



*Rewarding Learning*

**General Certificate of Secondary Education  
2013–2014**

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**Science: Single Award**

Unit 2: (Chemistry)

Higher Tier

**[GSS22]**

**THURSDAY 14 NOVEMBER 2013, MORNING**

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**MARK  
SCHEME**

## General Marking Instructions

### Introduction

Mark schemes are published to assist teachers and students in their preparation for examinations. Through the mark schemes teachers and students will be able to see what examiners are looking for in response to questions and exactly where the marks have been awarded. The publishing of the mark schemes may help to show that examiners are not concerned about finding out what a student does not know but rather with rewarding students for what they do know.

### The Purpose of Mark Schemes

Examination papers are set and revised by teams of examiners and revisers appointed by the Council. The teams of examiners and revisers include experienced teachers who are familiar with the level and standards expected of students in schools and colleges.

The job of the examiners is to set the questions and the mark schemes; and the job of the revisers is to review the questions and mark schemes commenting on a large range of issues about which they must be satisfied before the question papers and mark schemes are finalised.

The questions and the mark schemes are developed in association with each other so that the issues of differentiation and positive achievement can be addressed right from the start. Mark schemes, therefore, are regarded as part of an integral process which begins with the setting of questions and ends with the marking of the examination.

The main purpose of the mark scheme is to provide a uniform basis for the marking process so that all the markers are following exactly the same instructions and making the same judgements in so far as this is possible. Before marking begins a standardising meeting is held where all the markers are briefed using the mark scheme and samples of the students' work in the form of scripts. Consideration is also given at this stage to any comments on the operational papers received from teachers and their organisations. During this meeting, and up to and including the end of the marking, there is provision for amendments to be made to the mark scheme. What is published represents this final form of the mark scheme.

It is important to recognise that in some cases there may well be other correct responses which are equally acceptable to those published: the mark scheme can only cover those responses which emerged in the examination. There may also be instances where certain judgements may have to be left to the experience of the examiner, for example, where there is no absolute correct response – all teachers will be familiar with making such judgements.

- |          |   |     |   |
|----------|---|-----|---|
|          |   |     |   |
| <b>1</b> | <b>(a)</b> Alkali metals [1]<br>halogens [1]<br>noble gases [1] | [3] |   |
|          | <b>(b)</b> (Dmitri) Mendeleev                                   | [1] |   |
|          | <b>(c)</b> Decreases  | [1] | 5 |
| <b>2</b> | <b>(a)</b> 71   | [1] |   |
|          | <b>(b)</b> Tin  | [1] |   |
|          | <b>(c) (i)</b> Iron sulfate [1]<br>copper [1] either order      | [2] |   |
|          | <b>(ii)</b> Displacement  | [1] |   |
|          | <b>(d)</b> Silver is unreactive                                 | [1] |   |
|          | <b>(e) (i)</b> 3  | [1] |   |
|          | <b>(ii)</b> 6   | [1] | 8 |

**3 Indicative Content:**

- indigestion is caused by excess stomach acid
- stomach acid is hydrochloric acid
- indigestion tablets contain an alkali/base
- alkali neutralises the acid/neutralisation reaction
- sodium chloride
- water
- carbon dioxide

Band	Response	Mark
A	Candidates must use appropriate specialist terms throughout to describe indigestion using <b>five to seven</b> of the points above, in a logical sequence. They use good spelling, punctuation and grammar and the form and style are of a high standard.	[5–6]
B	Candidates use some appropriate specialist terms to describe indigestion using <b>three to four</b> of the points above, in a logical sequence. They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	[3–4]
C	Candidates describe indigestion using <b>one or two</b> of the points above. However, these are not presented in a logical sequence. They use limited spelling, punctuation and grammar and have made limited use of specialist terms. The form and style are of a limited standard.	[1–2]
D	Not worthy of credit.	[0]

AVAILABLE  
MARKS

6

**4 (a) A, B and C [1]**

A compound has two or more elements chemically joined [1] [2]

**(b) E [1]****(c) C [1]****(d) B [1]**

3 atoms, 2 smaller than the other [1] [2]

