Start here. Q.32 LOAB

a) The cell shown is the mercury cell.
The brine enteres the electrolysis cell where the anode releasing $Cl_2$ gas seperates the brine into its components. The amalgum (Na/Hg) (Hg being the cathode) runs off into the graphite decomposer where NaOH is extracted, $H_2$ gas is released, and Hg descends through the graphite package to be recycled

b) The electrolysis of aqueous sodium chloride (NaCl) would be much easier to perform than molten sodium chloride as aqueous means in the presence of water, which electrolysis is easily done through
$NaCl + 1e^- \rightarrow Na^+ + Cl^-$

Electrolysis – electricity through water makes $H_2$ & oxygen

c) i) $K = \frac{[SO_3]}{[SO_2] \times [O_2]}$

$SO_2 + O_2 \rightarrow SO_3$

$= \frac{0.5}{0.8 \times 0.4}$

$= 1.5625$

at A, ~~$k = \frac{0.5}{0.8 \times 0.4}$~~

$k = \frac{0.5}{0.5 \times 0.4}$

$= 2.5$

ii) The amount of ~~product~~ reactant decreased and so by le Chateliers principle, the amount of product increased to reestablish equilibrium

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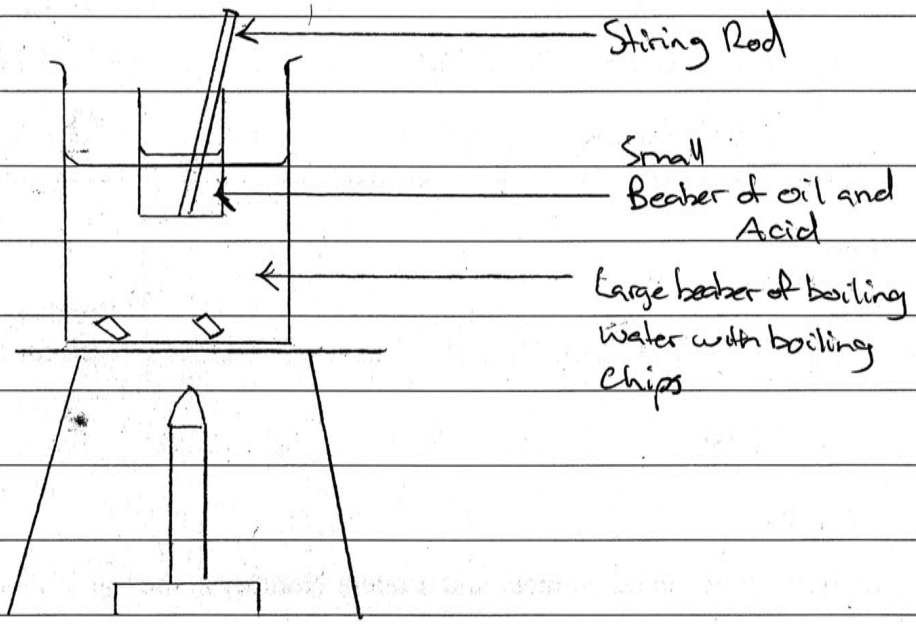
d. i) This is soaponification, an emulsion

Reactant A is an acid

ii) By mixing cooking (vegetable) oil with an acid, such as $H_2SO_4$ in a hot water bath, a gluggy residue will be produced along with glycerol.
The diagram shows the experimental setup




- Stiring the acid/oil solution for 10 minutes after boiling of water is achieved will form a solid ~~precipitate~~ residue.
- After 10 minutes, extract ONLY the residue and dispose of any remaining solution.
- Rinse with distilled water to extract if necessary
- Dry the residue and a basic soap has been made.

e) $2NaCl + CaCO_3 \rightarrow Na_2CO_3 + CaCl_2$

The solvey process is a process of mixing sodium chloride ($NaCl$) and limestone ($CaCO_3$) to produce large amounts of sodium carbonate ($Na_2CaCO_3$). Sodium carbonate is used as a dehydrating agent in domestic cleaning products and industry.

Environmental impacts of using limestone start at the beginning with extraction. Machinery used to extract limestone gives off oxides which are damaging to atmosphere. In production, small amounts of $CO_2$ and $NH_3$ (ammonia gas) are released. As solvay plants are located near cities and towns, this can be damaging to sensitive human and animal health conditions. This is closely monitered to maintain safe levels. Water used to cool the process becomes hot and must be cooled before returning to water ways where damage can occur if left heated. Waste $CaCl_2$ is sold until sales are met, then remaining amounts are dumped into the ocean. Noise pollution affects urban areas so land areas of the plant are insulated and sound proofed.

The importance of using limestone is to obtain the carbonate molecule to make $Na_2CO_3$.

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