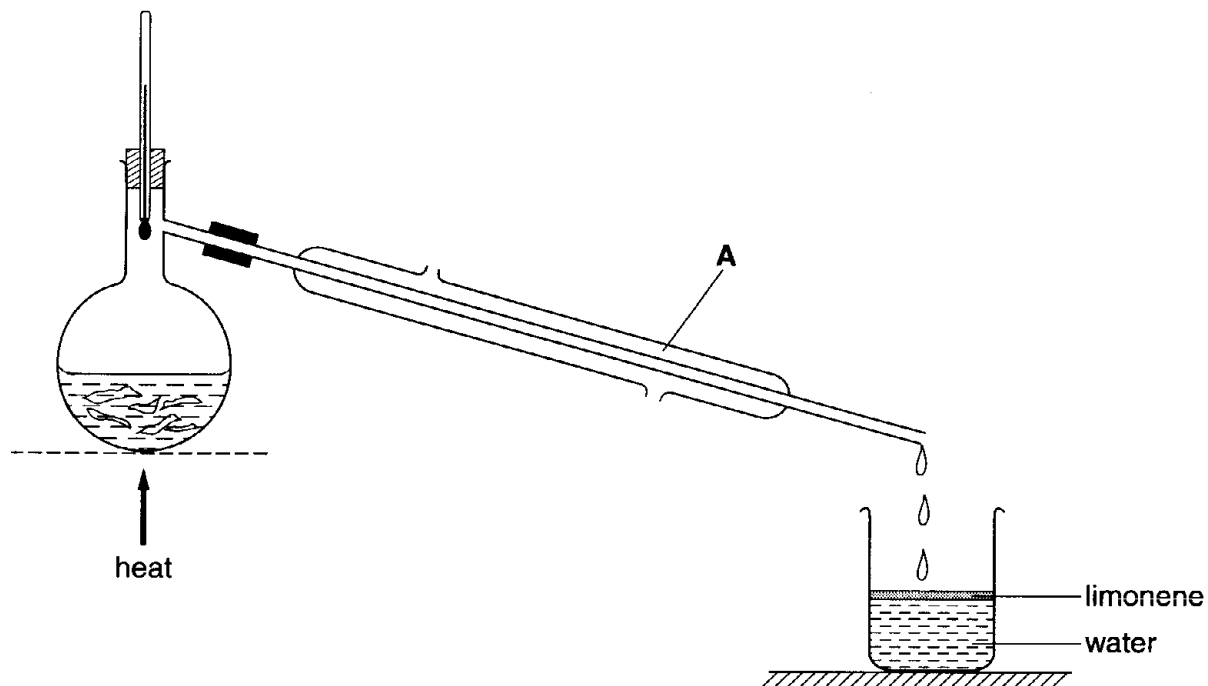


Core 1

Limonene is a liquid hydrocarbon found in orange peel. It can be extracted by boiling the orange peel with water, using the apparatus shown below. The mixture of limonene and water distils at a temperature which is $1\text{ }^{\circ}\text{C}$ below the boiling point of water.



(a) (i) State the name of the piece of apparatus labelled **A**.

.....[1]

(ii) Suggest what the reading on the thermometer will be when the limonene-water mixture is being distilled.

..... $^{\circ}\text{C}$ [1]

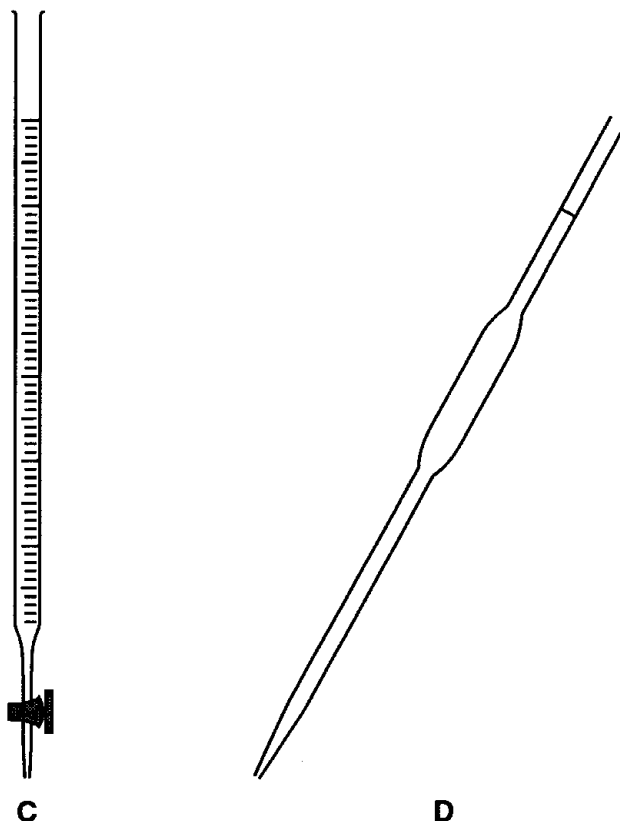
(iii) Limonene is less dense than water. What information in the diagram shows this?

.....[1]

Alternative to Practical 1

A student used the pieces of equipment shown below to compare the concentration of alkali in two liquid oven cleaners.