6

## 5 (a) Any three from:

- dip the flame test wire into (concentrated) acid
- put flame test wire into the Bunsen flame to **clean it**
- dip the wire into the metal **ion** sample (and then into Bunsen flame)
- record the colour of the flame [3]

(b)

Metal ion	Flame colour
Sodium	<b>Orange/yellow [1]</b>
<b>Potassium [1]</b>	Lilac
Copper	<b>Blue/green [1]</b>

[3]

6

## 6 (a)

Element	Mass Number	Number of protons	Number of electrons	Number of neutrons
Calcium	40	20	<b>20 [1]</b>	20
Carbon	12	<b>6 [1]</b>	6	6
Potassium	39	19	19	<b>20 [1]</b>

[3]

(b) The number of protons **and** neutrons in an atom [1](c) (i) Correct electronic arrangement for Potassium 2.8.8.1 [1]  
correct electronic arrangement for Chlorine 2.8.7 [1] [2](ii) Potassium loses 1 electron [1]  
chlorine gains 1 electron [1]  
idea that electron is transferred from potassium to chlorine [1] [3](iii) Caesium will have a more vigorous/violent reaction [1]  
caesium is more reactive/lower down Group One [1] [2]

11

## 7 (a) Calcium hydrogencarbonate [1]

water [1]  
carbon dioxide [1] } any order [3]

(b) Blocks pipes/stops water flowing [1]

(c)  $\text{CaCl}_2$  [1]  
 $\text{CO}_2$  [1] } any order [3]  
correct balancing [1]

(d) Adding washing soda/distillation/ion exchange [1]

8

		AVAILABLE MARKS
8	(a) 8.6–10 Any value in range	[1]
	(b) Shaking of the ground/major damage to some buildings	[1]
	(c) Earthquakes are very common/predictions not always accurate/impossible to predict	[1]
	(d) (i) Correct label of first peaks as earthquake	[1]
	(ii) Size of earthquake [1] how long the earthquake lasted [1]	[2]
	(e) (i) Any <b>two</b> of: <ul style="list-style-type: none"> <li>● there was originally one continent/“pangaea”</li> <li>● over 200 million years ago</li> <li>● it broke up/moved apart forming continents</li> </ul>	[2]
	(ii) Any <b>one</b> of: <ul style="list-style-type: none"> <li>● shape of <i>continents</i> “fit” like a jigsaw</li> <li>● <i>same</i> fossils on different continents</li> <li>● <i>same</i> rock types on different continents</li> </ul>	[1]
9	(a) Polypropene is stronger [1] must compare polypropene is cheaper [1]	[2]
	(b) Silicone [1] high melting point/can withstand high temperatures [1]	[2]
	(c) Cheaper [1] strong with explanation [1]	[2]
10	(a) Using electricity [1] to break down a compound [1]	[2]
	(b) Al <sup>3+</sup> [1] 3e <sup>-</sup> [1] 3e(✓)	[2]
		9
		6
		4

**11 Indicative Content:**

- crude oil is separated by fractional distillation
- crude oil is first heated/evaporated
- it separates into different fractions at different levels/temperatures
- each fraction has a *different* boiling point/condensation point
- any **two** fractions named: petrol, naphtha, paraffin, lubricating oil or bitumen
- appropriate use for one of the named fractions

Band	Response	Mark
A	Candidates must use appropriate specialist terms throughout to describe fractional distillation using <b>five to six</b> of the points above, in a logical sequence. They use good spelling, punctuation and grammar and the form and style are of a high standard.	[5–6]
B	Candidates use some appropriate specialist terms to describe fractional distillation using <b>three to four</b> of the points above, in a logical sequence. They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	[3–4]
C	Candidates describe fractional distillation using <b>one or two</b> of the points above. However, these are not presented in a logical sequence. They use limited spelling, punctuation and grammar and have made limited use of specialist terms. The form and style are of a limited standard.	[1–2]
D	Not worthy of credit.	[0]

**Total**AVAILABLE  
MARKS

6

75