

Year 12 Chemistry  
Environmental Chemistry  
Practice Test

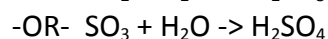
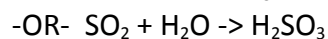
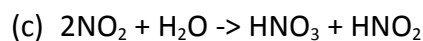
- 1.
- (a)
- (i) Anaerobic
- (ii)
- (1)  $\text{SO}_4^{2-}$
- (2)  $\text{H}_2\text{S}$
- (b) It is a soluble salt and the ammonium ion in solution is absorbed by plant roots
- 2.
- (a) The Earth's surface absorbs short-wave radiation (UV and visible light) from the sun and re-emits it as longer-wave radiation (infra-red). Greenhouse gases in the atmosphere have polar covalent bonds which stretch and bend to absorb the IR, thereby warming the Earth's atmosphere.
- (b) It will cause climate change which affects water collection and crops disrupting the human population.  
-OR- It will cause polar ice caps to melt, causing coastal flooding which disrupts the human population.
- (c)  $6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$
- (d)
- (i)  $\text{N}_2 + \text{O}_2 \rightarrow 2\text{NO}$
- (ii)  $\text{N}_2$  contains a triple bond (so a large amount of energy is required)
- (iii) Biological fixation / Lightning discharge / Haber process
- (e) It contains a catalyst which causes NO to break down into  $\text{N}_2$
- (f)  $\text{NO}_2 \xrightarrow{W} \text{NO} + \text{O}$   
 $\text{O}_2 + \text{O} + \text{N}_2 \rightarrow \text{O}_3 + \text{N}_2^*$   
-OR- Atomic oxygen breaks away from the nitrogen dioxide when it absorbs UV. This atomic oxygen reacts with  $\text{O}_2$  to form  $\text{O}_3$ . The  $\text{N}_2$  acts as a stabilising molecule.
- (g) Secondary

3.

(a) It contains dissolved  $\text{CO}_2$  from the atmosphere. When  $\text{CO}_2$  dissolves in water it forms carbonic acid which releases hydrogen ions into solution.

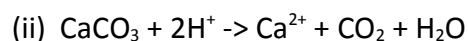
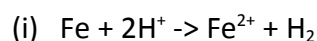
(b)  $-\log_{10}(2.0 \times 10^{-6}) = 5.7$

This would not be considered acid rain.



(d)  $10^{-4.0} = 1.0 \times 10^{-4} \text{ mol L}^{-1}$

(e)



(iii) Disruption of disease defense mechanisms in plants

-OR- Prevention of nutrient uptake in plants

-OR- Damage to essential bacteria in plants

-OR- Adhere to gills of fish and suffocate them

-OR- Enter the drinking water of humans causing disease and/or death

(f) Suspended clay particles have a negative surface charge and so will be attracted to these cations. The clay particles join together with the  $\text{Al}^{3+}$  ions to form larger sized particles which cannot stay in solution.

(g)

(i) Oxidising action

(ii) Increasing the pH means decreasing the concentration of  $\text{H}^+$ . This will drive the reaction to the left, increasing the concentration of  $\text{OCl}^-$ .