



Rewarding Learning

General Certificate of Secondary Education
2015

Double Award Science: Chemistry

Unit C2

Foundation Tier

[GSD51]

TUESDAY 9 JUNE 2015, AFTERNOON

**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.

- 1 (a) coal [1] oil [1] peat [1] [3]
- (b) oxygen [1] energy [1] [2]
- (c) (i) Any **two** of:
Smoke/gas given off
(carbon) sparks
glows/bright light/orange-yellow flame/bright flame
heat given off
Not white light; **not** pungent smell; **not** bubbles; **not** fizzing; **not** just flame
or other correct
e.g. carbon disappears
 $2 \times [1]$ [2]
- (ii) Carbon dioxide [1]
- (iii) Copper (II) oxide **or** copper oxide [1]
orange/pink/red-brown **or** similar (accept brown) [1] to black [1]
Allow 'copper coloured'; **not** 'copper'; **not** red [3]

AVAILABLE
MARKS

11

- 2 (a)
- | Water sample | Soap added and shaken | | Detergent added and shaken | |
|--------------|-----------------------|-----------|----------------------------|-----------|
| | lather | no lather | lather | no lather |
| hard water | | ✓ [1] | ✓ [1] | |
| soft water | ✓ [1] | | ✓ | |
- [3]

- (b) Advantages
Any **two** of:
Water tastes better
Good for bones and teeth
Prevent heart disease
Brewing of beer
Not contains calcium ions
or other correct $2 \times [1]$
- Disadvantages
Any **two** of:
Wastes soap
Causes scum when it (hard water) reacts with soap
Causes fur in kettles
Limescale in hot water pipes
Allow cost if correctly linked
Not just 'fur', 'scale', 'scum' – must be link
or other correct $2 \times [1]$ [4]

7

5 (a) Indicative Points

Similarities

All three gases are:

- colourless
- odourless
- not toxic
- tasteless
- all found in the atmosphere/air

any other correct (for all three gases)

maximum 2 indicative points for similarities

Testing

- idea of testing in logical order, e.g. take **a** jar (not **the** gas jar) and test all three
- use a glowing splint/lit splint
- result: it relights/burns more brightly with oxygen
- add limewater
- result: it turns milky with carbon dioxide
- nitrogen identified by elimination

N.B. indicative points for results are dependent on correct tests

Response	Marks
Candidates must use specialist terms throughout to plan the experiment (7–8 indicative points required including the idea of testing in order). They use good spelling, punctuation and grammar and the form and style are of a high standard.	5–6
Candidates use some specialist terms to plan the experiment (4 to 6 indicative points required). They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	3–4
Candidates give 1–3 of the indicative points but not necessarily in a logical sequence. They use limited spelling, punctuation and grammar and they have made little use of specialist terms.	1–2
Response not worthy of credit.	0

- (b) idea of (intense) volcanic activity [1]
which released gases into the atmosphere [1]

N.B. For any credit volcanoes must be mentioned

Credit release of gases unless wrongly qualified, e.g. toxic, dangerous, SO₂

- (c) (i) oxygen

- (ii) argon

[6]

[2]

[1]

[1]

AVAILABLE
MARKS

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			AVAILABLE MARKS	
6	(a) (i)	C	[1]	
	(ii)	Let 3 nails remain for same time/same size of nail/same temperature/ same <u>type</u> of nail/same size of test tube Ignore 'bung' or idea of 'control'	[1]	
	(iii)	To remove air or oxygen	[1]	
	(iv)	Air/oxygen and water/moisture/dampness/wetness	[1]	
	(b) (i)	Magnesium oxide [1] Hydrogen [1]	[2]	
	(ii)	Solid goes (from grey) to white or solid glows brightly Allow white light; not white flame	[1]	
	(c) (i)	Any two of: (Blue) solution goes colourless or fades Magnesium dissolves/disappears Reddish-brown/pink/brown/orange/copper coloured Not heat produced Not red; not 'copper' Or other correct – 2 × [1]	[2]	
	(ii)	Magnesium is more reactive (than copper) or vice-versa Not faster	[1]	
	(d) (i)	it continues to glow [1] idea that a grey or black solid (not powder) is formed [1] Allow idea of turning grey or black unless wrongly qualified; not 'soot'; not 'powder' Not pungent smell	[2]	
	(ii)	$\text{Fe} + \text{S} \rightarrow \text{FeS}$ LHS [1] RHS [1] If balancing wrong but formulae all correct award [1]	[2]	14
7	(a)	Average mass of an atom (of an element) [1] compared with that of a carbon-12 (isotope) [1] which has mass of exactly (clearly implied) 12 [1]	[3]	
	(b) (i)	sulfur dioxide 64	[1]	
	(ii)	sodium sulfate 142	[1]	
	(iii)	aluminium hydroxide 78	[1]	
	(c) (i)	2	[1]	
	(ii)	51 g	[1]	8

			AVAILABLE MARKS	
8	(a)	burette/measuring cylinder/(gas) syringe/graduated test tube	[1]	8
	(b)	8–9 points [2] 5–7 points correct [1] appropriate hand drawn curve [1]	[3]	
	(c)	(i) 140 s or 140 seconds (units needed)	[1]	
		(ii) $41 \text{ cm}^3 \pm 1$	[1]	
	(d)	(i) decrease or equivalent	[1]	
		(ii) stay the same	[1]	
9	(a)	(i) Any three of: water pollution damages beaches kills or damages birds kills or damages sea life destroys habitats/breeding grounds destroys marine plant life idea of effect of light on sea life can stay a long time Ignore eyesore Not defoliates trees; not animals except reference to habitats; not cost of cleaning or other correct Any 3 × [1]	[3]	
		(ii) Oil spillages are cleaned up by spraying them with detergents/ idea of physical removal/dispersants/bacteria or other correct Not burning; not filtering; not neutralising	[1]	
	(b)	methane + oxygen → carbon dioxide + water [1] [1] [1]	[3]	
	(c)	(i) Any two of: effervescence/bubbles/fizzing/gas given off idea that the gas is colourless solid dissolves/disappears blue solution formed heat evolved Not 'copper' dissolves or other correct Any 2 × [1]	[2]	
		(ii) Magnesium/zinc/aluminium/iron or other correct Not potassium, sodium, lithium, calcium, copper, gold etc.	[1]	
		(iii) food flavouring/vinegar/food preservation or other correct e.g. cleaning – not industrial; not disinfectant Allow used for wasp stings, not bee stings	[1]	
Total				11
Total				90