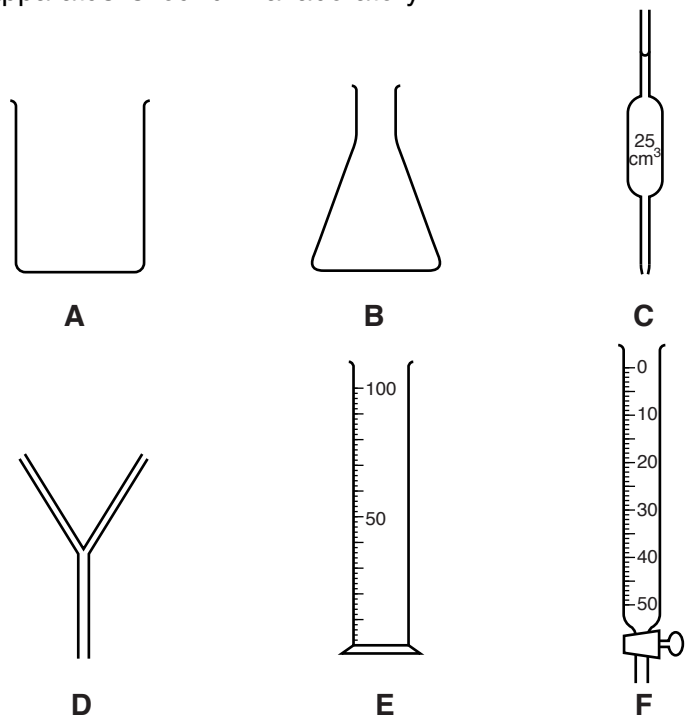
Experimental Design

Q1/41/M/J/16

1 **(a)** The following apparatus is found in a laboratory.

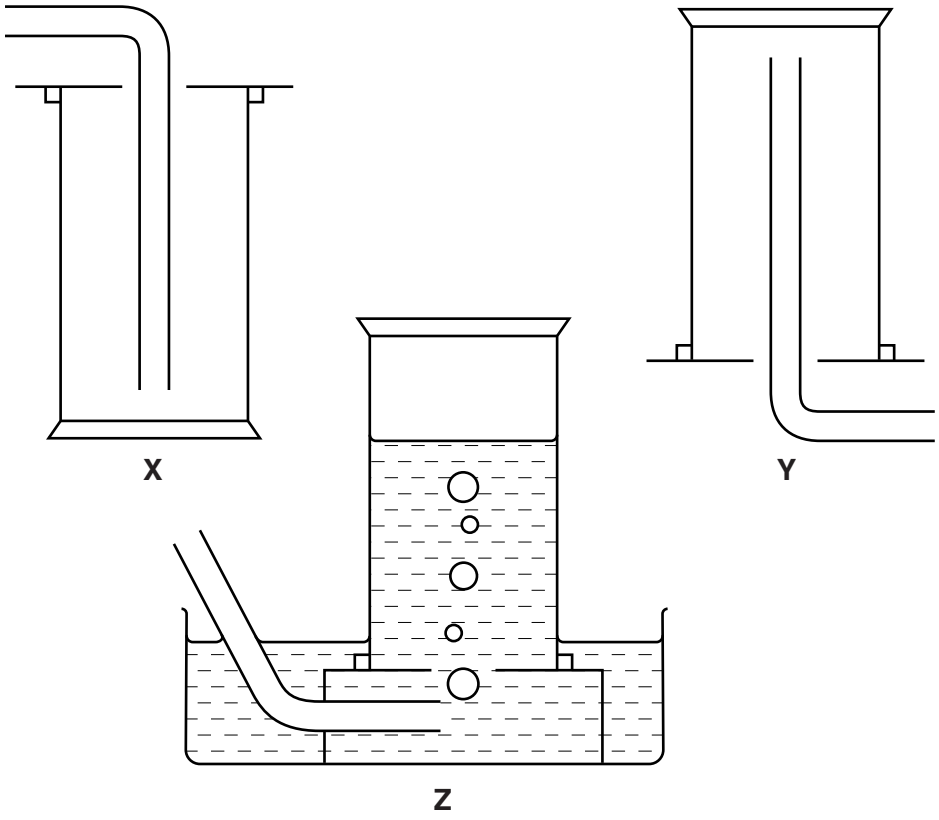


Write in the table the letter of the apparatus most suitable for the purpose.

purpose	apparatus
removing 25.0 cm^3 of a liquid from a container	
measuring 60 cm^3 of a liquid	
as a titrating flask	
separating a precipitate from a solution	

[4]

(b) The diagrams show three methods for collecting gases.



