Redox

Question Paper

Level	IGCSE
Subject	Chemistry
Exam Board	CIE
Topic	Chemical Reactions
Sub-Topic	Redox
Paper Type	Alternative to Practical
Booklet	Question Paper

Time Allowed: 26 minutes

Score: /21

Percentage: /100

1 A catalyst is a substance that speeds up the rate of a chemical reaction and remains unchanged at the end of the reaction.

Hydrogen peroxide solution, H_2O_2, breaks down to form oxygen. This decomposition is very slow if a catalyst is not used.

Plan an investigation to show that copper(II) oxide is a suitable catalyst for this reaction.

You can use aqueous hydrogen peroxide and common laboratory apparatus.

Step 1   Show that copper(II) oxide catalyses the decomposition of hydrogen peroxide and measure the rate of the reaction.

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Step 2   Show that the copper(II) oxide is unchanged at the end of the decomposition.

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[Total: 8]

2 A student investigated the redox reaction between potassium iodate(V) and iodide ions. Two experiments were carried out.

Experiment 1

A burette was filled up to the 0.0 cm³ mark with the solution **A** of sodium thiosulphate. By using a measuring cylinder, a 10 cm³ sample of the solution **B** of potassium iodate(V) was added into a conical flask. A 10 cm³ sample of dilute sulphuric acid was added to the flask followed by 20 cm³ of aqueous potassium iodide.

Solution **A** was added slowly to the flask until there was a pale yellow colour in the contents of the flask. Starch solution was then added into the flask and the colour changed to blue-black. Solution **A** was added to the flask until the colour just disappeared. Use the burette diagram to record the volume in the table.

final burette reading / cm³
18
17
16
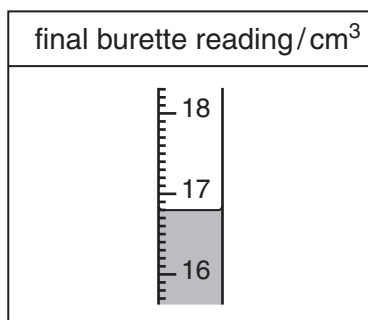
Experiment 2

Experiment 1 was repeated using solution **C** of potassium iodate(V) instead of solution **B**.

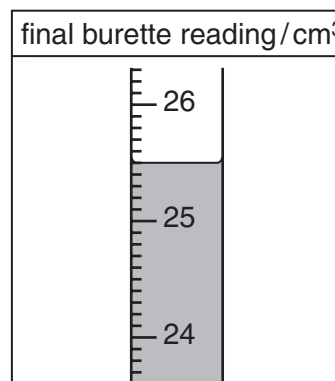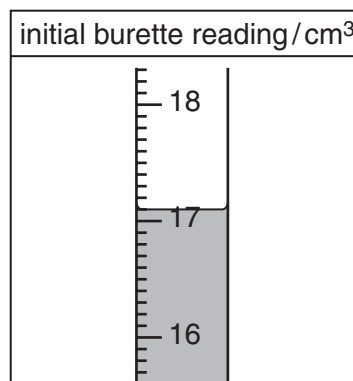**Use the burette diagrams** to record the volumes in the table and complete the table.

initial burette reading / cm³	final burette reading / cm³
18	26
17	25
16	24

Table of results

Burette readings/cm^3		
	Experiment 1	Experiment 2
Final reading		
Initial reading	0.0	
Difference		

[4]

The reaction of the mixture of potassium iodate(V), sulphuric acid and potassium iodide in the flask produces iodine. Sodium thiosulphate then reacts with the iodine.

(a) (i) In which Experiment was the greatest volume of aqueous sodium thiosulphate used?

....[1]

(ii) Compare the volumes of sodium thiosulphate used in Experiments 1 and 2.

....

....[1]

(iii) Suggest an explanation for the difference in the volumes.

....

....[2]

(iv) Predict the volume of solution **A** which would be needed to react completely if Experiment 1 was repeated with 20.0 cm^3 of the solution of potassium iodate. Explain your prediction.

volume of solution **A** ....

explanation ....

....[3]

(b) Suggest the reason starch solution was added.

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....[2]