

Experimental Design

Question Paper

Level	O Level
Subject	Chemistry
Exam Board	Cambridge International Examinations
Topic	Experimental Chemistry
Sub-Topic	Experimental Design
Booklet	Question Paper

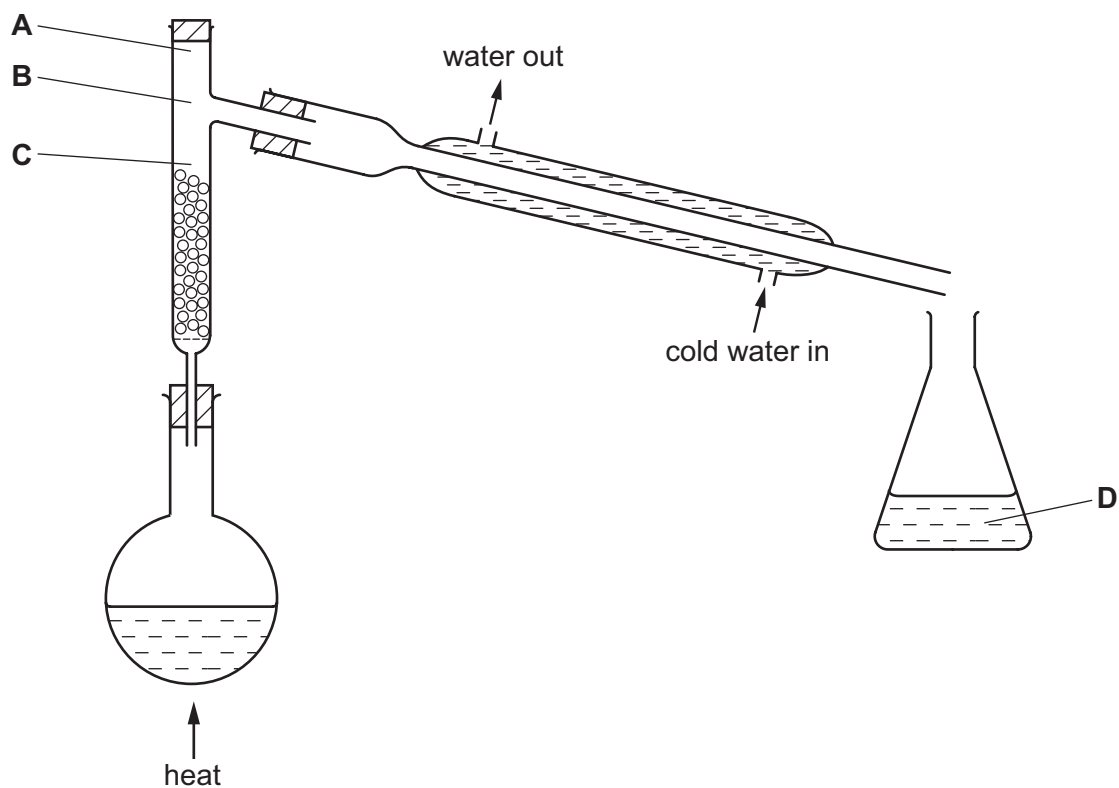
Time Allowed: 17 minutes

Score: /14

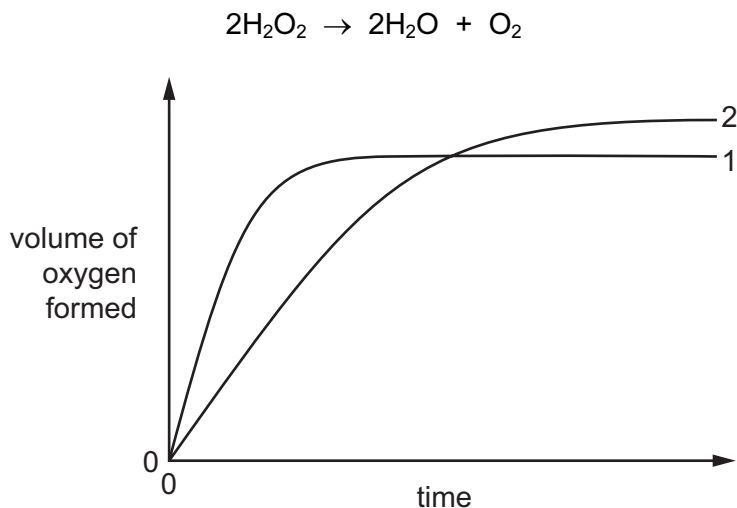
Percentage: /100

- 1 The fractional distillation apparatus shown is being used to separate a mixture of two liquids. A thermometer is missing from the apparatus.

