



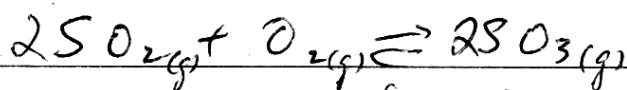
(a) (i) Saponification is the manufacture of soap through the heating of an oil.

(ii) Particles of soap are polar. One end is ~~non-polar~~ while the other is polar. The ~~non-polar~~ tail sticks into grease, while the ~~polar~~ end points outward. This is because water is also slightly polar.



This makes the grease come off easily, and is suspended in the water.

(b)



$$K = \frac{[\text{SO}_3]^2}{[\text{SO}_2]^2 [\text{O}_2]}$$

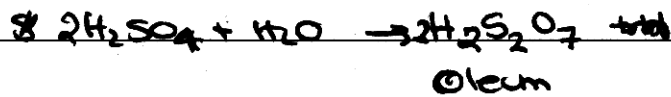
$$= \frac{[80.07]^2}{[64.07]^2 [32]}$$

$$= 0.0488 \quad (\text{4. d. p.})$$



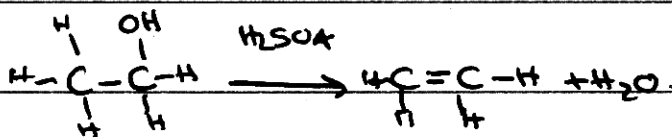
c) i) when sulfuric acid is added to water

Sulfuric acid + H<sub>2</sub>O → oleum



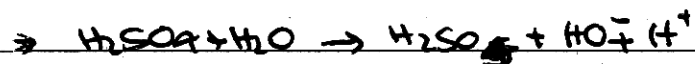
ii) Sulfuric acid can be used as a dehydrating agent in

the formation of ethene from ethanol eg

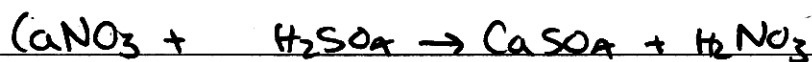


sulfuric acid can be used as a oxidising agent

eg of oxidising



a precipitating sulfate







e) The Castner-Kneeler method, or the Mercury cell, was a once often used method of producing NaOH. The Mercury cell, however, was a culprit of Mercury pollution and often the sea water used to extract brine, was sent back into the sea with solid mercury in it. Solid mercury in a stable state, does not have a negative impact on the environment. Unfortunately, bacteria in the ocean managed

to convert some of the solid mercury into mercury compounds. The Mercury was then ingested by fish and other aquatic organisms, and the concentration of mercury accumulated up through the food chain so that the top predator eg human, ate the most mercury. Due to this pollution, new methods of extracting NaOH were developed, and methods such as the membrane cell were developed reducing mercury pollution and other side effects. The extraction of the brine itself (the source of sodium) also caused concern but ~~some~~ plants now producing NaOH are sited close to salt mines or the sea and use responsible, environmental sound methods for NaCl extraction.