



Rewarding Learning

**General Certificate of Secondary Education
2014–2015**

**Double Award Science:
Chemistry**

Unit C1

Higher Tier

[GSD22]

THURSDAY 14 MAY 2015, MORNING

**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.

			AVAILABLE MARKS	
1	(a)	Ne	[1]	4
	(b)	Na ⁺	[1]	
	(c)	H ₂ O	[1]	
	(d)	HCO ₃ ⁻	[1]	
2	(a)	calcium chloride	[1]	6
	(b)	the gas/carbon dioxide leaves the flask/escapes Not: gas released; not given off	[1]	
	(c)	idea of making sure all the acid was used up/neutralised	[1]	
	(d)	use a pH meter/sensor/probe Not: pH paper/scale	[1]	
	(e)	No gas would be formed [1] a salt and water is produced [1] or No gas would be formed [1] ∴ nothing could escape [1] or It would only produce a salt and water [2] – only is explicit	[2]	
3	(a)	169 (mg per 100 g water)	[1]	5
	(b)	nitrogen	[1]	
	(c)	it decreases	[1]	
	(d)	explicit idea that fish need oxygen to breathe/respire [1] allow idea of suffocation idea that warm water contains less oxygen (not less gas) [1]	[2]	

- 4 (a) electrolysis [1]
- (b) (molten) lead bromide [1]
- (c) conducts **electricity** [1]
does not react/idea of high melting point [2]

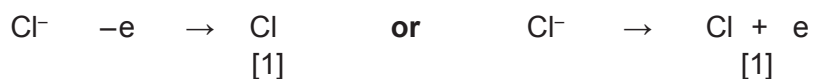
(d)

name of substance	observations at anode	observations at cathode	product at anode	product at cathode
lead bromide	*bubbles of reddish brown gas [1]	beads of metal	bromine	lead
lithium chloride	bubbles of greenish/yellow gas	beads of metal	chlorine [1]	lithium
potassium iodide	bubbles/purple vapour	beads of metal [1]	iodine [1]	potassium [1]

*Allow: brown/orange-brown/yellow-brown/orange

Not: yellow; **not** red

[5]



AVAILABLE
MARKS

11

5 (a) Indicative Content

- Protons
- Electrons
- Neutrons
- Correct numbers of protons
- Correct number of electrons
- Correct number of neutrons
- Protons in nucleus
- Neutrons in nucleus
- Electrons in shells

AVAILABLE
MARKS

Response	Mark
Candidates must use appropriate scientific terms throughout to describe the structure of a carbon atom using 7–9 of the points in the indicative content. They use good spelling, punctuation and grammar and the form and style are of a high standard.	[5]–[6]
Candidates use 5 or 6 points from the indicative content to describe the structure of a carbon atom using some scientific terms. They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	[3]–[4]
Candidates use 3 or 4 of the points from the indicative content to describe the structure of a carbon atom. They use limited spelling, punctuation and grammar and make little use of scientific terms.	[1]–[2]
Response not worthy of credit.	[0]

[6]

(b) isotopes

[1]

(c) covalent

Not: simple molecular; **not:** simple covalent; **not:** giant covalent

[1]

8

6 (a) 2,8,2 arrangement [1]

2,8,6 arrangement [1]

[2]

(b) correct ion structure for magnesium [1]

correct ion structure for sulfide [1]

correct charge on magnesium ion [1]

correct charge on sulfide ion [1]

[4]

MgS

Allow $Mg^{2+} S^{2-}$

Allow correct product of equation

[1]

7

			AVAILABLE MARKS	
7	(a)	covalent Not: simple molecular; not: simple covalent; not giant covalent	[1]	
	(b)	correct sharing [1] – for H ₂ O correct outer electrons for oxygen and hydrogen [1] this mark dependent on first mark dot/cross [1]	[3]	
	(c)	correct sharing [1] for oxygen molecule correct electrons i.e. inner and outer [1] this mark dependent on sharing mark correctly labelled double bond [1] correctly labelled lone pair [1]	[4]	
	(d)	two atoms (in a molecule) Allow idea of two atoms unless wrongly qualified, e.g. don't allow idea of same atoms or an element	[1]	
8	(a)	They both: <ul style="list-style-type: none"> • float • react very quickly • melt/form a ball • form alkaline solutions/hydroxide/colourless solution • give off a gas/produce hydrogen • dissolve/disappear/get smaller • produce heat/exothermic • can ignite/catch fire • idea of moving or other correct (Any 3 × [1])	[3]	
	(b)	Sodium and potassium both have 1 electron in the outer shell [1] they both lose 1 electron [1] or they both lose 1 electron [1] to form a stable arrangement [1] Not: just idea of same number of electrons; not both group 1	[2]	
	(c)	Flame colour – potassium lilac or purple/sodium yellow or sodium no flame [1] or idea that only potassium catches fire [1] speed of reaction – potassium faster/sodium slower/idea of potassium more reactive [1] or other correct (Any 2 × [1])	[2]	
	(d)	$2K + 2H_2O \rightarrow 2KOH + H_2$ <div style="text-align: center;"> [1] [1] </div> i.e. each correct product [1] correct balancing [1] if all formulae correct	[3]	
	(e)	$2Na + Br_2 \rightarrow 2NaBr$ correct LHS [1] correct RHS [1] correct balancing [1] if all formulae correct	[3]	

9 (a) (i) A and E	[1]	AVAILABLE MARKS
(ii) conduct (electricity) when solid [1] delocalised electrons carry the charge/idea that both are metals [1]	[2]	
(b) (very) high melting point [1] doesn't conduct (electricity) [1]	[2]	
(c) C is ionic [1] idea that electrolytes must have ions to carry the charge or ions can move when molten or in solution [1] if ions not explicit no credit	[2]	7
Total		70

