

# Manufacture and Uses(Sulfur)

## Question Paper

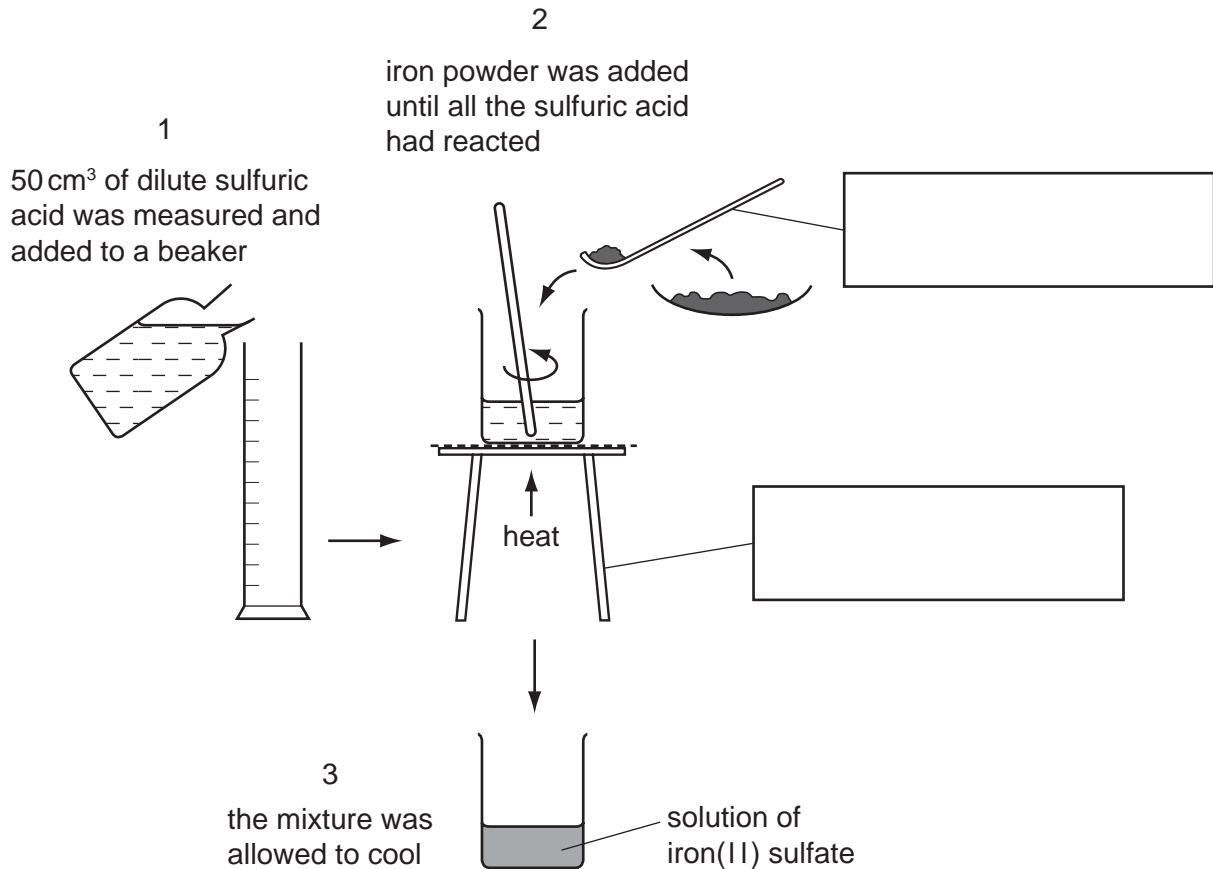
<b>Level</b>	IGCSE
<b>Subject</b>	Chemistry
<b>Exam Board</b>	CIE
<b>Topic</b>	Sulfur
<b>Sub-Topic</b>	Manufacture and uses (Includes Sulfur dioxide questions)
<b>Paper Type</b>	Alternative to Practical
<b>Booklet</b>	Question Paper

**Time Allowed:** 36 minutes

**Score:** /30

**Percentage:** /100

- 1 A student reacted excess iron powder with sulfuric acid to prepare a solution of iron(II) sulfate.  
The diagram shows the procedure followed in three stages.



(a) Complete the boxes to identify the pieces of apparatus labelled. [2]

(b) How would the student know when all of the sulfuric acid had reacted? Give **two** reasons.

1 .....