Which method **X**, **Y** or **Z** is suitable for collecting a gas which is

(i) less dense than air and soluble in water,

..... [1]

(ii) more dense than air and soluble in water,

..... [1]

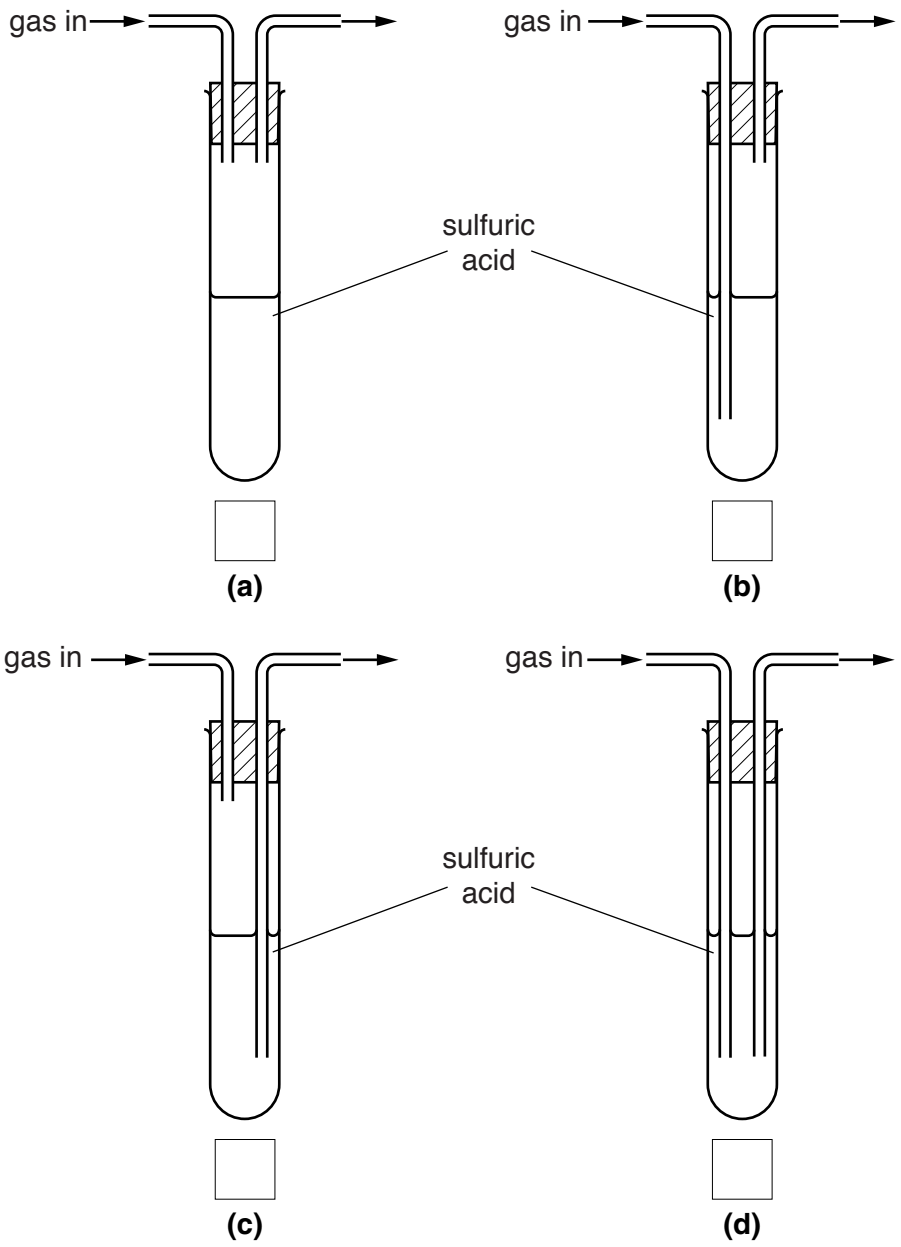
(iii) insoluble in water?

