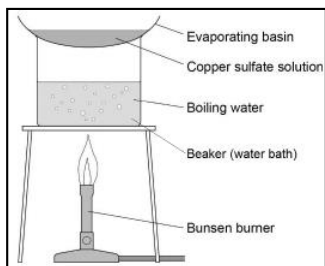
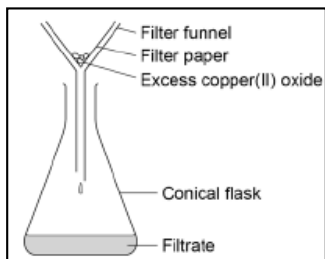


1 - Preparation of a pure, dry salt

Correctly order the steps to produce soluble salts:

- _ Filter the excess solid out of the solution
- _ Keep adding the solid until no more reacts
- _ Heat the solution to evaporate some of the water
- _ Leave the salt solution to cool and dry so it crystallises
- _ React an acid with a solid insoluble substance (e.g. metal, metal oxide, or metal carbonate)

Name the separation technique shown in each diagram



Name the type of reaction that takes place when dilute hydrochloric acid reacts with calcium oxide.

Write a balanced symbol equation for the reaction of dilute hydrochloric acid with calcium oxide.

When carrying out this reaction, the student used an **excess** of calcium oxide. Why?

A student added solid calcium oxide to dilute hydrochloric acid in a beaker. The student added solid calcium carbonate to dilute hydrochloric acid in another beaker.

Describe **one** difference between the two reactions that the student would **see**.

4 - Temperature changes

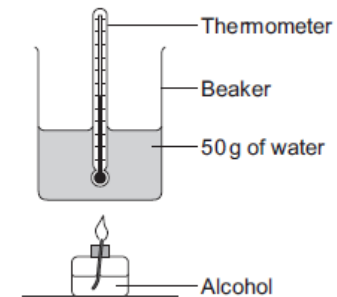
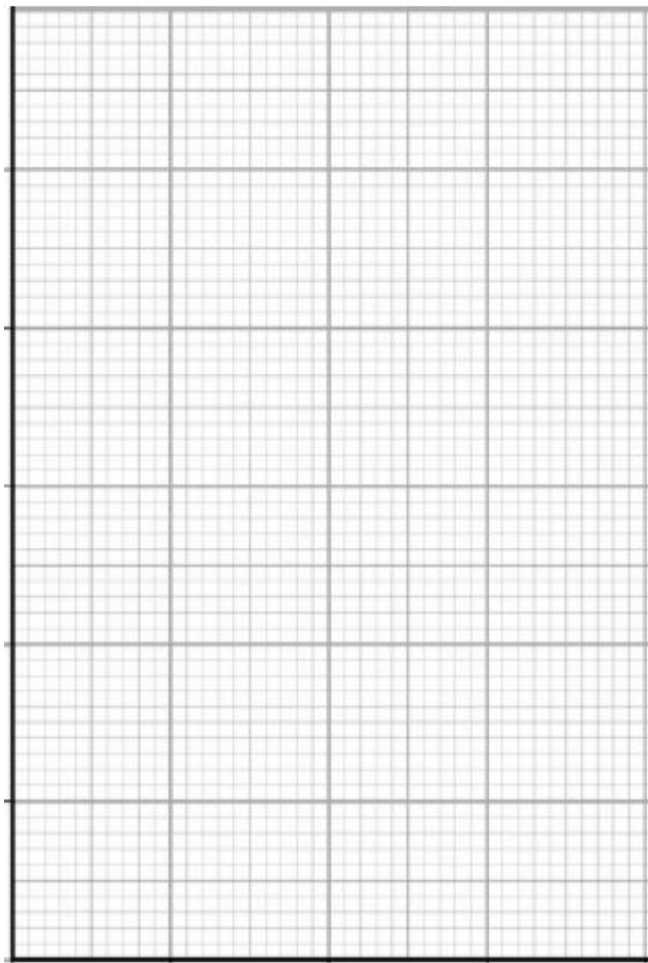
Total volume of NaOH added / cm ³	Mean maximum temperature / °C
0	22.5
5	24.3
10	27.2
15	29.1
20	31.1
25	31.9
30	32.3
35	31.6
40	30.8

A student added sodium hydroxide to hydrochloric acid and measured the temperature.

Plot a graph of the student's results and draw two straight lines of best fit.

From the graph read off the maximum temperature change.

This is an example of an exothermic reaction. Can you explain why the results show the temperature starting to fall after a certain volume of sodium hydroxide had been added?



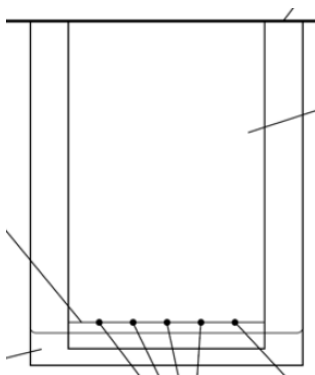
A student uses the above equipment to measure the energy change from the combustion of methanol.

What safety precautions should the student take?

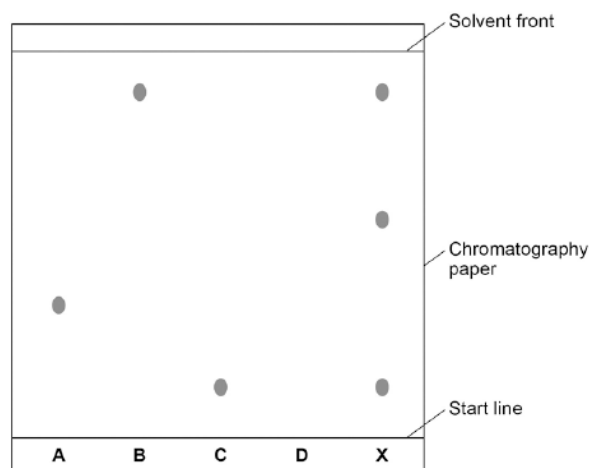
The combustion reaction is exothermic. Sketch an energy profile diagram for this reaction.

2 - Chromatography

Label the diagram of the apparatus used to do chromatography



Use the diagram to answer the questions



How many dyes are in substance X?

Which dyes are **not** in substance X?

How do you know?

Calculate the R_f value for each dye A-C.

Food dye	Distance travelled (mm)		R _f value
	Solvent	Spot of dye	
A	150	66	
B	150	13	
C	150	84	

Which dye is the most soluble in water? How do you know?

What do we use to draw the start/baseline? Why?

In simple chromatography, what is used as the stationary phase?

In simple chromatography, what is usually used as the mobile phase?