2 ..... [2]

(c) Describe the effect of boiling the solution of iron(II) sulfate for several minutes.

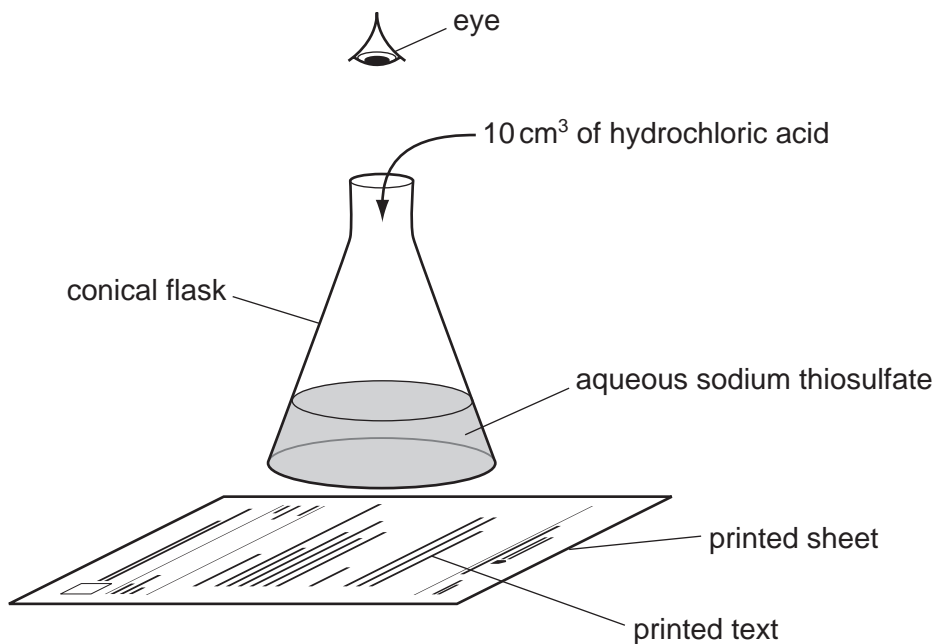
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.....

..... [3]

[Total: 7]

- 2 Hydrochloric acid reacts with aqueous sodium thiosulfate to form a precipitate, which makes the solution turn cloudy. The formation of the precipitate can be used to show how fast the reaction proceeds, using the apparatus shown below.



A student used this method to investigate the effect of changing the concentration of the sodium thiosulfate solution on the speed of the reaction.

The student used different concentrations of sodium thiosulfate solution.

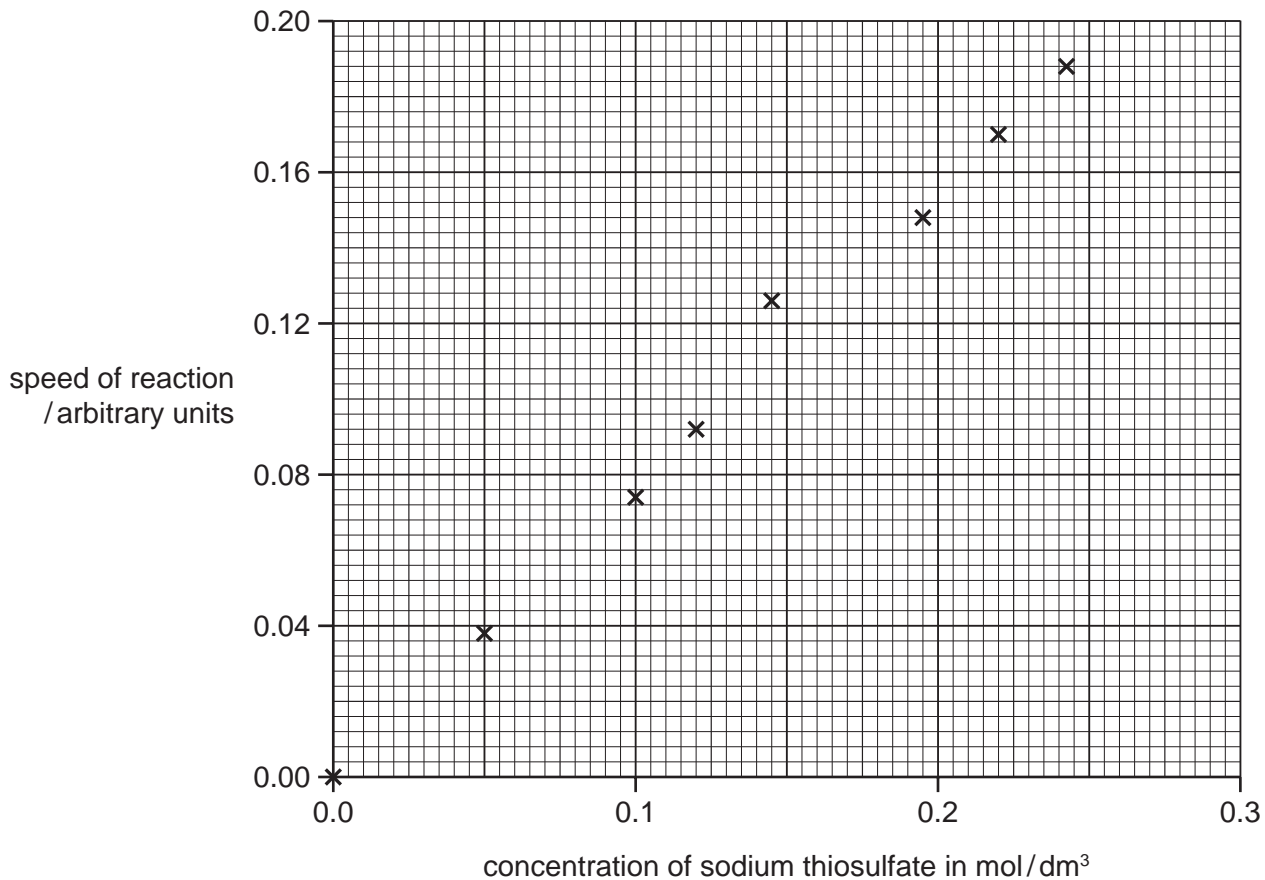
All other variables were kept the same.

