

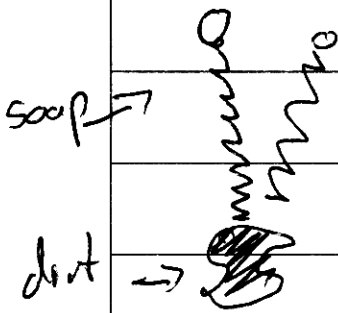
Question 28 Industrial Chemistry.

a) i) Saponification is the production of making fatty acids and oils, it is the opposite procedure to esterification.

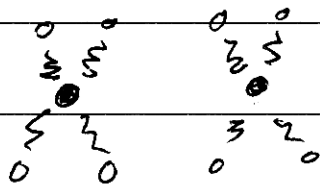
ii) ~~The cleaning action of soap~~

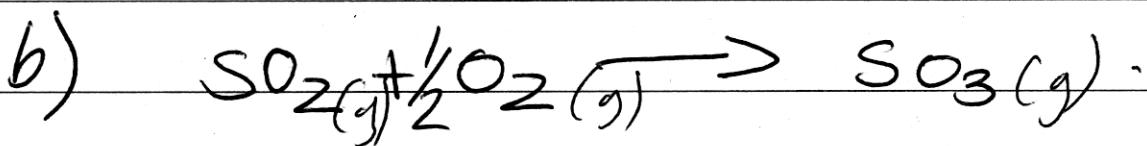
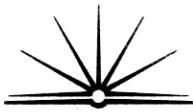
Soap is an effective cleaner, this is due to the composition of soap where it is made up of hydrophobic and hydrophilic elements the hydrophilic elements

attach themselves to the dirt and break it down and the dispersing the dirt.



Breaking down the dirt (cleaning).





$$K = \frac{[\text{SO}_3]}{[\text{SO}_2] [\text{O}_2]^{1/2}}$$

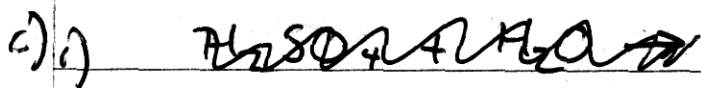
$$\text{SO}_2 = 0.06 \text{ mol L}^{-1} \quad K = \frac{[\text{SO}_3]}{[\text{SO}_2] + [\text{O}_2]^{1/2}}$$

$$\text{O}_2 = 0.05 \text{ mol L}^{-1}$$

$$\text{SO}_3 = 0.04$$

$$= \frac{[0.06]}{[0.05]^{1/2}}$$
$$= \frac{0.04}{0.284}$$

$$= \frac{0.284}{0.04}$$



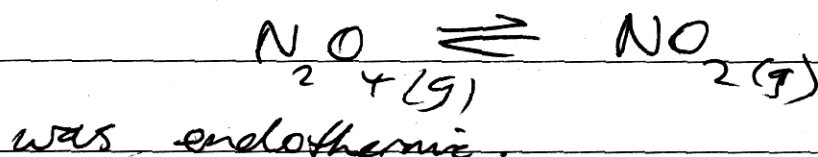
ii) Sulfuric acid can dehydrate mixtures, during the production of esters water is made, when mixed with sulfuric acid as the water is produced it is taken away pushing the equilibrium to the right (esters) this is it used as a catalyst though,

~~when~~ when sulfates are mixed with water (dissolved, mean)
the addition of sulfuric acid oxidises it (turns it into a solid) ← the sulfuric acid also dehydrates the mixture at the same time which helps precipitate the sulphates
gives it electrons

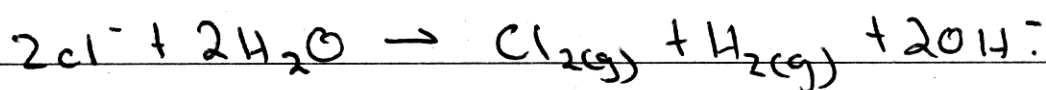
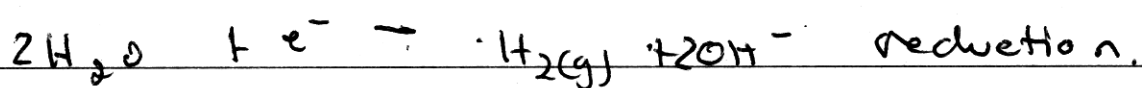
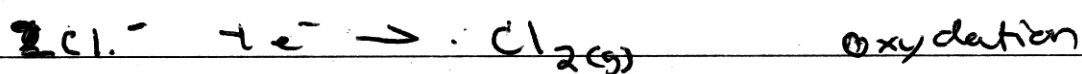


d) (i.) ~~bb~~ We used the equilibrium reaction involving NO_2 gas and N_2O_4 gas. The two gases were mixed in a vessel, and placed in iced water and hot water successively

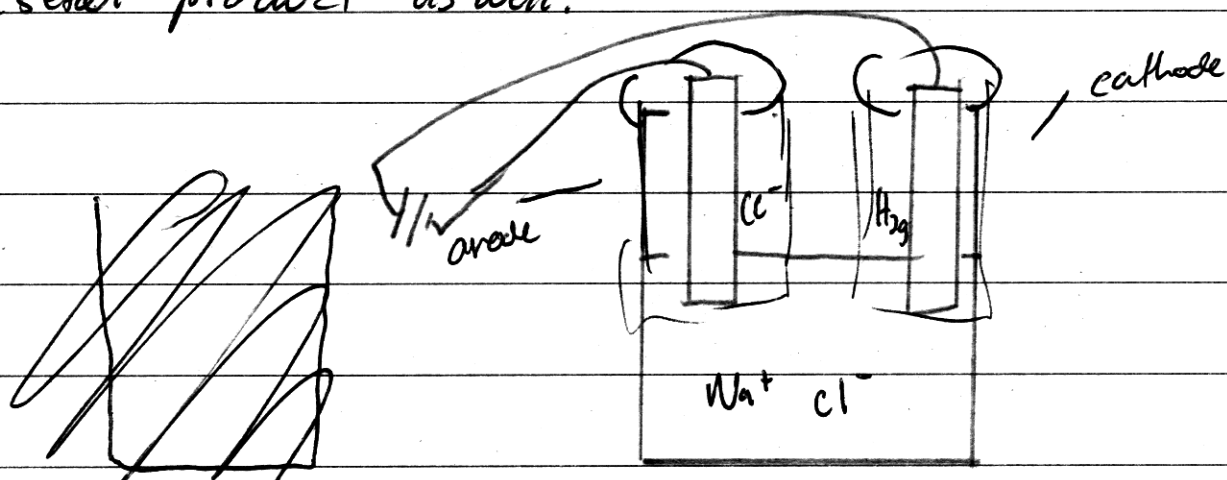
(ii.) The equilibrium reaction was analysed quantitatively by the colour changes which took place - from brown to colourless. In iced water, the gaseous mixture turned a much darker brown, indicating the presence of more N_2O_4 gas. The converse was also true. This showed that the forward reaction

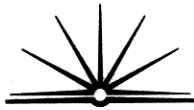


(e) Sodium hydroxide production is done using electrolysis. Concentrated Sodium chloride (Brine) is dissolved in the liquid and the Cl undergoes ^{oxidation} ~~reduction~~ and also hydrogen gas is produced.



Then ~~found~~ when they found out that $\text{H}_2(\text{g})$ was produced they collected it because it is a useful product as well.





The diagram shows that $\text{Cl}_2(\text{g})$ & $\text{H}_2(\text{g})$ is produced and collected and what's left over inside the beaker is the NaOH .