..... [1]

[Total: 7]

Q3/41/M/J/16

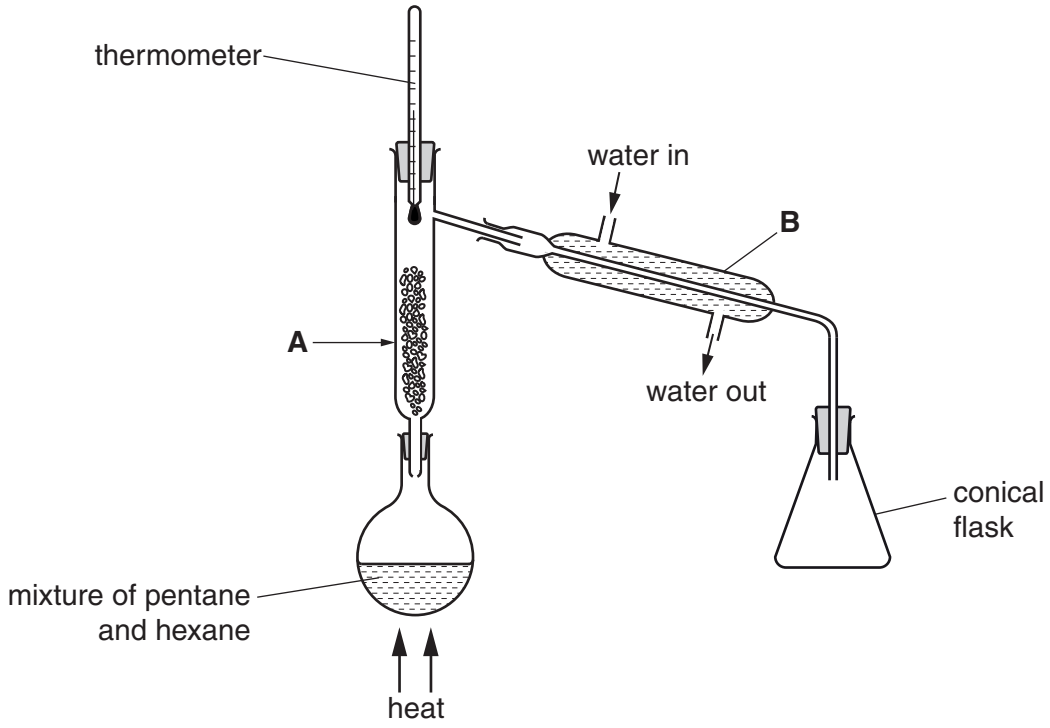
2 A gas may be dried by passing it through concentrated sulfuric acid.
Which method should be used?



[Total: 1]

Q1/41/O/N/16

3 A student separates a mixture of pentane and hexane using the apparatus shown. Pentane collects in the conical flask.



(a) (i) Name apparatus **A**.

..... [1]

(ii) What is the purpose of apparatus **A**?

..... [1]

(iii) Name apparatus **B**.

..... [1]

(b) Identify **two** errors in the student's apparatus.

1. .....

2. .....

[2]

The errors are corrected before the separation is started.

(c) Name the process used to separate the mixture of liquids.

..... [1]

(d) **(i)** State why a Bunsen burner should not be used to heat the mixture of pentane and hexane.

..... [1]

(ii) What should be used instead of a Bunsen burner?

..... [1]

(e) Suggest why pentane collects in the conical flask before hexane.

.....

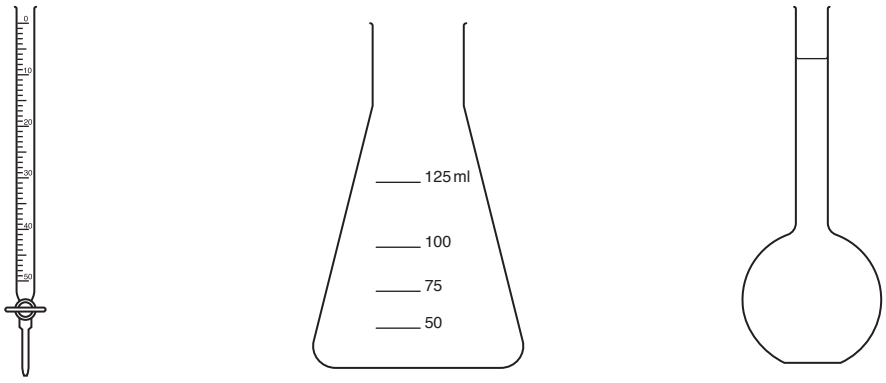
..... [2]

[Total: 10]

Q1(a)/41/M/J/18

4 A student does a series of titrations to determine the percentage of ethanoic acid in a sample of vinegar.

Diagrams of some of the apparatus used by the student are shown.



