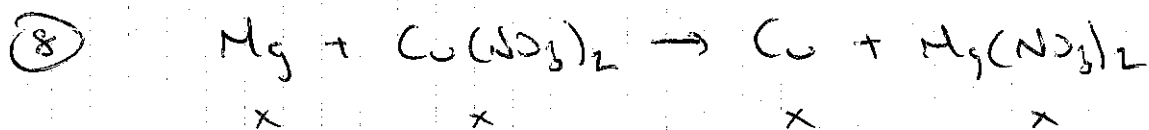
$$\textcircled{7} \text{ b) } \text{CH}_3\text{CO}_2\text{H} = 2x = 2(0.0415) = 0.0829 \text{ mol}$$

$$0.0829 \text{ mol} \times 60.04 \text{ g/mol} = 4.978 \text{ g}$$

$$10 \text{ g} - 4.978 \text{ g} = \boxed{5.02 \text{ g}}$$

$$\text{Pb}(\text{CH}_3\text{CO}_2)_2 = x = 0.0415 \text{ mol}$$

$$0.0415 \text{ mol} \times 325.26 \text{ g/mol} = \boxed{13.5 \text{ g}}$$



$$\text{a) } \text{Mg} \cdot \frac{25.3 \text{ g}}{24.3 \text{ g/mol}} = 1.041 \text{ mol} = x$$

$$\text{Cu} = x = 1.041 \text{ mol}$$

$$\text{Cu}(\text{NO}_3)_2 \cdot \frac{44.3 \text{ g}}{187.5 \text{ g/mol}} = 0.236 \text{ mol} = x$$

$$\text{Cu} = x = 0.236 \text{ mol}$$

∴ $\text{Cu}(\text{NO}_3)_2$ is limiting reactant

$$\text{Cu} = 0.236 \text{ mol}$$

$$0.236 \text{ mol} \times 63.5 \text{ g/mol} = \boxed{15 \text{ g}}$$

$$\textcircled{8} \quad \text{b) } \text{Mg} = x = 0.236 \text{ mol}$$

$$0.236 \text{ mol} \times 24.3 \text{ g/mol} = 5.74 \text{ g}$$

$$25.3 \text{ g} - 5.74 \text{ g} = \boxed{19.6 \text{ g}} \text{ Mg left}$$