

Start here.

Q. 32

LDAB

a) The cell shown is the mercury cell.

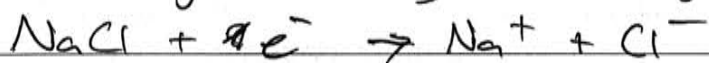
The brine enters the electrolysis cell where the anode separates the brine into its components, ^{releasing Cl_2 gas} The amalgam

(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.

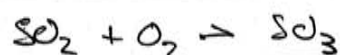
b) The electrolysis of aqueous sodium chloride (NaCl) would be much easier to perform than molten sodium

Electrolysis -
electricity through water
makes H_2 & oxygen

chloride as aqueous means in the presence of water, which electrolysis is easily done through



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



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

$$= 1.5625$$

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 Chatelier's principle, the amount of product increased to reestablish equilibrium

Additional writing space on back page.

Start here.

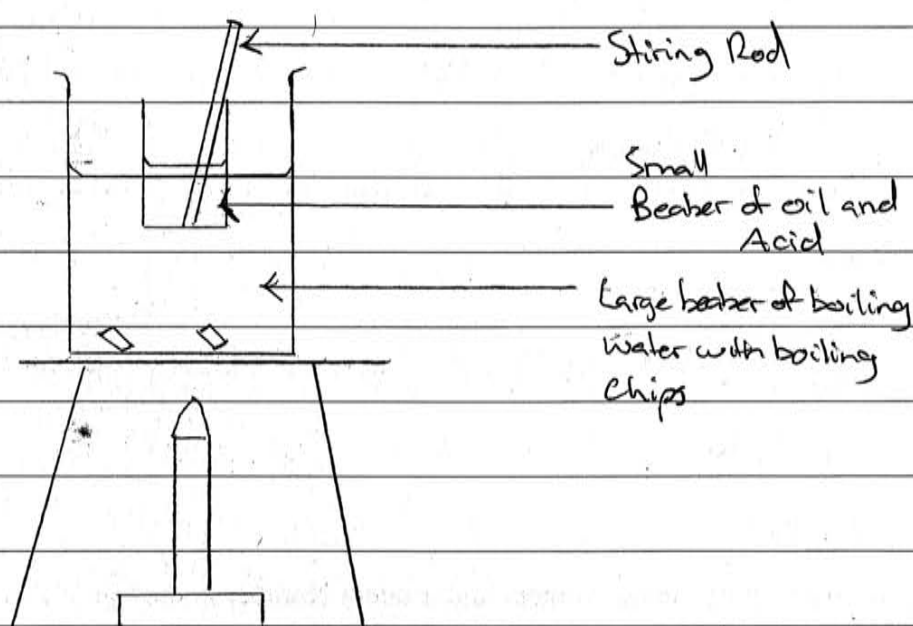
Q. 32.

d. i) This is saponification, an emulsion

Reactant A is an acid

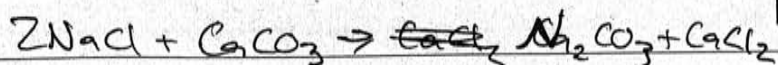
ii) By mixing cooking (vegetable) oil with an acid, such as H_2SO_4 in a hot water bath, a gummy residue will be produced along with glycerol.

The diagram shows the experimental setup



- Stirring 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.)



The solvay process is a process of mixing sodium chloride (NaCl) and limestone (CaCO_3) to produce large amounts of sodium carbonate (Na_2CO_3). Sodium carbonate is used as a dehydrating agent in domestic cleaning products and industry.

Environmental impacts of using limestone start at the ~~beginning~~ beginning with extraction. ~~Best~~ 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 monitored to maintain safe levels. Water used to cool the process ~~is~~ 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~~ met, then remaining amounts are dumped into the ocean. Noise pollution ~~is~~ 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 .

Additional writing space on back page.