

**Advanced Subsidiary GCE
SCIENCE**

G643

Practical Task for Unit G643

Specimen Task

For use from September 2008 to June 2009.

All items required by teachers and candidates for this task are included in this pack.

INFORMATION FOR CANDIDATES

- Practical Task: Comparing different dilution methods

INFORMATION FOR TEACHERS

- Mark scheme.
- Instructions for Teachers and Technicians.

SPECIMEN

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G643

Practical Task for Unit G643

Specimen Task

For use from September 2008 to June 2009.

Candidates answer on this task sheet.

INSTRUCTIONS TO CANDIDATES

- Answer **all** parts of the task.

INFORMATION FOR CANDIDATES

- The total number of marks for this task is **25**.

ADVICE TO CANDIDATES

- Read each part carefully and make sure you know what you have to do before starting your answer.

FOR TEACHER'S USE		
	Max.	Mark
TOTAL	25	

This task consists of **5** printed pages and **1** blank page.

Practical Task

Comparing different dilution methods

You are given a solution of sodium hydroxide (40 g dm^{-3}).



You have to dilute this solution to finish up with a solution of 5 g dm^{-3} but are to do the dilution in **two** different ways.

Finally, you titrate each of the diluted solutions with a standard solution of hydrochloric acid.

The results of these titrations can be used to decide which method gives the more reliable dilution method.

Dilution method 1 – Serial dilution

Use two 100 cm^3 measuring cylinders.

- 1 Measure out 100 cm^3 of sodium hydroxide solution and 100 cm^3 of distilled water in separate measuring cylinders.
- 2 Pour both into a 250 cm^3 beaker and stir thoroughly. This solution is 20 g dm^{-3} .
- 3 Measure 100 cm^3 of this solution and 100 cm^3 of distilled water in separate measuring cylinders.
- 4 Pour both into a 250 cm^3 beaker and stir thoroughly. This solution is 10 g dm^{-3} .
- 5 Measure 100 cm^3 of this solution and 100 cm^3 of distilled water in separate measuring cylinders.
- 6 Pour both into a 250 cm^3 beaker and stir thoroughly. This solution is 5 g dm^{-3} . Label this solution **A**.

Dilution method 2 – Single dilution

- 1 Pipette 25 cm^3 of sodium hydroxide solution (40 g/dm^3) into a 250 cm^3 beaker.
- 2 Use a measuring cylinder to add 175 cm^3 of distilled water to the beaker and stir thoroughly. This solution is 5 g dm^{-3} . Label this solution **B**.

Titration

Now fill a burette with hydrochloric acid solution. Pipette out 25 cm^3 of solution **A** and titrate using a suitable indicator. Repeat until you have consistent results. Record all your results in a table on page 4.

Repeat the procedure with solution **B**.

During the titration, record the name of the indicator you used, observe the colour changes and record them in a suitable way.

- (a) 25 cm^3 of a 40 g dm^{-3} solution requires exactly 250 cm^3 of the standard hydrochloric acid solution for neutralisation. You can use this information to calculate what titration results you would expect from the diluted solutions.

- (b) Make an evaluation of your experiment, commenting on the reliability of the results, possible sources of error and improvements you could make to the procedures followed.

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Total [25]
[Turn over

Results Tables

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END OF TASK

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The maximum mark for this task is **25**.

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Question Number	Answer	Max Mark
	<p>Marking the task Candidates are assessed on five skills.</p> <p>A2: Demonstrates safe and skilful techniques B1: Makes reliable and valid observations and measurements B2: Records reliable and valid observations and measurements C2: Analyse and interpret own results C4: Explain and evaluate own results</p>	<p>[5] [5] [5] [5] [5]</p>
	<p>Carrying out the experiment safely and skilfully(A2) Appreciates the hazards of sodium hydroxide and takes suitable precautions including safe pipetting of sodium hydroxide Follows dilution instructions with help (1 mark) or Follows dilution instructions without help (2 marks) Sets up titration apparatus and carries out titration with help (1 mark) or Sets up titration apparatus and carries out titration without help (2 marks)</p>	<p>[1] [2] [2]</p>
	<p>Making observations with appropriate precision and accuracy and record them (B1 and B2) B1 Three readings with 0.20 cm³ in each case Average readings within 5% of supervisor's results (based upon the titration of the sample produced by a single dilution) (Allow 3 marks if between 5 and 10% and 1 mark if between 10 and 20%) B2 Results recorded in suitable tables with initial and final readings (one mark for each set of titrations. Deduct 1 mark if correct units not given) Burette readings recorded to nearest 0.05cm³ (one mark for each set of titrations) Describe colour changes during the titration correctly</p>	<p>[1] [4] [2] [2] [1]</p>
	<p>Analysing and interpreting results (C2) Correct subtraction of burette readings Correctly calculated averages for titration readings (one mark for each example) Correctly calculated theoretical value for titration using the data given Decision about which method of dilution gives better results with justification</p>	<p>[1] [2] [1] [1]</p>

Question Number	Answer	Max Mark
	Evaluation (C4) Comment on the reliability of the results. (C3) Identifies possible sources of error in each method. (C4) Suggest possible improvements to each method. (C4)	[1] [2] [2]
	Paper Total	[25]

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This task relates to Module 2, Unit G642. There is no time limit but it is expected that it can be completed within one timetabled lesson.

It is assumed that you will have completed the teaching of the above module before setting your students this task. This module has links to other modules which contain related learning experiences – please refer to your specification.

Candidates may attempt more than one Practical task with the best mark from this type of task being used to make up the overall mark for Unit G643.

Preparing for the assessment

It is expected that before candidates attempt Practical Task for Unit G643 (Unit G643) they will have had some general preparation in their lessons. They will be assessed on a number of qualities such as demonstration of skilful and safe practical techniques using suitable qualitative methods, the ability to make and record valid observations, and the ability to organise results suitably. It is therefore essential that they should have some advance practice in these areas so that they can maximise their attainment.

Preparing candidates

At the start of the task the candidates should be given the task sheet.

Candidates must work on the task individually under controlled conditions with the completed task being submitted to the teacher at the end of the lesson. Completed tasks should be kept under secure conditions until results are issued by OCR.

Candidates should not be given the opportunity to redraft their work, as this is likely to require an input of specific advice. If a teacher feels that a candidate has under-performed, the candidate may be given an alternative task. In such cases it is essential that the candidate be given detailed feedback on the completed assessment before undertaking another Practical Task. Candidates are permitted to take each task **once** only.

Assessing the candidate's work

The mark scheme supplied with this pack should be used to determine a candidate's mark out of a total of 25 marks. The cover sheet for the task contains a grid for ease of recording marks. To aid moderators it is preferable that teachers mark work using red ink, including any appropriate annotations to support the award of marks.

Notes to assist teachers with this task

Teachers must trial the task before candidates are given it, to ensure that the apparatus, materials, chemicals etc provided by the centre are appropriate. The teacher carrying out the trial must complete a candidate's task sheet showing the results attained, and retain this, clearly labelled, so that it can be provided to the moderator when requested.

Health and Safety

Attention is drawn to Appendix D of the specification.