



ADVANCED
General Certificate of Education
2010

71
Candidate Num

Chemistry

Assessment Unit A2 3
Internal Assessment
Practical Examination 2

[AC232]

FRIDAY 21 MAY



TIME

2 hours 30 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

Answer all three questions.

Write your answers in the spaces provided.

INFORMATION FOR CANDIDATES

The total mark for this paper is 70.

Questions 1 and 2 are practical exercises each worth 25 marks. Question 3 is a planning exercise worth 20 marks.

Quality of written communication will be assessed in **Question 3**. You may not have access to notes, textbooks and other material to assist you.

A Periodic Table of elements (including some data) is provided.

For Examiner's use only		
Question Number	Marks	Modera -tion Mark
1		
2		
3		

Total Marks	

6033

		Si	
1	itration exercise	Te. Mar.	en.
A	an acidified solution of sodium iodate(V) acts as an oxidising agent.	man	100
Υ	ou are provided with:		
fo fo S	solution of sodium iodate(V) of unknown concentration; our 20 cm ³ portions of sulphuric acid; our 1.5 g samples of potassium iodide; odium thiosulphate solution of concentration 0.05 mol dm ⁻³ ; tarch indicator.		
t	Assuming that all the apparatus is clean and dry, you are required carry out a titration and use your results to calculate the concentration of sodium iodate(V).		
(a) Give details of the procedure you intend to use.		

__ [6]

Tea Mari (b) Carry out your procedure. Present your results in a suitable table and calculate the average titre. [10]

[2]

(ii) Balance the following half-equation:

$$10_3^- + H^+$$

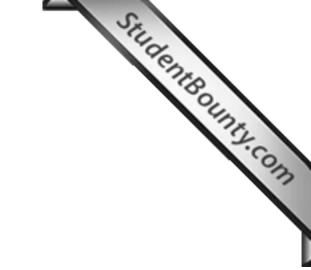
$$\rightarrow$$
 I_2 + H_2O [2]

(iii) Combine the reduction half-equation above with the following oxidation half-equation:

$$2 l^- \rightarrow l_2 + 2e^-$$

_____[2]

(iv) Calculate the concentration of the sodium iodate(V) solution in g dm^{-3} .



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(Questions continue overleaf)

2 Observation/deduction

Safety goggles must be worn at all times and care should be exercised during this practical examination.

(a) You are provided with a salt, labelled A. Carry out the following tests. Record your observations in the spaces below.

Test	Observations
1 Describe the appearance of A.	
	[1]
2 Dissolve a spatula measure of A in approximately 50 cm ³ of water.	
	[1]
3 Add a few drops of barium chloride solution to 2 cm ³ of the solution of A.	
	[1]
4 Add a few drops of sodium hydroxide solution to 2 cm ³ of the solution of A.	
	[2]
5 In a fume cupboard, add excess concentrated ammonia solution dropwise, until present in excess, to 2 cm ³ of the solution of A.	[3]
6 Add approximately 8 cm ³	[-]
of concentrated hydrochloric acid to 2 cm ³ of the solution of A.	
	[2]

(c) Compounds D and E have the molecular formula C₃H₆O₂. They both produce a triplet, quartet and singlet in their NMR spectra. Carry out the following test on D. A sample of E is **not** required. Record your observations in the space below.

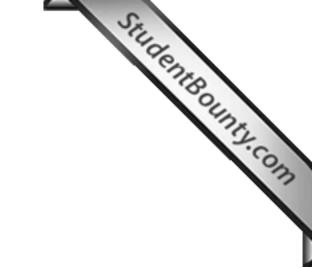
Test	Observations
Add a spatula measure of sodium carbonate to about 1cm ³ of D in a test tube.	
	[3]

Deduce	the	structural	formula	of D

 1

Deduce the structural formula of E

_____[1]



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(Questions continue overleaf)

Planning exercise

3 Preparation of butyl butanoate, CH₃CH₂CH₂COOCH₂CH₂CH₂CH₃

Butyl butanoate is a liquid with a boiling point of 165°C and a density of 0.87 g cm⁻³. It may be prepared by reaction between butanoic acid and butan-1-ol using concentrated sulphuric acid as a catalyst.

You are required to prepare 30 cm³ of pure butyl butanoate based on the mass of butanoic acid used.

(a)	Write an equation for the esterification.
(b)	Calculate the mass of butanoic acid needed assuming a 70% yield.
	[4]
(c)	

Tec Mar.

[5]

THIS IS THE END OF THE QUESTION PAPER

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