

Centre No.					
Candidate No.					

Paper Reference (complete below)					
				/	

Surname	Initial(s)
Signature	

Paper Reference(s)

6243/02

Edexcel GCE

Chemistry

Advanced Subsidiary

Unit Test C3B

Wednesday 4 June 2003 – Morning

Time: 1 hour

Examiner's use only

--	--	--

Team Leader's use only

--	--	--

Question Number	Leave Blank
1	
2	
3	
4	
5	
6	
Total	

Materials required for examination
Nil

Items included with question papers
Nil

Instructions to Candidates

In the boxes above, write your centre number, candidate number, surname and initials, the paper reference and your signature.

Answer ALL the questions in the spaces provided in this question paper.

Calculators may be used.

Show all the steps in any calculations and state the units.

Information for Candidates

The total mark for this paper is 50. The marks for the various parts of questions are shown in round brackets: e.g. (2).

All blank pages are indicated.

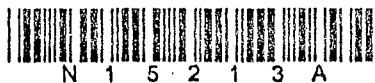
A Periodic Table is printed on the back cover of this question paper.

Advice to Candidates

You are reminded of the importance of clear and orderly presentation in your answers.

Printer's Log. No.

N15213A



Answer all questions

Leave blank

1. Dilute sulphuric acid was added to three solids, A, B and C. If no gas was given off at room temperature, the mixture was heated.

Complete the boxes below.

(a) SOLID A

Observation on adding acid	Test on gas evolved	Identity of gas	Inferences about solid A
Bubbles of a colourless gas given off at room temperature	Test: Observation:	Carbon dioxide	

(4)

(b) SOLID B

Observation on adding acid	Test on gas evolved	Identity of gas	Inference about solid B
A colourless pungent smelling gas given off on warming	Test: Observation:	Sulphur dioxide	

(3)

(c) SOLID C

Observation on adding acid	Test on gas evolved	Identity of gas	Inference about solid C
Bubbles of a colourless gas given off at room temperature	Test: Observation:	Hydrogen	

(3)

(Total 10 marks)

Q1

2. A liquid organic compound X contains three carbon atoms.

Tests were carried out on X, and the results are shown in the table below.

(a) Complete the inference boxes in the table.

	Test	Observation	Inference
1	Shake a few drops of X with 3 drops of bromine water	The colour of the bromine water changed rapidly from orange to colourless	
2	Warm a few drops of X with aqueous sodium hydroxide. Acidify with dilute nitric acid and add a few drops of aqueous silver nitrate	A yellow precipitate was obtained	
3	Add excess concentrated aqueous ammonia to the precipitate obtained in test 2	The precipitate did not dissolve	

(3)

(b) The organic product of the reaction of X with aqueous sodium hydroxide is a primary alcohol.

Draw the full structural formula of X.

(2)

Q2

(Total 5 marks)

3. Propanone can be prepared in the laboratory by oxidising propan-2-ol. A student was given the following instructions and data.

The preparation of propanone

- Dissolve 10 g of potassium dichromate(VI) in 30 cm³ of water.
- Add 12 cm³ of propan-2-ol followed by 6 cm³ of concentrated sulphuric acid.
- Boil the mixture for 15 minutes.

DATA

The boiling temperatures of the volatile substances are:

Substance	Boiling temperature / °C
propan-2-ol	82
water	100
propanone	56

(a) What safety precaution in addition to wearing eye protection must be taken when adding the concentrated sulphuric acid?

.....
.....

(1)

(b) (i) Draw a diagram of the apparatus that you would use to boil the mixture for 15 minutes.

(3)

(ii) Outline how you would obtain propanone from this aqueous mixture after it had been boiled for 15 minutes.

Leave blank

.....
.....
.....

(2)

(c) The sample of propanone was dried. Describe a test that you would do to show that your final sample of propanone did not contain any propan-2-ol.

.....
.....
.....

