

# Acids, Bases and Salts

## Question Paper 5

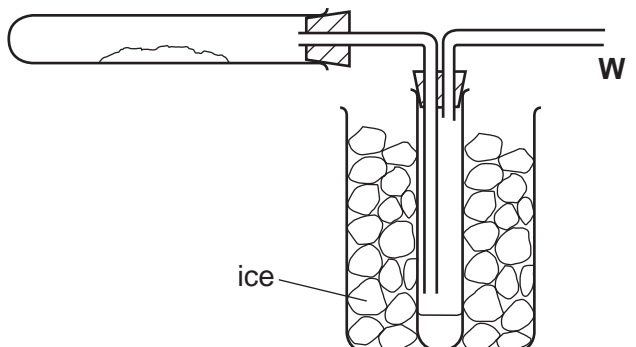
<b>Level</b>	IGCSE
<b>Subject</b>	Chemistry
<b>Exam Board</b>	CIE
<b>Topic</b>	Acids, Bases and Salts
<b>Sub-Topic</b>	
<b>Paper Type</b>	Alternative to Practical
<b>Booklet</b>	Question Paper 5

**Time Allowed:** 53 minutes

**Score:** /44

**Percentage:** /100

1 Hydrated cobalt chloride crystals,  $\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$ , were heated in the apparatus shown



(a) Indicate on the diagram, using an arrow, where heat is applied. [1]

(b) The crystals change colour from ..... to ..... [1]

(c) What is the purpose of the ice?  
.....  
..... [1]

(d) Why is the tube open at point **W**?  
..... [1]

[Total: 4]

2 The following instructions were used to prepare magnesium sulfate crystals,  $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ .

**Step 1** Measure  $50\text{ cm}^3$  of dilute sulfuric acid into a beaker and warm the solution.

**Step 2** Using a spatula, add some magnesium oxide and stir the mixture. Continue adding the magnesium oxide until excess is present.

**Step 3** Separate the excess magnesium oxide from the solution of magnesium sulfate.

**Step 4** Heat the solution until crystals form. Obtain the crystals and dry them.

(a) Why is the sulfuric acid warmed?

..... [1]

(b) How would you know when excess magnesium oxide is present in **Step 2**?

..... [1]

(c) What method is used in **Step 3**?

..... [1]

(d) Why must care be taken when drying the crystals in **Step 4**?

..... [1]

(e) Explain how the method would differ if magnesium carbonate was used instead of magnesium oxide.

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

[Total: 6]

3 E numbers identify chemicals which are added to foods.

(a) E210 is benzoic acid. How could you show that a solution of benzoic acid is a weak acid?

test .....

result ..... [2]

(b) E211 is sodium benzoate. Name a suitable substance that would react with a solution of benzoic acid to form sodium benzoate.

..... [1]

(c) E110 is Sunset yellow.

