

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use Total Task 1



General Certificate of Education
Advanced Subsidiary Examination
June 2014

Chemistry

CHM3X/PM1

Unit 3X AS Externally Marked Practical Assignment

Task Sheet 1

To be completed before Task Sheet 2

For submission by 15 May 2014

For this paper you must have:

- a ruler
- a calculator.

A quantitative investigation of an additive used in foods

Succinic acid, also called 'Spirit of Amber', is an additive used as a sweetener in the food industry.

Succinic acid is a white crystalline solid that dissolves in water. Solutions of succinic acid can be neutralised by an alkali, such as sodium hydroxide.

Task 1

You are provided with a sample of succinic acid in a weighing bottle.

The aim of Task 1 is to make a solution of succinic acid and to titrate it with a $0.100 \text{ mol dm}^{-3}$ solution of sodium hydroxide.

Procedure

- **Wear eye protection at all times.**
 - **Assume that all substances are toxic and corrosive.**
- 1 Weigh the weighing bottle and its contents to the precision of the balance.
Record the **precise** mass in the table provided on the Candidate Results Sheet for Task 1.
 - 2 Add the contents of the weighing bottle to a 250 cm^3 beaker and reweigh the empty weighing bottle. Record the **precise** mass in your table. Ignore any traces of succinic acid that remain in the weighing bottle.
 - 3 Calculate the mass of succinic acid that you have transferred to the beaker.
Inform your teacher if your mass is not between 1.30 and 1.70 g.
 - 4 Add approximately 100 cm^3 of distilled or deionised water to the beaker containing the solid.
Use a stirring rod to stir the contents of the beaker until all of the succinic acid dissolves.
This may take a few minutes.
 - 5 Use a wash bottle to rinse the surface of the stirring rod directly into the beaker.
Use a funnel to transfer the contents of the beaker into a 250 cm^3 volumetric (graduated) flask.
Use the wash bottle to rinse the beaker and pour these washings into the volumetric flask.
 - 6 Make the volumetric flask up to the mark by adding distilled or deionised water from the wash bottle.
 - 7 Stopper the volumetric flask and invert it at least 20 times to ensure thorough mixing of the contents.
 - 8 Rinse a burette with the $0.100 \text{ mol dm}^{-3}$ sodium hydroxide provided for Task 1. Set up the burette and use a funnel to fill it with this sodium hydroxide solution. Record the initial burette reading in a table of your own design on the Candidate Results Sheet for Task 1.

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- 9 Transfer some of the succinic acid solution you have prepared to a clean, dry 250 cm³ beaker. Using a pipette filler, rinse a pipette with this solution. Use the pipette to transfer 25.0 cm³ of the succinic acid solution to a 250 cm³ conical flask.
- 10 Add 3 or 4 drops of phenolphthalein indicator to the conical flask.
- 11 Add the sodium hydroxide solution from the burette until the mixture in the conical flask just turns pink. The colour may fade on standing. You should therefore record the burette reading when the colour first changes and not add more sodium hydroxide solution.
- 12 Rinse the conical flask with distilled or deionised water. Repeat the titration until you obtain **two** titres that are within 0.10 cm³ of each other. You should do no more than five titrations.

Have one of your final burette readings checked by your teacher.

- 13 Calculate and record the average titre on the Candidate Results Sheet for Task 1. Show clearly the titres that you used in calculating this average titre.

You are **not** required to carry out any further calculations on the Candidate Results Sheet for 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

Record your weighing results in this table.

Mass of weighing bottle and succinic acid / g	
Mass of emptied weighing bottle / g	
Mass of succinic acid / g	

Record your titration results in an appropriate table in this space.

[8 marks]Average titre / cm³

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R		W		P	
C		A			