Where should the bulb of the thermometer be placed?



- 2 In the graph, curve 1 was obtained by observing the decomposition of 100 cm^3 of 1.0 mol/dm^3 hydrogen peroxide solution, catalysed by manganese(IV) oxide.



Which alteration to the original experimental conditions would produce curve 2?

- A adding some 0.1 mol/dm^3 hydrogen peroxide solution
 - B lowering the temperature
 - C using less manganese(IV) oxide
 - D using a different catalyst
- 3 In a titration between an acid (in the burette) and an alkali, you may need to re-use the same titration flask.

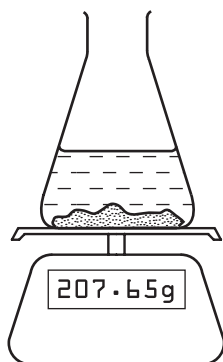
Which is the best procedure for rinsing the flask?

- A Rinse with distilled water and then with the alkali.
- B Rinse with tap water and then with distilled water.
- C Rinse with tap water and then with the acid.
- D Rinse with the alkali.

- 4 Calcium carbonate reacts with hydrochloric acid, producing carbon dioxide gas.



The rate of this reaction can be measured using the apparatus shown.



Which additional piece of apparatus is also required?

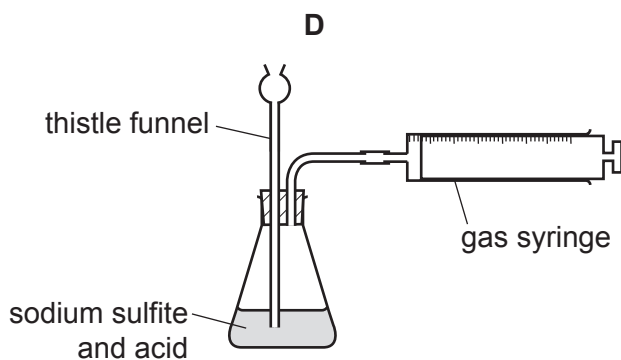
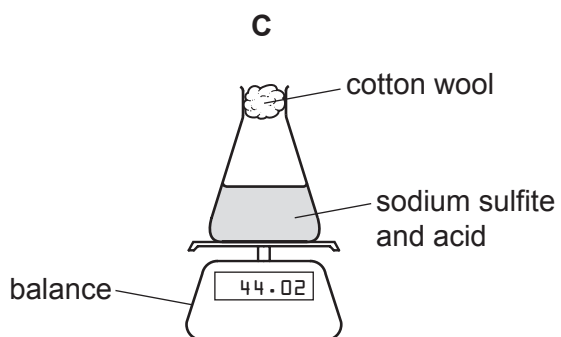
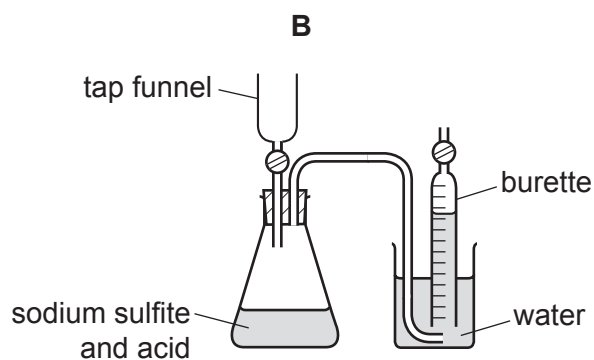
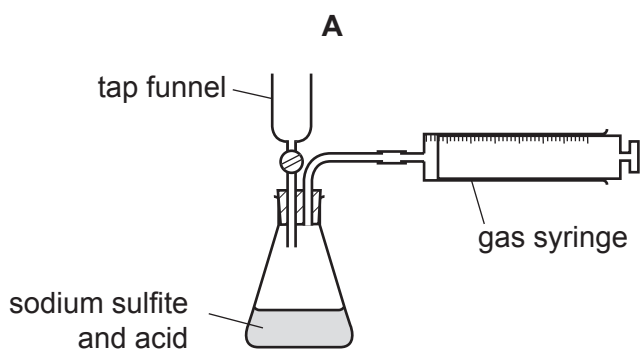
- A** a burette
- B** a clock
- C** a gas syringe
- D** a thermometer