(a) Give **two** variables which were kept the same in the investigation.

1. ....

2. .... [2]

The results of the experiments are shown plotted on the grid below.



(b) Draw a line of best fit on the grid. [1]

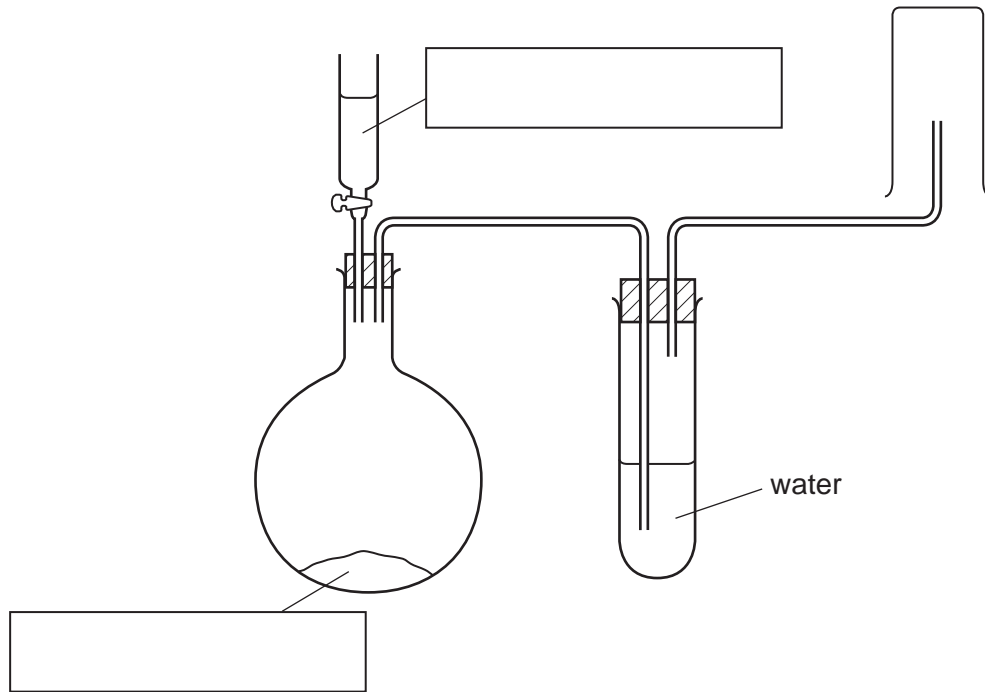
(c) Suggest **two** reasons why not all of the points lie on the line of best fit.  
 1. ....  
 2. .... [2]

(d) From your graph, deduce the speed of reaction when the concentration of sodium thiosulfate is 0.075 mol / dm<sup>3</sup>. Show clearly **on the graph** how you worked out your answer.  
 ..... [2]

(e) Explain why the speed of reaction increases when the concentration of sodium thiosulfate is increased.  
 .....  
 ..... [2]

(f) Sketch on the grid the line you would expect if the experiments were repeated at a higher temperature. [1]

- 3 Sulphur dioxide gas is denser than air and soluble in water. A sample of sulphur dioxide can be prepared by adding dilute hydrochloric acid to sodium sulphite and warming the mixture. Study the diagram of the apparatus used.



