



Cambridge Assessment International Education

Cambridge International General Certificate of Secondary Education

CANDIDATE NAME		
CENTRE NUMBER		CANDIDATE NUMBER
CHEMISTRY		0620/63
Paper 6 Alterna	ative to Practical	October/November 2019
		1 hou
Candidates ans	wer on the Question Paper.	

READ THESE INSTRUCTIONS FIRST

No Additional Materials are required.

Write your centre number, candidate number and name on all the work you hand in.

Write in dark blue or black pen.

You may use an HB pencil for any diagrams or graphs.

Do not use staples, paper clips, glue or correction fluid.

DO **NOT** WRITE IN ANY BARCODES.

Answer all questions.

Electronic calculators may be used.

You may lose marks if you do not show your working or if you do not use appropriate units.

At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets [] at the end of each question or part question.

This syllabus is regulated for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

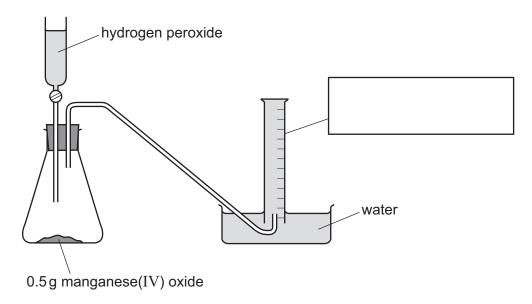


1 Hydrogen peroxide, H₂O₂(aq), decomposes slowly to form water and oxygen.

$$2H_2O_2(aq) \rightarrow 2H_2O(I) + O_2(g)$$

The addition of $0.5\,\mathrm{g}$ of manganese(IV) oxide speeds up this decomposition. Manganese(IV) oxide is an insoluble solid.

The apparatus shown was used to follow the rate of decomposition of hydrogen peroxide. The hydrogen peroxide was added to the conical flask and a stop-watch was started.



(a)	Cor	mplete the box to name the apparatus.	[1]
(b)	Wha	at measurements should be taken to follow the rate of the reaction?	
			[2]
(c)	The	rate of the reaction decreases over time. After 5 minutes the rate of reaction is zero.	
	(i)	Why does the rate of reaction decrease?	
	(ii)	Explain why the rate of reaction is zero after 5 minutes.	[1]

......[1]

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(d) (i) Th	he manganese(IV) oxide acts as a catalyst.
	low could a student separate the catalyst from the reaction mixture at the end of the eaction?
	[1]
` '	uggest how the student could show that the catalyst separated in (d)(i) is unchanged at ne end of the reaction.
	[3]
	[Total: 9]

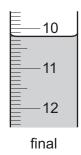
2 Astudent investigated the reaction between dilute hydrochloric acid and three different concentrations of aqueous sodium hydroxide, labelled **R**, **S** and **T**.

Three experiments were done.

Experiment 1

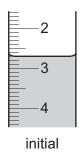
- A burette was filled with dilute hydrochloric acid. The initial burette reading was measured.
- Using a measuring cylinder, 20 cm³ of solution **R** was poured into a conical flask.
- Six drops of methyl orange indicator were added to the conical flask.
- Dilute hydrochloric acid was added from the burette, until the solution just changed colour.
- The final burette reading was measured.

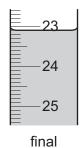




Experiment 2

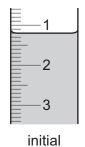
• Experiment 1 was repeated but using 20 cm³ of solution **S** instead of solution **R**.

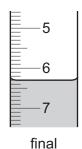




Experiment 3

Experiment 1 was repeated but using 20 cm³ of solution T instead of solution R.





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(a) Use the burette diagrams to record all the burette readings in the table.

burette reading/cm ³	Experiment 1 using solution R	Experiment 2 using solution S	Experiment 3 using solution T
final burette reading			
initial burette reading			
volume used			

[4]

(b)	Wh	at colour change is observed in the conical flask at the end-point?
	fror	n to[2]
(c)	Suç	ggest why Universal Indicator is not a suitable indicator in these experiments.
		[1]
(d)	(i)	Complete the sentences below.
		Experiment needed the smallest volume of dilute hydrochloric acid to change the colour of the indicator.
		Experiment needed the largest volume of dilute hydrochloric acid to change the colour of the indicator.
		[1]
	(ii)	Determine the simplest whole number ratio of volumes of dilute hydrochloric acid used in Experiments 1 and 2.
		Experiment 1 Experiment 2 [1]
((iii)	Deduce the order of concentrations of the solutions of aqueous sodium hydroxide, ${\bf R},{\bf S}$ and ${\bf T}.$
		most concentrated
		least concentrated[1]
(e)		at would be the effect on the results, if any, if the solutions of aqueous sodium hydroxide re warmed before adding the dilute hydrochloric acid? Give a reason for your answer.
	effe	ect on the results
	rea	son[2]

Suggest how the reliability of the results could be checked.
[2
Suggest a different method, not involving an indicator, of finding the order of concentrations of the solutions of aqueous sodium hydroxide, R, S and T.
[3
[Total: 17

3	Two substances,	, solid U and liquid V ,	, were analyse	ed. Solid U wa	as chromium(III)	nitrate.
	Tests were done	on solid U and liquid	V			

tests on solid U

Complete the expected of	bservations.
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Soli	id U	was added to distilled water and shaken to dissolve solid ${f U}$ and form solution ${f U}$.	
(a)	Des	scribe the colour of solution U .	
		[1]
Sol	ution	U was divided into three equal portions in three test-tubes.	
(b)	(i)	A few drops of aqueous sodium hydroxide were added to the first portion of solution ${\bf U}$ un a change was seen.	til
		observations[2]
	(ii)	An excess of aqueous sodium hydroxide was then added to the mixture.	
		observations	1]
(c)	An	excess of aqueous ammonia was added to the second portion of solution $oldsymbol{U}$.	
	obs	ervations[1]
(d)		minium foil and aqueous sodium hydroxide were added to the third portion of solution to mixture was heated and the gas produced was tested.	J.
	obs	ervations	

tests on liquid V

One of the tests done on liquid ${\bf V}$ and the observations made are shown.

tests on liquid V	observations
A lighted splint was used to touch about 1 cm ³ of liquid V .	liquid V set on fire and burned with a smoky blue flame

(e)	Draw one conclusion about liquid V .
	[1]
	[Total: 8]

4 Potassium nitrate and ammonium chloride are two salts. The energy change when they each dissolve in water is endothermic.

Plan an experiment to show which of these two salts produces the larger endothermic energy change per gram.

Your answer should include:

- any measurements you would take and record
- how the results could be used to draw a conclusion.

You are provided with potassium nitrate and ammonium chloride, distilled water and commor laboratory apparatus.

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