

Centre Number						Candidate Number				
Surname						Other Names				
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<p>Candidate Declaration. I have read and understood the Notice to Candidate and can confirm that I have produced the attached work without assistance other than that which is acceptable under the scheme of assessment.</p>										
Candidate Signature						Date				

For Examiner's Use	
Total EMPA mark	
Examiner's Initials	
Section	Mark
Task 1	
Task 2	
Section A	
Section B	
Section C	
TOTAL EMPA MARK	



General Certificate of Education
Advanced Level Examination
June 2013

Chemistry

CHM6X

Unit 6X A2 Externally Marked Practical Assignment

Written Test

For submission by 15 May 2013

<p>For this paper you must have:</p> <ul style="list-style-type: none"> the Periodic Table/Data Sheet provided as an insert (enclosed) your Task Sheets 1 and 2, including your own Candidate Results Sheets a ruler with millimetre measurements a calculator. 	<p>Time allowed</p> <ul style="list-style-type: none"> 1 hour 20 minutes
<p>Instructions</p> <ul style="list-style-type: none"> Use black ink or black ball-point pen. Fill in the boxes at the top of this page. Answer all questions. You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages. Do all rough work in this book. Cross through any work you do not want to be marked. 	<p>Information</p> <ul style="list-style-type: none"> The marks for questions are shown in brackets. The maximum mark for this paper is 36. You are expected to use a calculator where appropriate. You will be marked on your ability to: <ul style="list-style-type: none"> organise information clearly use scientific terminology accurately.

Details of additional assistance (if any). Did the candidate receive any help or information in the production of this work? If you answer yes give the details below or on a separate page.

Yes No

Teacher Declaration:

I confirm that the candidate has met the requirements of the practical skills verification (PSV) in accordance with the instructions and criteria in section 3.8 of the specification.

Practical Skills Verification	Yes <input type="checkbox"/>
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Signature of teacher Date

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Section A

These questions are about the tasks, an investigation of a fungicide.

You should use your Task Sheets 1 and 2, including your own Candidate Results Sheets, to answer these questions.

Answer **all** questions in the spaces provided.

1 Record your average titre from **Task 1** to the appropriate precision.

.....

(1 mark)

2 The concentration of hydrochloric acid used in step 3 of **Task 1** was 2.00 mol dm^{-3} .

Calculate the amount, in moles, of hydrochloric acid used in this step.

.....

.....

(1 mark)

3 The concentration of the sodium hydroxide solution used in **Task 1** was $0.100 \text{ mol dm}^{-3}$.

3 (a) Use your answer to Question **1** to calculate the amount, in moles, of sodium hydroxide used in the average titre.

.....

.....

(1 mark)

3 (b) Use your answers from Questions **2** and **3 (a)** to deduce the amount, in moles, of hydrochloric acid that reacted with the Bordeaux mixture in the beaker in step 4 of **Task 1**.

Show your working.

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(3 marks)

4 Calcium hydroxide (Ca(OH)_2) is a base that can be neutralised by hydrochloric acid.

4 (a) Write an equation for this reaction of calcium hydroxide with hydrochloric acid.

.....
(1 mark)

4 (b) Use your answer from Question **3 (b)** to calculate the mass of calcium hydroxide in the Bordeaux mixture that you used in **Task 1**. Give this mass to three significant figures. Show your working.

(If you have been unable to complete Question **3 (b)**, assume that the amount of hydrochloric acid that reacted was 0.0212 mol. This is **not** the correct answer.)

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(3 marks)

4 (c) Calculate the percentage, by mass, of calcium hydroxide in your sample of Bordeaux mixture.

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(1 mark)

5 Write an equation for the reaction between calcium hydroxide and copper(II) sulfate in **Test 1** of **Task 2**.

.....
(1 mark)

6 Identify the species responsible for the colour of the solution in **Test 2** of **Task 2**.

.....
(1 mark)

7 Give the formula of the solid in the filter paper in **Test 3** of **Task 2**.

.....
(1 mark)

Turn over ►

8 State **one** reason why your observations suggest that the filtrate in **Test 3** of **Task 2** contains a transition metal ion.