Oven cleaners contain the alkali sodium hydroxide.



(a) Name the pieces of equipment.

C

D[2]

(b) Outline how these pieces of equipment could be used in an investigation to compare the concentration of alkali in the two liquid oven cleaners.

.....
.....
.....
.....
.....
.....[5]

Alternative to Practical 2

- 4 An aqueous solution **H** and a solid **J** were tested. The tests and some of the observations are in the following table. **H** was hydrochloric acid and **J** was a metal oxide.

Complete the observations in the table.

tests	observations
<p>(a) A little of solution H was tested with Universal indicator paper.</p> <p>The pH was recorded.</p>	<p>colour</p> <p>pH[2]</p>
<p>(b) To 1 cm³ of solution H was added one spatula measure of manganese(IV) oxide. The mixture was boiled. The gas was tested with damp blue litmus paper.</p>	<p>litmus paper turned pink, then white</p>
<p>(c) To 1 cm³ of solution H was added about 1 cm³ of aqueous silver nitrate.</p>	<p>.....[2]</p>
<p>(d) To 1 cm³ of solution H was added one spatula measure of sodium carbonate. The gas given off was tested with limewater.</p>	<p>.....</p> <p>.....[2]</p>
<p>(e) To 6 cm³ of solution H was added solid J. The mixture was boiled gently. Two portions of the mixture were tested as follows.</p> <p>(i) To 1 cm³ of the mixture was added an excess of aqueous sodium hydroxide a little at a time.</p> <p>(ii) To 1 cm³ of the mixture was added an excess of aqueous ammonia a little at a time.</p>	<p>white precipitate, dissolved in excess.</p> <p>white precipitate, dissolved in excess.</p>

- (f) Name the gas given off in test (b).

.....[1]

- (g) Name the gas given off in test (d).

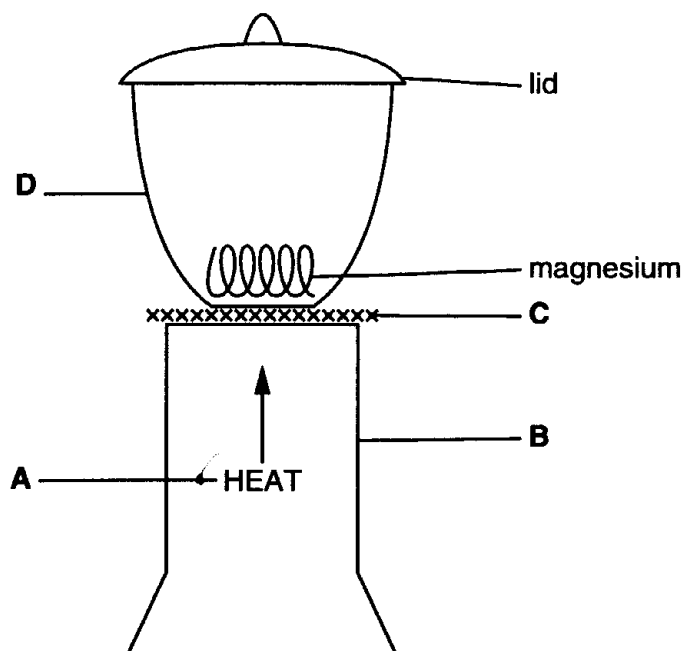
.....[1]

- (h) Identify the metal in oxide **J**.

.....[1]

Alternative to Practical 3

The diagram shows apparatus used for strongly heating some magnesium.



(a) Name each piece of apparatus.

- A
- B
- C
- D[4]

(b) Give **two** expected observations if the lid were removed during the heating.

- 1
- 2[2]

Extension 1

(d) Chromatography is used to identify simple carbohydrates, such as sugars, in plant material.