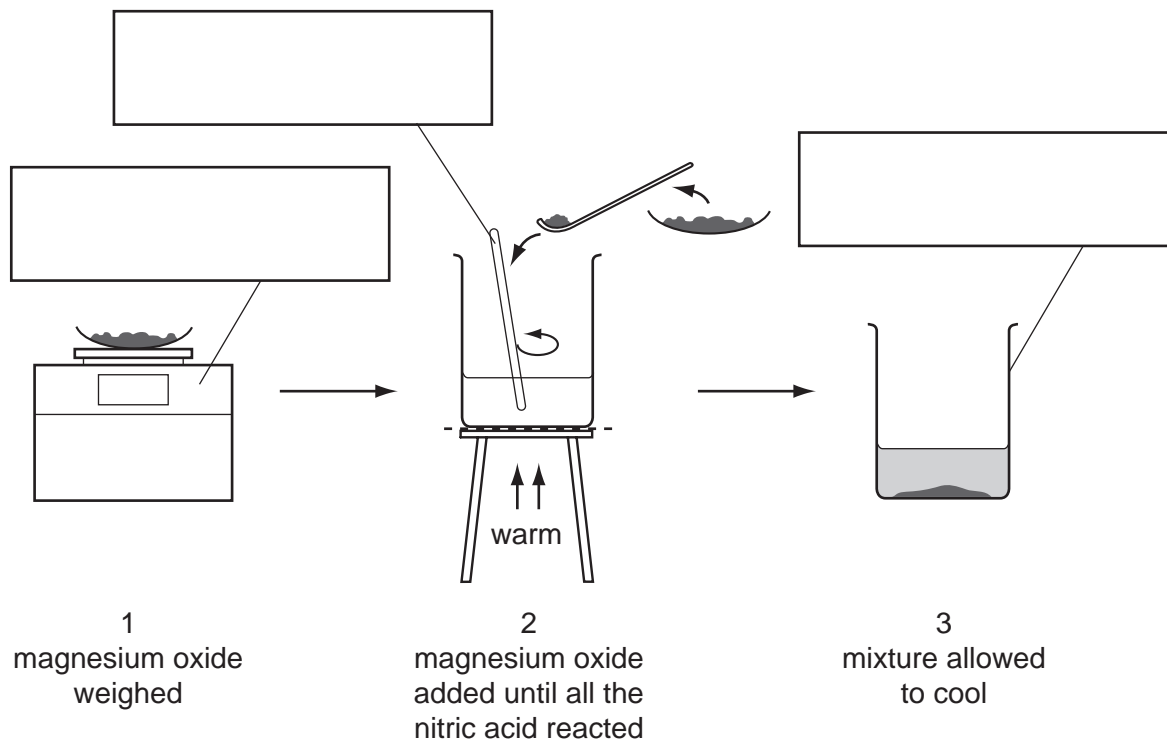
Outline a method you could use to show the presence of E110 in a food colouring.

A space has been left if you want to draw a diagram to help you answer the question.

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

[Total: 7]

- 4 A student reacted nitric acid with magnesium oxide to prepare magnesium nitrate. The diagram shows the procedure followed in three stages.



(a) Complete the boxes to identify the pieces of apparatus labelled. [3]

(b) (i) What term is used to describe the unreacted magnesium oxide?  
..... [1]

(ii) What method is used to remove the unreacted magnesium oxide after stage 3?  
..... [1]

(c) Describe how crystals of magnesium nitrate could be quickly obtained from the solution.  
.....  
..... [2]

[Total: 7]

- 5 An experiment was carried out to measure the temperature changes during the neutralisation of sodium hydroxide solution with dilute hydrochloric acid. Both solutions were allowed to stand in the laboratory for about 30 minutes.

25 cm<sup>3</sup> of sodium hydroxide solution was added to a polystyrene beaker and the temperature was measured. 10 cm<sup>3</sup> of hydrochloric acid was added to the beaker and the highest temperature reached measured.

The experiment was repeated using different volumes of acid.