(a) Fill in the boxes to show the chemicals used. [2]

(b) Show by using an arrow, on the diagram, where heat is applied. [1]

(c) Identify and explain two mistakes in the diagram.

Mistake 1 .....

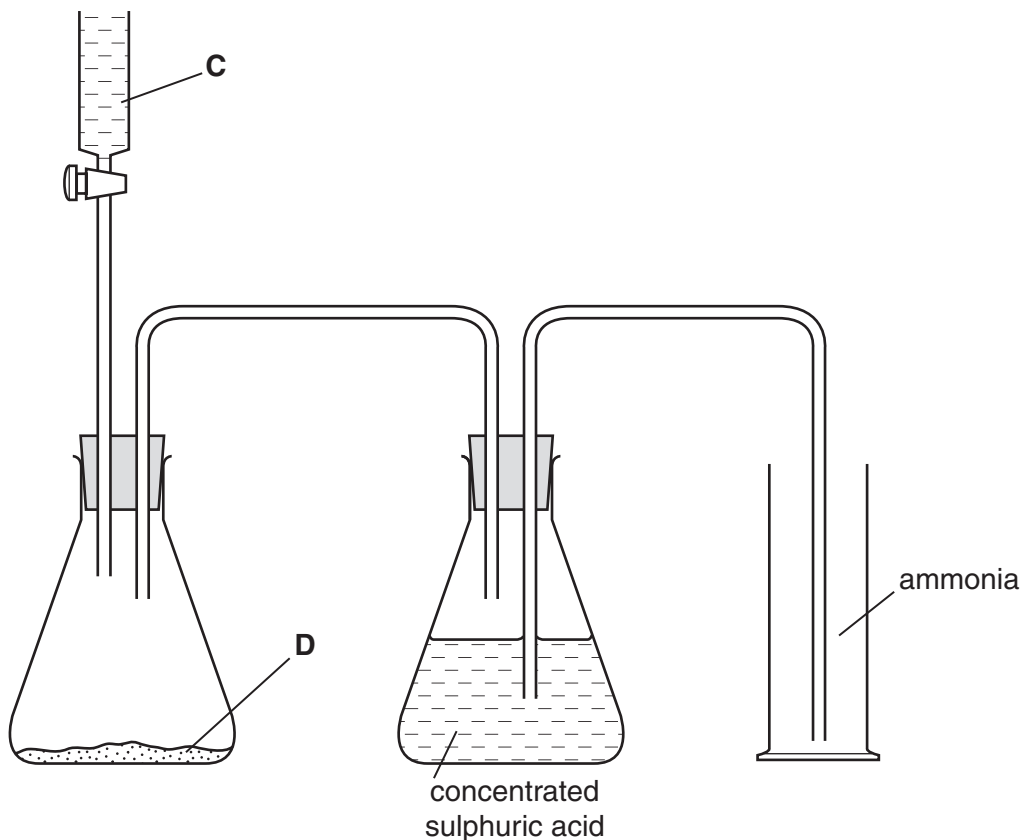
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Mistake 2 .....

..... [2]

[Total: 5]

- 4 Ammonia is produced when aqueous sodium hydroxide is warmed with ammonium sulphate. Ammonia is less dense than air and very soluble in water. The apparatus below was used to prepare a sample of dry ammonia gas.



- (a) Name substance **C**. .....[1]
- (b) Name substance **D**. .....[1]
- (c) What necessary piece of equipment is missing in the diagram?  
 .....[1]
- (d) Suggest why concentrated sulphuric acid should **not** be used to dry ammonia.  
 .....[1]
- (e) There are two other mistakes in the apparatus shown in the diagram. Identify and explain these mistakes.
- mistake 1 .....  
 explanation .....
- mistake 2 .....  
 explanation .....[4]