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| Centre Number       |  |  |  |  |  | Candidate Number |  |  |  |  |
| Surname             |  |  |  |  |  |                  |  |  |  |  |
| Other Names         |  |  |  |  |  |                  |  |  |  |  |
| Candidate Signature |  |  |  |  |  |                  |  |  |  |  |

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| For Examiner's Use<br>Total Task 1 |
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General Certificate of Education  
Advanced Level Examination  
June 2013

# Chemistry

# CHM6X/PM1

**Unit 6X A2 Externally Marked Practical Assignment**

**Task Sheet 1**

**To be completed before Task Sheet 2**

**For submission by 15 May 2013**

**For this paper you must have:**

- a ruler
- a calculator.

## An investigation of a fungicide

Fungus, in the form of mildew, is a common disease affecting the health and productivity of plants. For over a hundred years, gardeners have used a fungicide called Bordeaux mixture to control this disease. It was first used extensively in French vineyards where vines can be severely affected by mildew.

Bordeaux mixture is made by mixing powdered calcium hydroxide ( $\text{Ca}(\text{OH})_2$ ) and powdered copper(II) sulfate-5-water ( $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ ). The copper salt gives the mixture a pale blue colour.

In this part of the investigation, you will add a sample of Bordeaux mixture to a known amount (an excess) of hydrochloric acid. The calcium hydroxide in the mixture will neutralise some of the acid. The amount of unreacted hydrochloric acid can then be determined by titration with sodium hydroxide solution. This technique is called a back titration.

### Task 1 Back titration of Bordeaux mixture

#### Procedure

- **Wear eye protection at all times.**
  - **Assume that all solids and solutions are toxic and corrosive.**
  - **Read all of the following instructions and then design a table on the Candidate Results Sheet for Task 1 to record your results.**
- 1 You are provided with a sample of Bordeaux mixture. The precise mass of this mixture is written on the container. Record this mass on your Candidate Results Sheet for Task 1.
  - 2 Transfer all of the Bordeaux mixture into a clean  $100\text{ cm}^3$  beaker. Rinse any remaining solid into the beaker with distilled or deionised water.
  - 3 Use a pipette filler to rinse the pipette with the hydrochloric acid provided. Use this pipette to transfer  $25.0\text{ cm}^3$  of hydrochloric acid into the  $100\text{ cm}^3$  beaker.
  - 4 Stir the contents of the beaker until the solid dissolves. A small amount of white solid may remain undissolved.
  - 5 Set up a filter funnel and fluted filter paper resting in a clean  $250\text{ cm}^3$  volumetric flask. Pour the contents of the beaker, and washings from the stirrer and beaker, into the funnel. Allow the filtrate to collect in the flask. Pour a little more distilled or deionised water through the filter paper to wash it.
  - 6 Make up the liquid in the volumetric flask to the graduation mark with distilled or deionised water. Put a stopper in the flask and invert the flask several times to make sure that the contents are fully mixed.

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- 7 Rinse a burette with the sodium hydroxide solution provided. Set up the burette and use another filter funnel to fill it with the sodium hydroxide solution. Record the initial burette reading.
  - 8 Rinse the pipette thoroughly with distilled or deionised water. Use the pipette filler to rinse the pipette with the solution from the volumetric flask. Use this pipette to transfer  $25.0\text{ cm}^3$  of this solution to a  $250\text{ cm}^3$  conical flask.
  - 9 Add 3 or 4 drops of methyl orange indicator to the solution in the conical flask. The solution will turn red.
  - 10 Add sodium hydroxide solution from the burette until the mixture in the conical flask just turns orange. (It will turn yellow if you add too much sodium hydroxide.) Record your final burette reading in your table.
  - 11 Rinse the conical flask with distilled or deionised water. Repeat the titration until you obtain **two** concordant titres. In this experiment, titres are concordant if they are within  $0.20\text{ cm}^3$  of each other.  
You should do no more than five titrations.  
  
**Have one of your final burette readings checked by your teacher.**
  - 12 Calculate and record the average titre on the Candidate Results Sheet for Task 1. Show clearly those titres that you used in calculating this average titre.

You are **not** expected to carry out any further work in Task 1.  
You will use your results in Section A of the Written Test.

**Turn over for the Candidate Results Sheet for Task 1**

**Turn over ►**

**Candidate Results Sheet for Task 1**

Teacher Group .....

**Results**

Mass of Bordeaux mixture ..... g

Record your titration results in an appropriate table in the space below.

*(7 marks)*Average titre / cm<sup>3</sup> .....

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|-------------------------|--|---|--|
| R                       |  | P |  |
| C                       |  | A |  |

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