Save My Exams! – The Home of Revision

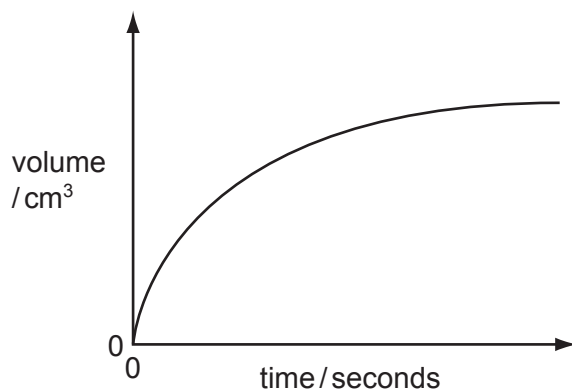
For more awesome GCSE and A level resources, visit us at www.savemyexams.co.uk/

- 5 A student wanted to follow how the rate of the reaction of sodium sulfite with acid varies with time. The reaction produces gaseous sulfur dioxide.

Which apparatus is **not** suitable?

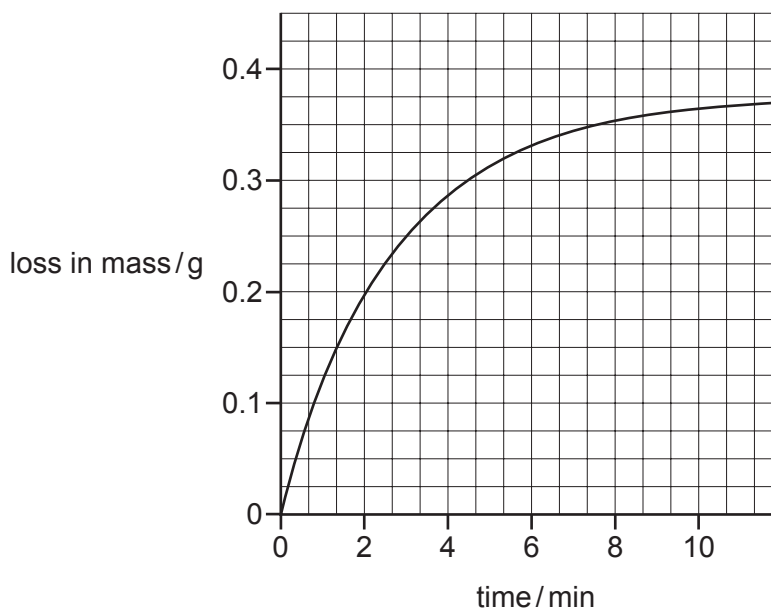


- 6 A student measured the rate of reaction between calcium carbonate and dilute hydrochloric acid. A graph showing the volume of gas produced against time is shown.



Which apparatus was used to measure the variables shown on the graph?

- A balance and gas syringe
 - B burette and pipette
 - C gas syringe and stop watch
 - D pipette and stop watch
- 7 Copper(II) carbonate powder was heated. The loss in mass was plotted against time as shown on the graph.