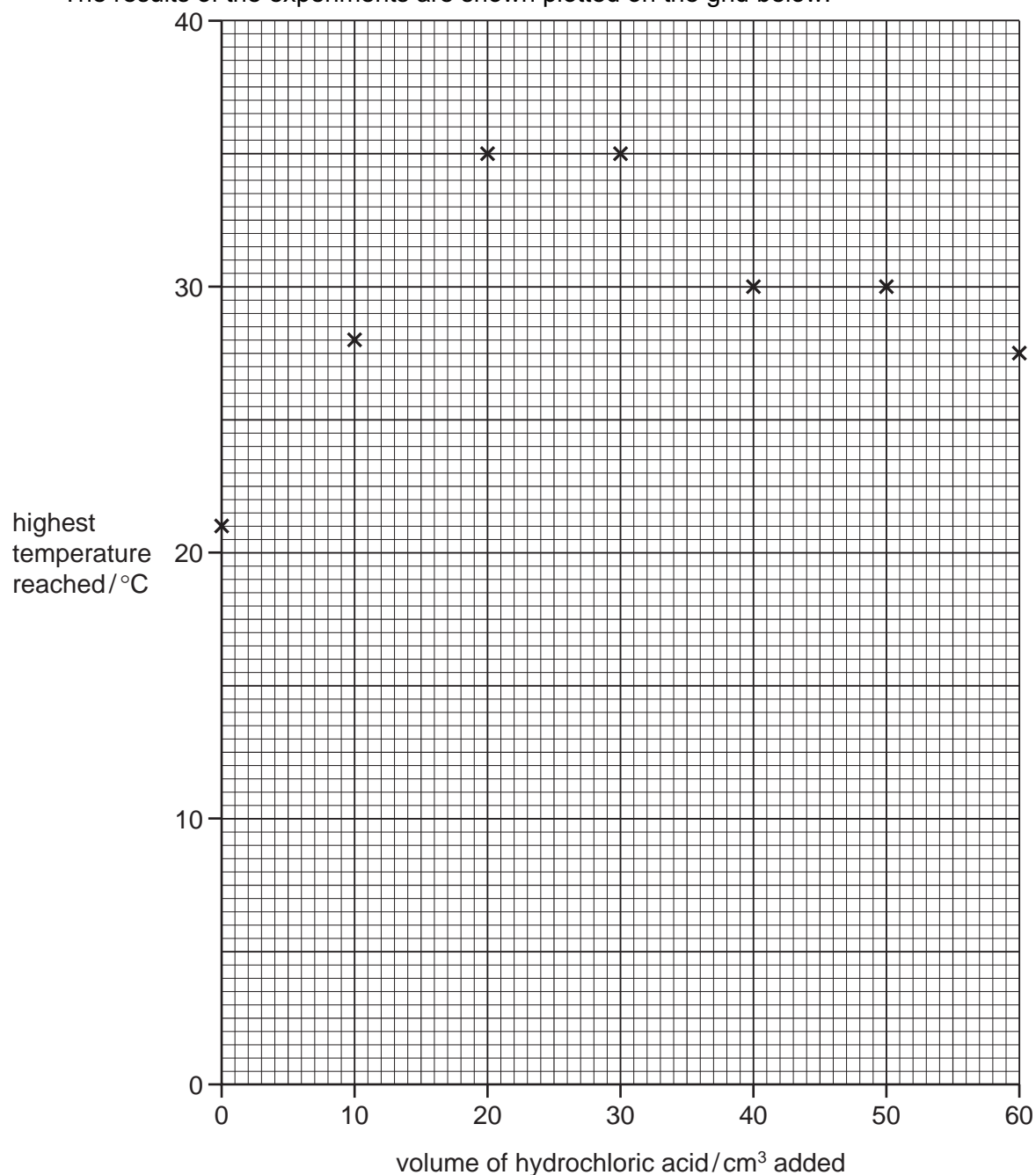
- (a) Why were the solutions left to stand for about 30 minutes before the experiments?

..... [1]

- (b) Why was a polystyrene beaker used instead of a glass beaker?

..... [1]

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



(c) What type of chemical reaction occurs when sodium hydroxide is neutralised by hydrochloric acid?

..... [1]

(d) (i) Which point appears to be inaccurate?

..... [1]

(ii) Draw **two** straight lines through the points and extend them until they cross. [2]

(iii) What volume of hydrochloric acid was needed to neutralise 25 cm<sup>3</sup> of the sodium hydroxide solution?

..... [2]

[Total: 8]

**6** Acid base indicators

Indicators are used to identify acids and bases.  
Indicators can be obtained from berries and other fruits.

**(a)** Plan an experiment to obtain an aqueous solution of an indicator from some berries.

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

**(b)** Plan an experiment to use the indicator solution to show that it is an effective indicator.

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

[Total: 6]



7 A solution of magnesium sulphate can be made by reacting magnesium oxide with warm sulphuric acid.

(a) Describe how you could make a solution of magnesium sulphate starting with magnesium oxide powder and dilute sulphuric acid.

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

(b) Describe how you would obtain pure dry crystals of hydrated magnesium sulphate,  $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ , from the solution of magnesium sulphate in (a).

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

[Total: 6]