(2)

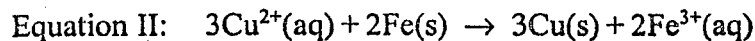
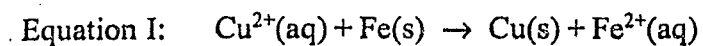
Q3

(Total 8 marks)

--

4. Iron metal reacts with copper(II) sulphate solution to form copper metal and iron ions.

An experiment was performed to find which of the two equations below is correct.



- Powdered iron of mass 1.40 g was placed in a beaker and excess copper(II) sulphate solution was added.
 - The mixture was stirred for five minutes.
 - The contents of the beaker were then poured into a funnel containing a weighed piece of filter paper.
 - The beaker and the residue were washed with cold water, and the copper and the filter paper were left overnight to dry.
 - Next day they were weighed, and the copper was found to have a mass of 1.65 g.
- (a) Calculate the mass of copper that should be produced from 1.40 g of iron if:

(i) equation I is correct

(ii) equation II is correct

Leave blank

(b) Which iron ion was produced in the reaction?

.....
(1)

(c) (i) Suggest why the experimental value of the mass of copper was slightly different from the value you calculated in (a).

.....
.....
(1)

(ii) Suggest one way in which the accuracy of this experiment could have been improved.

.....
.....
(1)

(d) (i) Why is it essential to use excess copper(II) sulphate solution?

.....
.....
(1)

(ii) Calculate the minimum volume of 1.00 mol dm^{-3} copper(II) sulphate solution that must be used.

(1)

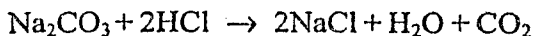
Q4

(Total 8 marks)

5. A 1.62 g sample of **impure** sodium carbonate was dissolved in distilled water and then made up to 250 cm³. 25.0 cm³ of this solution was put into a conical flask and three drops of methyl orange indicator added. This was titrated against a 0.105 mol dm⁻³ solution of hydrochloric acid until the end point was reached. The titration was repeated three more times. The results are shown below.

	1	2	3	4
Burette reading (final)	25.30	25.30	25.85	25.95
Burette reading (at start)	0.00	0.50	0.75	1.25
Titre/cm ³	25.30	24.80	25.10	24.70

The equation for the reaction is:



- (a) (i) The student was supplied with a burette that may not have been clean. What precautions should be taken before filling it with the standard hydrochloric acid solution?

.....

 (2)

- (ii) Describe the colour change that tells when the end point has been reached.

.....

 (2)

Leave
blank

- (b) (i) Select the appropriate titres and calculate their mean.

.....

.....

(2)

- (ii) Calculate the amount (in moles) of hydrochloric acid solution in the mean titre.

(1)

- (iii) Calculate the amount (in moles) of pure sodium carbonate in 25.0 cm³ of solution.

(1)

- (iv) Calculate the amount (in moles) of pure sodium carbonate in 250 cm³ of solution.

(1)

- (v) Calculate the mass of pure sodium carbonate, Na₂CO₃, taken.

(2)

- (vi) Calculate the percentage purity of the sample of sodium carbonate.

(1)

Q5

(Total 12 marks)

60

6. A sample of sodium chloride was thought to contain an impurity of barium nitrate. A student suggested a flame test could be used to confirm this.

Leave blank

(a) (i) Suggest why a flame test on the mixture would not be a satisfactory way of detecting the presence of barium ions in the sample.

.....
.....
.....
.....
.....
.....

(2)

(ii) Suggest a reagent that could be used to produce a precipitate of a barium compound from a solution of the sample.

.....
.....

(1)

(iii) What colour would the barium compound produce in a flame test?

.....

(1)

(b) Describe a test that the student could carry out to show the presence of nitrate ions in a solution of the sample.

.....
.....
.....

(3)

(Total 7 marks)

Q6

--

TOTAL FOR PAPER: 50 MARKS

END