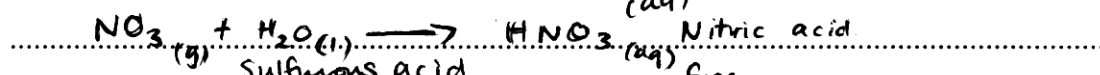
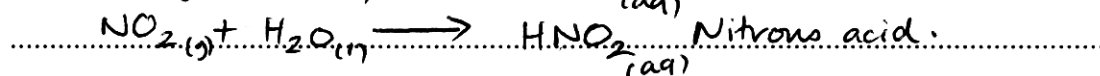
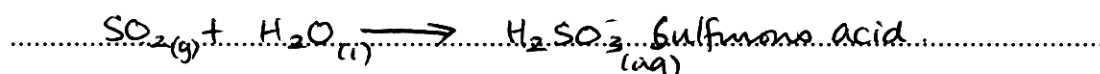


## Question 21 (7 marks)

Evaluate the impact of industrial sources of sulfur dioxide and nitrogen oxides on the environment, making use of appropriate chemical equations.

7

The release of  $\text{SO}_2$  and  $\text{NO}_x$  as a result of <sup>combustion</sup> producing coal, <sup>smelting of ores</sup> and the combustion of car engines have lead to  $\text{SO}_2$  and  $\text{NO}_x$  being released into the atmosphere. <sup>Some of the</sup> This <sup>is</sup> Oxides are removed from the atmosphere by rain as water droplets react with the oxides forming weak acids.



Furthermore  $\text{SO}_2$  can react with <sup>free</sup> oxygen radicals in the atmosphere and form Sulfuric acid.  $\text{H}_2\text{SO}_3(aq) + \text{H}_2\text{O}(l) \rightarrow \text{H}_2\text{SO}_4(aq)$

These <sup>reactions</sup> ~~production~~ result in acid rain. The acid rain has ~~the~~ depending on concentration has the potential to destroy forests as cuticles on leaves <sup>of plants</sup> which controls the plants water and gases is eroded away. This destroy trees.

In addition <sup>or</sup> The acid rain on soil makes the soil acidic and disrupts the water intake of the roots, it also dissolves nutrients and forms ions which is washed into oceans and rivers.

Acid rain also corrodes metals of buildings and marble statues.  $\text{H}_2\text{SO}_3(aq) + \text{CaCO}_3(s) \rightarrow \text{CaSO}_3 + \text{H}_2\text{O}(l) + \text{CO}_2(g)$  and Calcium Sulfate is formed. Therefore industrial sources of  $\text{SO}_2$

and  $\text{NO}_x$  causes major damage to the environment as it reacts with water. Leading to destruction of forests and plants, leaching of <sup>dissolved</sup> nutrients into the water of oceans and rivers which may cause eutrophication.