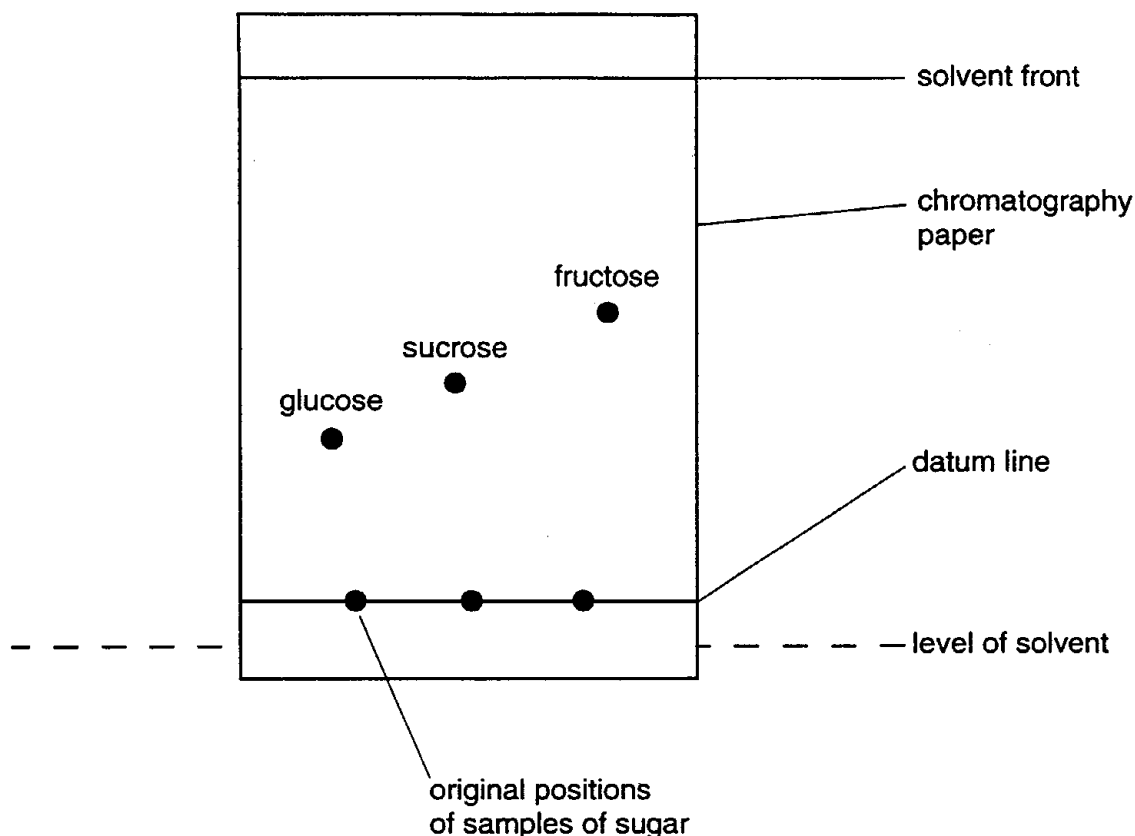


Fig. 5.2

A leaf is ground with 50% aqueous alcohol to give a colourless solution of the sugars. This solution is concentrated and a chromatogram is obtained. The paper is sprayed with resorcinol solution.

(i) A common use of ethanol is in alcoholic drinks. In this experiment it is used as a solvent. Give one other use.

.....[1]

(ii) Why is the datum line drawn in pencil?

.....[1]

(iii) Suggest a reason why it is necessary to spray the chromatogram with resorcinol.

.....
.....[2]

(iv) Describe how chromatography could be used to show that the hydrolysis of starch produces only one sugar, glucose.

.....
.....[2]

Extension 2

Chemistry is concerned with problem-solving and answering questions. For each of the following, describe any experiments that are needed and, when necessary, indicate how the results should be used to solve the problem.

- (a) Nickel sulphate-7-water exists as bright green crystals and anhydrous nickel sulphate as a yellow powder. How could you show that the action of heat on the hydrated salt is a reversible reaction?

.....
.....
.....[3]

- (b) How could you prove that the percentage of water in an aqueous solution of sodium chloride is 74%?

.....
.....
.....[4]

- (c) A small piece of cement from a wall is dissolved in nitric acid. The resulting mixture is filtered to give a solution.

- (i) What observation shows that the cement contains carbonate ions and what test is needed to confirm this?

observation

test

result

- (ii) How could you show that the solution contains calcium ions?

reagent

result

reagent

result

[6]

- (d) The formula of an acid is either of the type HY or H₂Y. How could you find out which one is correct by using aqueous solutions of the acid and of sodium hydroxide. Assume that both solutions have the same concentration, 0.1 mol/dm³.

.....
.....
.....
.....[4]

Core 1

- a(i) (Liebig) condenser
- (ii) 99
- (iii) limonene floats on water / on top of the water

Alternative to Practical 1

- a **C** = burette
 D = pipette
- b five points from these
 known volume of / pipette oven cleaner into flask / beaker
 named acid
 in burette
 use of indicator
 note volume of acid to neutralise oven cleaner
 repeat with other oven cleaner

Alternative to Practical 2

- a colour – red
pH 1-3
- c white
precipitate
- d fizz / effervescence / bubbles
limewater gives a milky / white precipitate
- f chlorine
- g carbon dioxide
- h zinc

Alternative to Practical 3

- a
 - A – Bunsen burner
 - B – Tripod
 - C – Gauze
 - D – Crucible

- b
 - indication of burning, light / flame / glow
 - white smoke / ash

Extension 1

- i fuel or making esters or antiseptic or ethanoic acid or vinegar or thermometers
- ii does not dissolve or does not contain dyes
- iii two of these
 - to develop it or locating agent
 - samples are colourless
 - to make them visible
- iv any two of these
 - only one spot
 - same position or Rf value
 - compare with glucose

Extension 2

- a heat green crystals
 add water to yellow powder
 goes green
- b weigh solution
 evaporate to dryness
 weigh (solid)
 solution – solid is water or mass of water / mass of solution * 100
- c bubbles
 limewater goes cloudy
- add sodium hydroxide
 white precipitate
- add aqueous ammonia
 no precipitate or faint one
- or flame test with red / orange / brick red flame
- d any four of these
 indicator
 titration
 find volume of sodium hydroxide to neutralise
 if volumes the same then HY
 if twice volume of alkali then H₂Y