A **B** **C**

(a) Name the three pieces of apparatus.

A .....

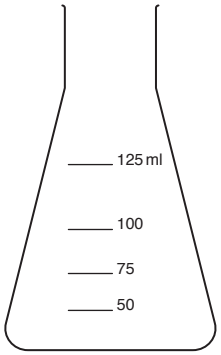
B .....

C .....

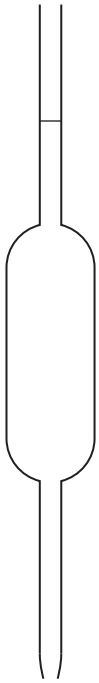
[3]

Q1/41/O/N/18

5 Give the names of the apparatus shown.



P



Q

P .....

Q .....

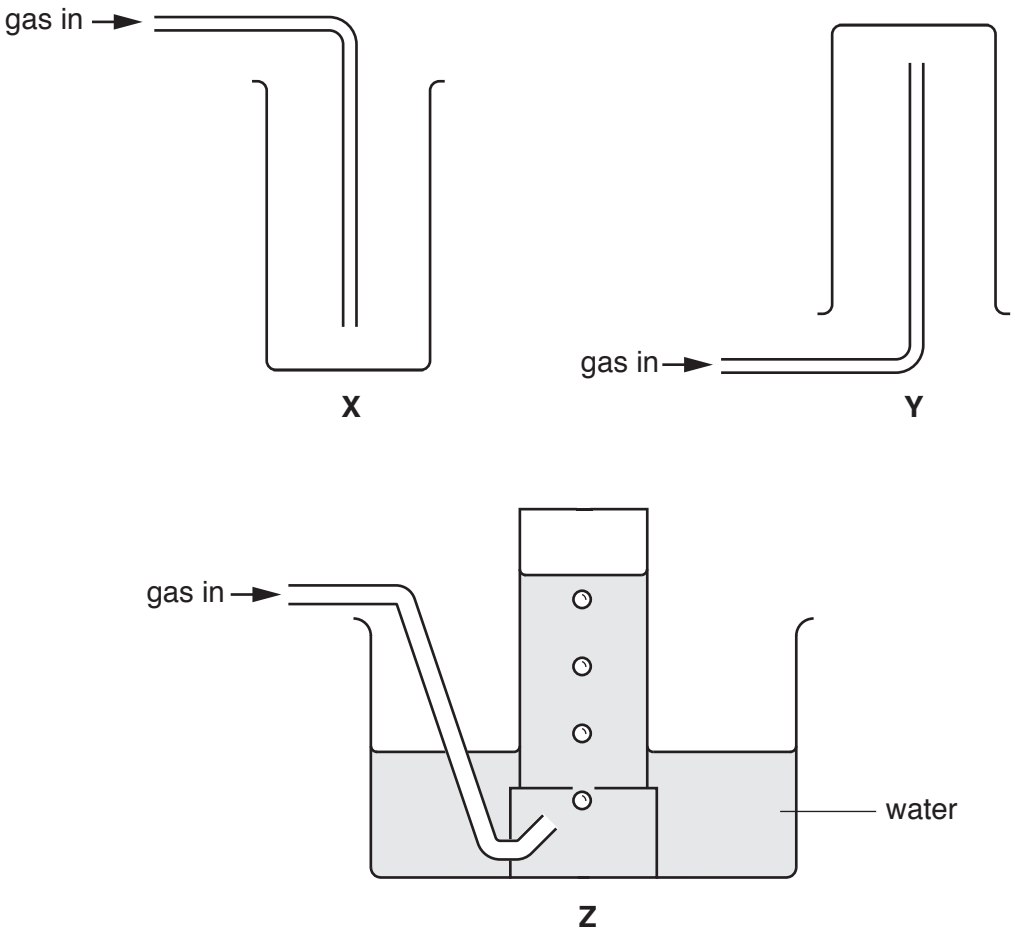
[2]

Q2/41/O/N/18

6 Three gases **A**, **B** and **C** have the properties shown in the table.

gas	density	solubility in water	appearance
A	more dense than air	soluble	colourless
B	less dense than air	soluble	brown
C	more dense than air	insoluble	colourless

(a) Some apparatus used to collect gases is shown.



Which apparatus, **X**, **Y** or **Z**, is most suitable to collect each gas?

gas **A** .....

gas **B** ..... [2]

(b) Gas **C** can be collected using apparatus **Z**.