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

9 In **Test 4** of **Task 2**, suggest why there was no visible change when the first few drops of dilute ammonia solution were added to the filtrate.

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

10 The reaction in **Test 5** of **Task 2** is a redox reaction. Identify the product formed by oxidation in this reaction.

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.....
(1 mark)

11 The solution formed by mixing the filtrate and solution **X** in **Test 6** of **Task 2** is called Fehling's solution. Use your observations of the reaction that occurs when solution **Y** is added to deduce the organic functional group present.

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.....
(1 mark)

12 The active ingredient in the fungicide is the copper(II) ion. Use your observations from **Test 1** of **Task 2** to suggest why Bordeaux mixture is more effective as the fungicide on vine leaves when it rains rather than just using copper(II) sulfate.

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(2 marks)

13 Despite its toxicity, Bordeaux mixture has been used for over a hundred years as an effective treatment for mildew in vineyards.

Suggest **one** environmental problem that could result from this prolonged use of Bordeaux mixture.

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(1 mark)

21

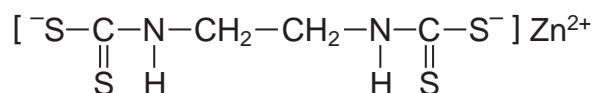
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Section B

Answer **all** questions in the spaces provided.

- 14** Because of the toxic nature of the copper(II) ion, a wide range of alternative anti-fungal drugs has been developed for use in agriculture. One example is Zineb.



Zineb

- 14 (a)** The negative ion in Zineb could act as a bidentate ligand.

On the structure above, draw a ring around each of **two** atoms that could provide the lone pairs of electrons when this ion acts as a bidentate ligand.

(1 mark)

- 14 (b)** Calculate the M_r of Zineb. Give your answer to the appropriate precision.

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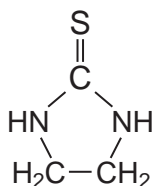
(1 mark)

- 14 (c)** Name the functional group formed at each end of the negative ion when all the sulfur atoms in the structure of Zineb are replaced by oxygen atoms.

.....

(1 mark)

- 15** Zineb has been investigated for harmful effects. Generally, Zineb has been found to be safe to use in agriculture. It is only slightly soluble in water and is sprayed onto plants. A breakdown product of Zineb is ethylene thiourea (ETU), which is very soluble in water. The structure of ETU is shown below.



Determine the percentage, by mass, of sulfur in ETU ($M_r = 102.1$).

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(1 mark)

- 16** Chromatography is a technique used to show the presence of a small amount of ETU in Zineb.

Outline how this technique is used to separate and identify ETU from a sample of Zineb powder.

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(4 marks)

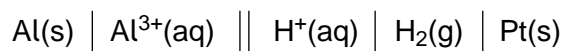
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Section C

These questions test your understanding of the skills and techniques you have acquired during your A-level course.

Answer **all** questions in the spaces provided.

17 An experiment was carried out to measure the e.m.f. of this cell.



17 (a) The aluminium used as the electrode is rubbed with sandpaper prior to use.

Suggest the reason for this.

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(1 mark)

17 (b) Draw a labelled diagram of a suitable apparatus for the right-hand electrode in this cell. You do **not** need to include the salt bridge or the external electrical circuit.

(2 marks)

17 (c) A simple salt bridge can be prepared by dipping a piece of filter paper into potassium carbonate solution. Explain why such a salt bridge would **not** be suitable for use in this cell.

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(2 marks)

18 Ammonia and methylamine were dissolved in separate samples of water. The two solutions had equal molar concentrations.

State **one** simple method, other than smell, of distinguishing these solutions.
State what you would observe.

Method

Observation.....

.....

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(2 marks)

7

END OF QUESTIONS

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