

**Advanced Subsidiary GCE**

## F333

**CHEMISTRY B (SALTERS)**

Unit F333: Chemistry in Practice:  
Skill III (Analysis and Evaluation)

**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**

- Unit F333: Chemistry in Practice: Skill III (Analysis and Evaluation)

#### **INFORMATION FOR TEACHERS**

- Mark scheme.
- Instructions for Teachers and Technicians.

SPECIMEN

Advanced Subsidiary GCE

## F333

**CHEMISTRY B (SALTERS)**

Unit F333: Chemistry in Practice:  
Skill III (Analysis and Evaluation)

**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 number of marks is given in brackets [ ] at the end of each part of the task.
- The total number of marks for this task is **12**.

### 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		
Qu.	Max.	Mark = Assessment Mark
TOTAL	12	

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TOTAL	12	

This task consists of 4 printed pages.

**F333 – Assessment of Skill III (Analysis and Evaluation)****Introduction**

Natural gas and crude oil often contain unwanted sulfur compounds which must be removed before they are used as fuels or chemical feedstock. The sulfur compounds are converted to sulfuric(VI) acid which is sold as a useful by-product. You are given a sample of the acid solution, thought to have a concentration between  $0.05$  and  $0.15 \text{ mol dm}^{-3}$ , and asked to find out its accurate concentration by titrating it with a  $0.10 \text{ mol dm}^{-3}$  solution of sodium carbonate.

- 1 Calculate the number of moles of sodium carbonate that you used in each titration. Show your working clearly and include appropriate units.

.....  
.....  
.....  
..... [1]

- 2 Write an equation for the reaction between sulfuric acid and sodium carbonate.

..... [1]

- 3 Use the average titre which you have found from your titration and your answer to 1 to calculate the concentration of the acid solution. Show your working clearly and include appropriate units.

.....  
.....  
.....  
..... [3]

- 4 Record the concentration of sulfuric acid to two significant figures.

..... [1]

- 5 Calculate the percentage uncertainty associated with the volume of sodium carbonate which you have transferred using a pipette (uncertainty associated with reading a  $25 \text{ cm}^3$  class B pipette is  $0.06 \text{ cm}^3$ ).

..... [1]

- 6 Calculate the percentage uncertainty associated with your average titre (uncertainty associated with each reading of a  $50 \text{ cm}^3$  class B burette is  $0.05 \text{ cm}^3$ ).

..... [1]

7 Describe four aspects of the titration procedure which help ensure that the results are accurate.

.....

.....

.....

.....

.....

..... [4]

[Total: 12]

END OF TASK

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**Specimen Mark Scheme + Instructions for Teachers and Technicians**

The maximum mark for this task is **12**.

**For use from September 2008 to June 2009.**

**It is expected that this Task can be completed in about 1 hour.**

Students should have acquired the necessary practical skills and theoretical background before attempting this task.

Candidates may attempt more than one Analysis and Evaluation task with the best mark from this type of task being used to make up the overall mark for Unit F333.

**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. If a teacher feels that a candidate has under-performed, the candidate may be given an **alternative** 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 12 marks. The cover sheet for the task contains a grid for ease of recording marks. To aid moderators, teachers should 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.

**Health and Safety**

Attention is drawn to Appendix J of the Chemistry B (Salters) specification.

Answer	Max Mark
Number of moles of sodium carbonate used in each titration calculated correctly	[1]
Correct equation included	[1]
Concentration of acid calculated correctly	[1]
Answer recorded to two significant figures	[1]
Calculations clearly explained	[1]
All appropriate units included	[1]
Percentage uncertainty associated with use of pipette correctly calculated	[1]
Percentage uncertainty associated with the average titre correctly calculated	[1]
Appropriate comments on aspects of the titration procedure which help ensure that the result is reliable and accurate are:	
<b>(a)</b> use clean, dry equipment or pre-wash burette and pipette with appropriate solutions (washing conical flask with a solution does not score this mark)	[1]
<b>(b)</b> use small number of drops of indicator	[1]
<b>(c)</b> repeat titrations to achieve concordant titres	[1]
<b>(d)</b> add acid solution dropwise near end point	[1]
<b>(e)</b> use white tile or paper as background to burette readings	[1]
<b>(f)</b> have eyes level with meniscus to avoid parallax error	[1]
(each point from <b>(a)</b> to <b>(f)</b> above scores one marking point up to a maximum of 4 marking points)	
<b>Total</b>	<b>[12]</b>