(i) State why apparatus **Z** is more suitable than apparatus **Y** to collect gas **C**.

.....[1]

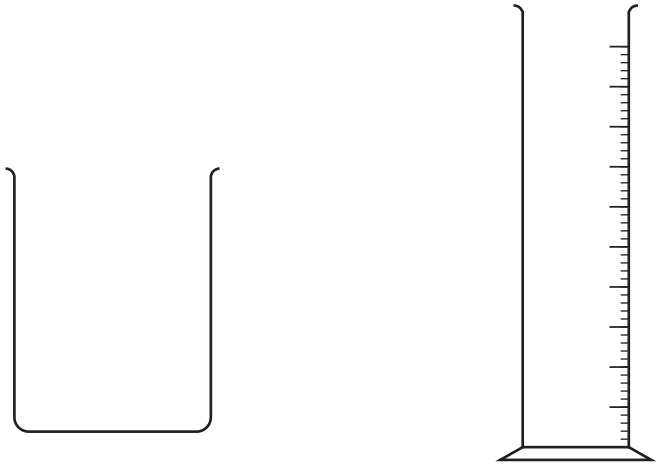
(ii) State why apparatus **Z** is more suitable than apparatus **X** to collect gas **C**.

.....[1]

[Total: 4]

Q1/42/O/N/18

7 State the names of the apparatus shown.



A **B**

A .....

B .....

[2]

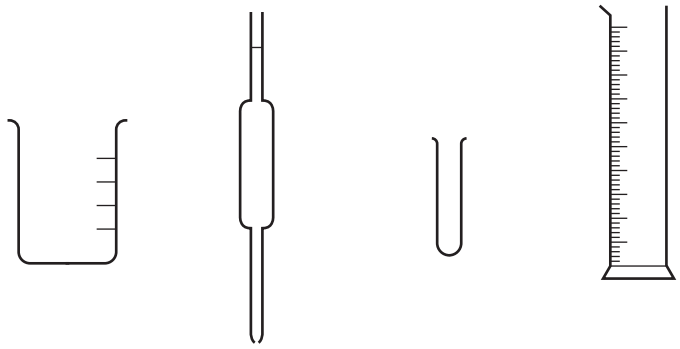
Q1(a,b)/41/M/J/19

8 Ammonium sulfate is a salt. It is used as a fertiliser.

A student prepares some ammonium sulfate crystals by neutralisation.

She uses dilute sulfuric acid and aqueous ammonia.

The diagrams show some of the apparatus the student can use.



A **B** **C** **D**

(a) The student measures 25.0 cm^3 of aqueous ammonia into a conical flask.

Write the letter of the piece of apparatus she should use to measure the aqueous ammonia. Name this piece of apparatus.

letter .....

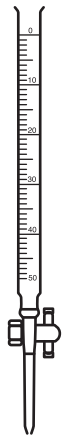
name .....

[1]

(b) **(i)** The student:

- adds a few drops of methyl orange indicator to the aqueous ammonia in the conical flask
- adds dilute sulfuric acid until the indicator changes colour
- records the volume of dilute sulfuric acid added.

She uses the apparatus shown in the diagram to add the sulfuric acid.



Name this piece of apparatus.

..... [1]

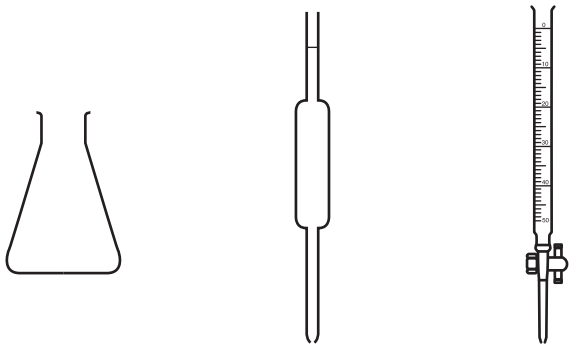
Q1(a)/42/M/J/19

9 Milk of Magnesia is a liquid medicine used to treat indigestion.

Milk of Magnesia contains magnesium hydroxide, $Mg(OH)_2$.

A student does a series of titrations to determine the percentage by mass of magnesium hydroxide in Milk of Magnesia.

Diagrams of some of the apparatus used by the student are shown.



A **B** **C**

(a) Name the three pieces of apparatus.

A .....

B .....

C .....