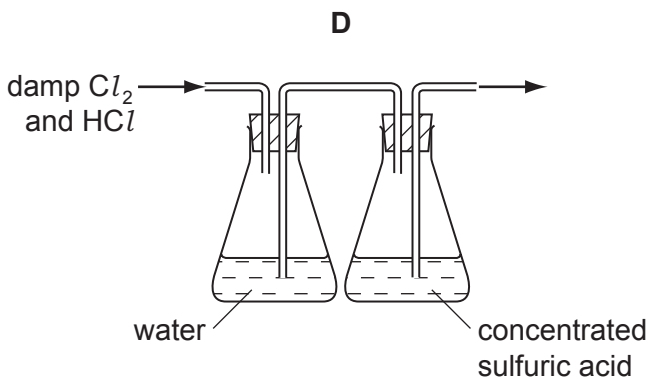
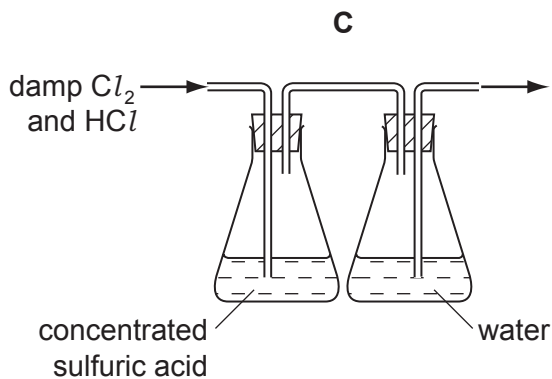
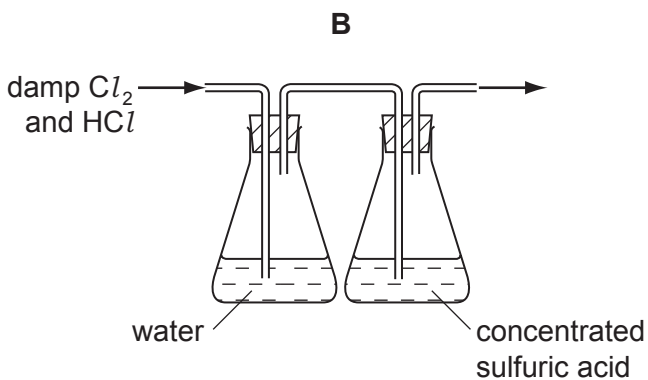
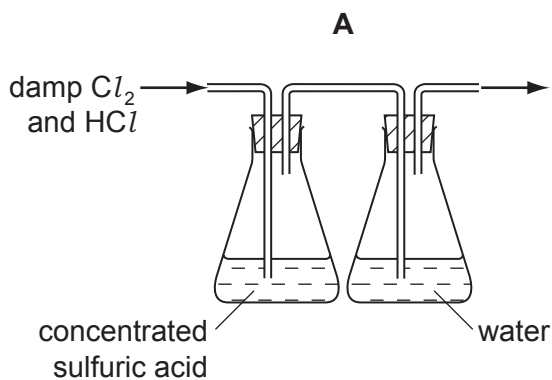
During which time interval is the reaction fastest?

- A 0 to 2 min
- B 2 to 4 min
- C 6 to 8 min
- D 8 to 10 min

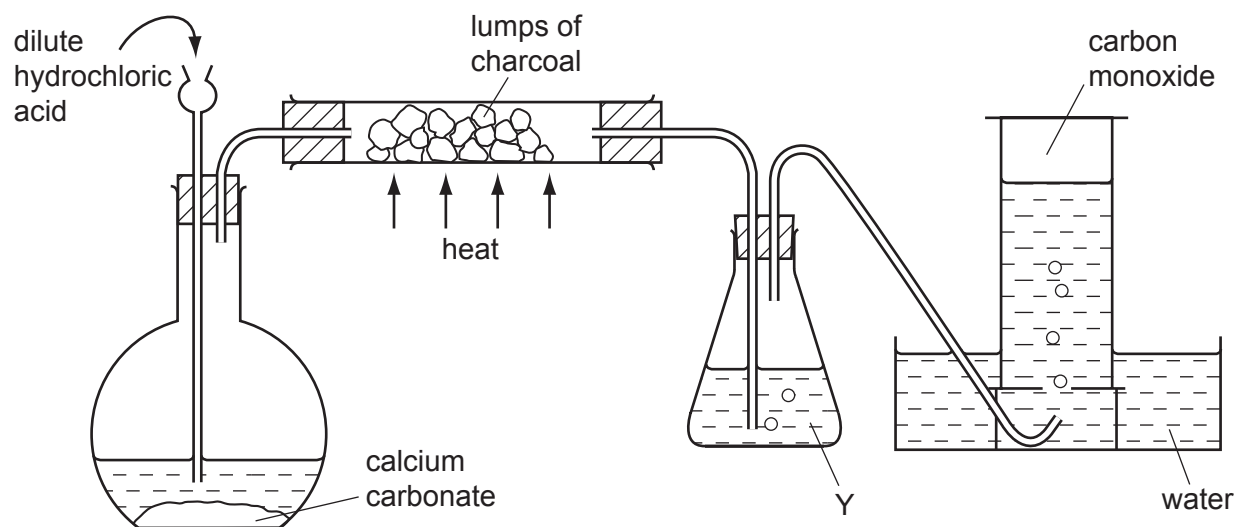
8 Hydrogen chloride is very soluble in water, whereas chlorine is only slightly soluble in water.

Both gases can be dried using concentrated sulfuric acid.

Which diagram represents the correct method of obtaining pure dry chlorine from damp chlorine containing a small amount of hydrogen chloride?



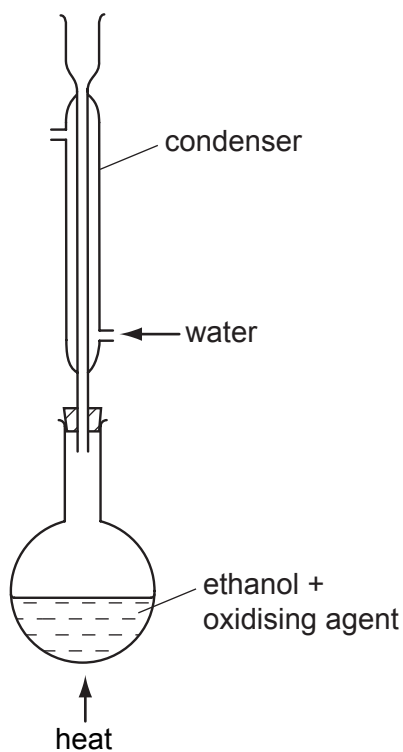
9 The diagram shows apparatus used to obtain carbon monoxide.



What is the main purpose of Y?

- A to dry the gas
- B to prevent water being sucked back on to the hot carbon
- C to remove carbon dioxide from the gas
- D to remove hydrogen chloride from the gas

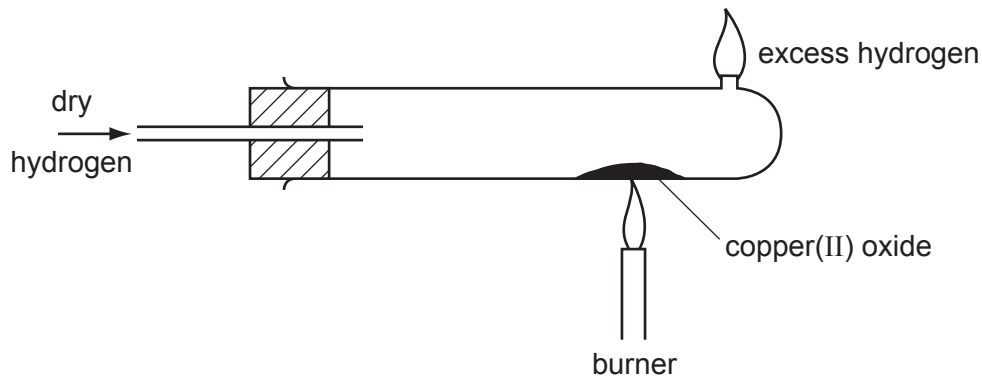
10 The oxidation of ethanol to ethanoic acid is often carried out in the apparatus shown.



What is the purpose of the condenser?

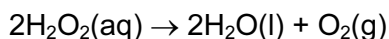
- A to prevent air reacting with the ethanoic acid
- B to prevent any ethanol from escaping
- C to prevent the ethanoic acid changing back to ethanol
- D to prevent the ethanoic acid reacting with the ethanol

- 11 The diagram shows copper(II) oxide being reduced, by hydrogen, to copper. After reduction is complete, the burner is turned off but the flow of hydrogen is continued until the tube is cool.