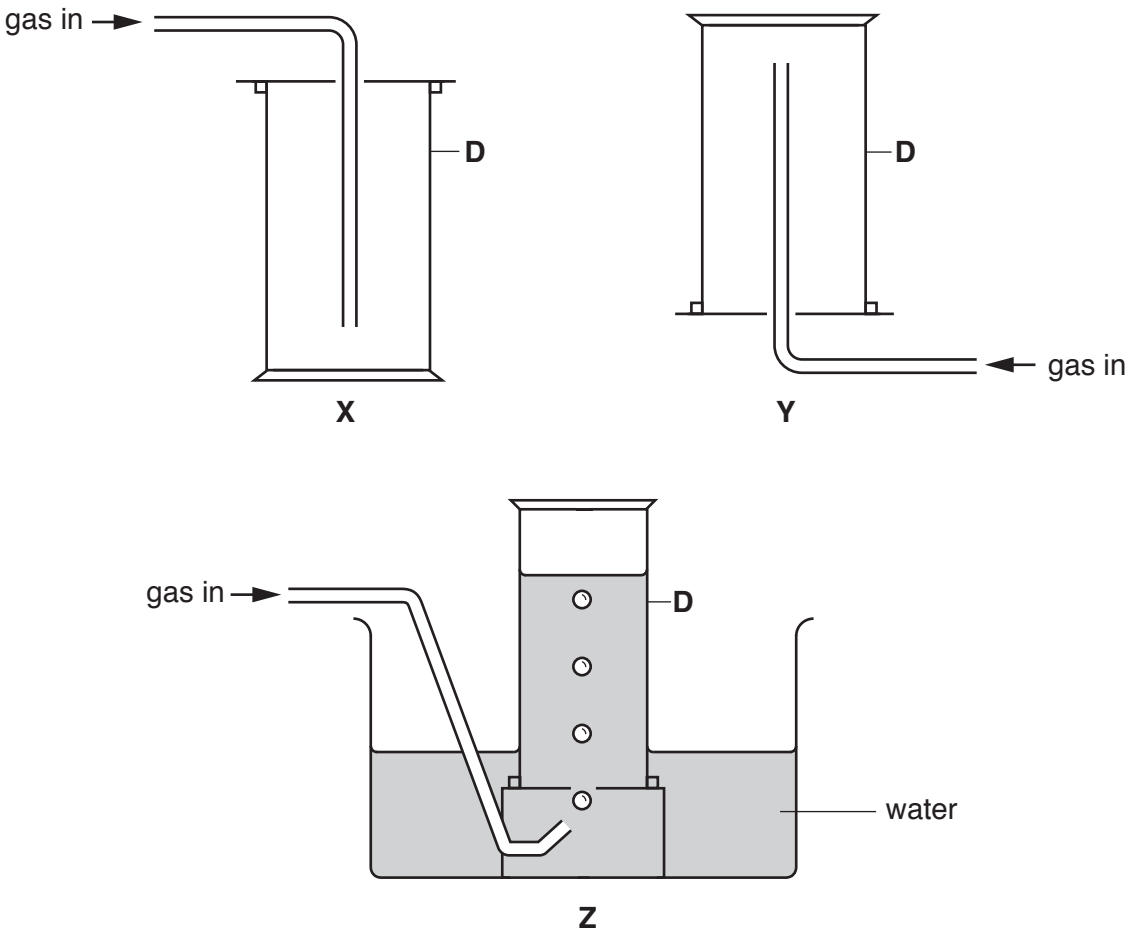
[3]

Q1/42/O/N/19

10 Three gases, **A**, **B** and **C**, have the properties shown.

gas	density	solubility in water	appearance
A	less dense than air	insoluble	colourless
B	more dense than air	insoluble	colourless
C	more dense than air	soluble	green

Some sets of apparatus, **X**, **Y** and **Z**, used to collect gases are shown.



(a) Apparatus **D** is used to collect the gases.

Name apparatus **D**.

..... [1]

(b) Which **two** sets of apparatus, from **X**, **Y** and **Z**, can be used to collect gas **A**?

..... and ..... [1]

(c) Which set of apparatus, **X**, **Y** or **Z**, can be used to collect gas **C**?

..... [1]

(d) (i) State why apparatus **Y** is less suitable than apparatus **X** to collect gas **B**.

..... [1]

(ii) State why apparatus **X** is less suitable than apparatus **Z** to collect gas **B**.

.....

..... [1]

[Total: 5]