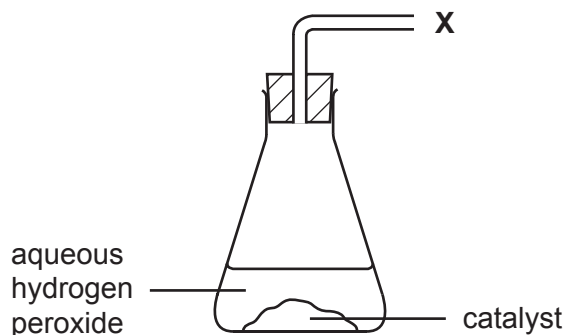


Why is the hydrogen allowed to flow through the tube during cooling?

- A to allow the tube to cool slowly
 - B to lessen the risk of explosion in the hot tube
 - C to prevent the copper from reacting with the air
 - D to remove any traces of water left in the tube
- 12 Aqueous hydrogen peroxide undergoes catalytic decomposition as shown in the equation below.



The diagram shows part of the apparatus used to measure the rate of decomposition.

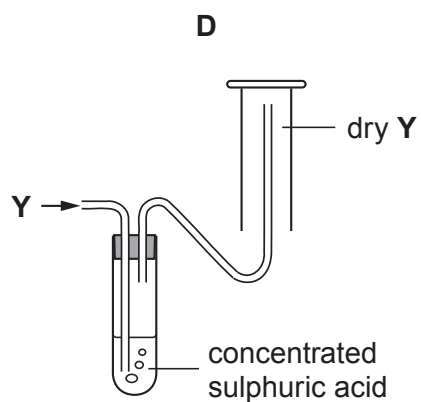
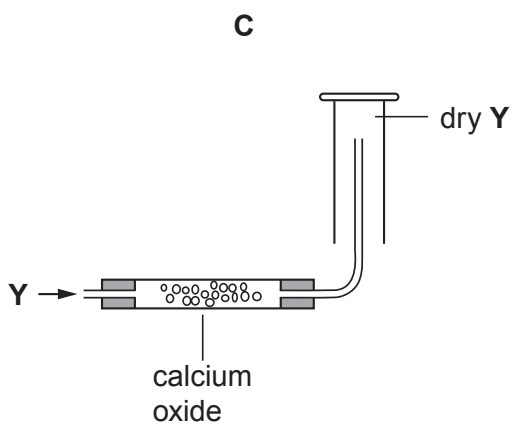
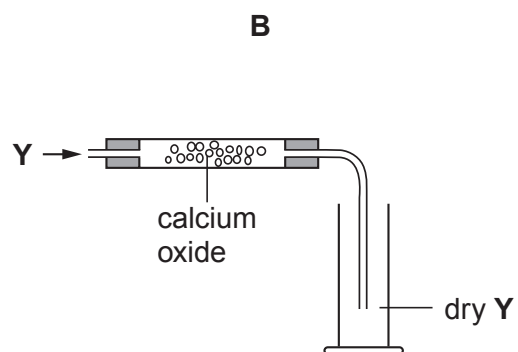
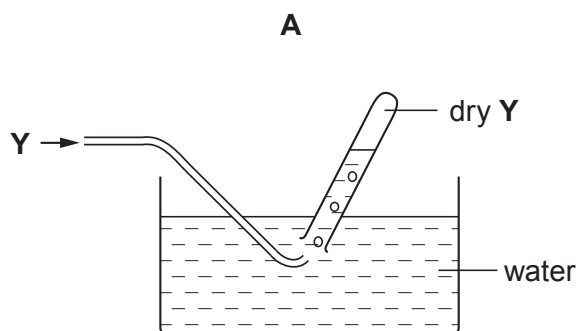


Which piece of apparatus is connected at position X?

- A burette
- B gas syringe
- C measuring cylinder
- D pipette

13 A gas Y, is less dense than air, very soluble in water and is an alkali.

Which method is used to collect a dry sample of the gas?



14 A gas, **X**, is less dense than air and insoluble in water.

Which method **cannot** be used to collect the gas?

