Rewarding Learning

General Certificate of Secondary Education
2016–2017

Double Award Science: Chemistry

Unit C1

Foundation Tier

[GSD21]

THURSDAY 23 FEBRUARY 2017, 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.

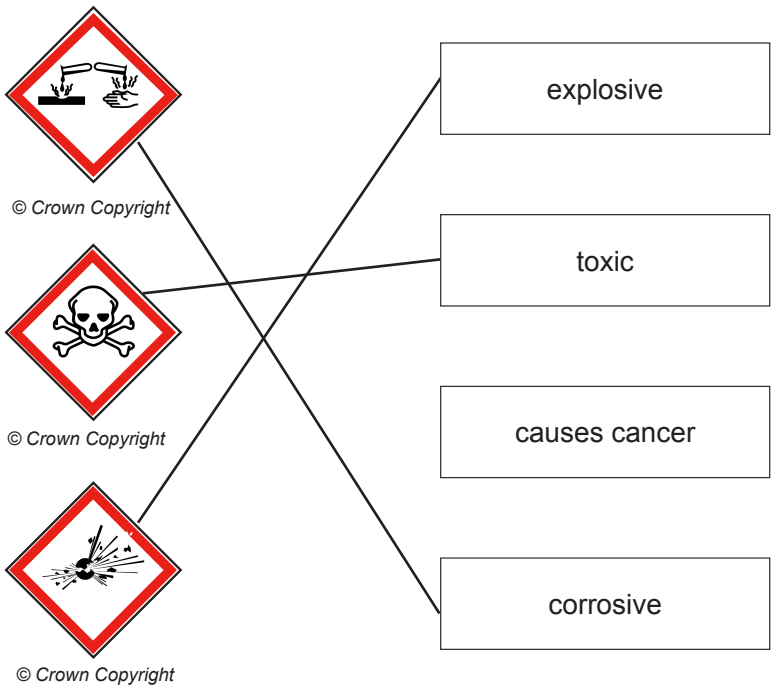
The job of the examiners is to set the questions and the mark schemes; and the job of the revisers is to review the questions and mark schemes commenting on a large range of issues about which they must be satisfied before the question papers and mark schemes are finalised.

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.

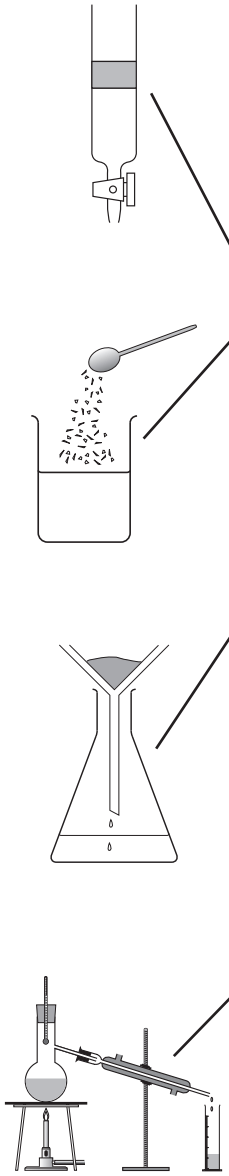
The main purpose of the mark scheme is to provide a uniform basis for the marking process so that all the markers are following exactly the same instructions and making the same judgements in so far as this is possible. Before marking begins a standardising meeting is held where all the markers are briefed 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)**	hazard	[1]	
	(b)	**symbol** **danger**		



		3 × [1]	[3]	
	(c)	Easier to read, universally understood, greater visual impact No answers linked to danger Any 2 × [1]	[2]	6
2	**(a)**	**mixture** of two or more **elements** [1]/of which at least one is a **metal** [1] Mixture of metals [1] Mixture essential for any credit	[2]	
	(b)	5	[1]	
	(c)	carbon	[1]	
	(d)	aluminium or tin	[1]	5

3	Diagram	Use of apparatus		AVAILABLE MARKS
		To add a solid to a solvent To separate sand from salty water To separate two immiscible liquids To collect a distillate from a mixture of salty water To collect a dry sample of copper sulfate crystals		
	4 × [1]		[4]	4

4	**(a)**	four	[1]	
	(b)	covalent	[1]	
	(c)	all	[1]	
	(d)	hard	[1]	
	(e)	allotropes	[1]	5

AVAILABLE MARKS

5 (a) (i)

substance	pH range	colour of universal indicator	colour of litmus paper	colour of red cabbage solution
dilute sulfuric acid	**0–2** [1]	red	red	red
ammonia solution	8–11	blue	blue	green
pure water	7	**green** [1]	red/blue	purple
lemon juice	3–6	orange	**red** [1]	pink
sodium hydroxide* [1]	12–14	purple	blue	yellow

*or other correct [4]

(ii) idea that it changes colour at different pH values [1]

(iii) idea that there are two types of litmus paper [1]
they do not change colour in water/water is neutral [1] [2]

(iv) ammonia [1]

(b) (i) pH meter/pH probe [1]

(ii) blueberries [1]

(iii) broccoli [1] 11

6 (a) (i) hydrochloric acid [1]

(ii) hydrogen (apply ECF for correct formulae) [1]

(iii) magnesium chloride (apply ECF for correct formulae) [1]

(iv) any **two** of
magnesium dissolves/disappears [1]
fizzing/bubbles/effervescence/gas evolved/gas given off [1]
colourless solution [1] [2]
max 2 × [1]

(b) apply a lit splint [1]
squeaky pop [1] [2]

(c) (i) $2\,K + 2HCl \rightarrow 2\,KCl + H_2$
RHS correct formulae [1]/balancing [1] [2]

(ii) idea that potassium is very reactive [1]
idea of being very dangerous [1] [2] 11

				AVAILABLE MARKS
7	**(a)**			

Word	Description letter
hydrated	E
solvent	A
solubility	D
anhydrous	B
solution	C

5 × [1] [5]

(b) **(i)** hydrated [1]

(ii) $CuSO_4$ [1] 7

8 **(a)** aluminium [1]

(b) argon [1]

(c) 2 [1]

(d) six electrons **in outer shell** clearly implied [1]

(e) increases [1]

(f) **(i)** 18 [1]

(ii) 22 [1]

(iii) has a full outer shell/8 electrons in outer shell [1] 8

		AVAILABLE MARKS
9	**Indicative content** • Calcium 2,8,8,2 • Fluorine 2,7 • Correct idea of electron transfer from calcium to fluorine • Two electrons lost by calcium • Fluorine gains one electron • Two fluorine atoms required • Calcium ion Ca^{2+} • Fluoride ion F^- • Strong/electrostatic forces of attraction • Correct formula CaF_2	

Response	Mark
Candidates must use appropriate scientific terms throughout to describe the formation of calcium fluoride using **8–10** 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 **5–7** points from the indicative content to describe the formation of calcium fluoride 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 **2–4** of the points from the indicative content to describe the formation of calcium fluoride. They use limited spelling, punctuation and grammar and make little use of scientific terms. The form and style are of a limited standard.	[1]–[2]
Response not worthy of credit.	[0]

[6] 6

10 **(a)** electrolysis [1]

(b) anode(s) [1]

(c) oxygen [1]

(d) any **two** of:
anode is made of carbon/graphite [1]
oxygen reacts with anode/carbon/graphite [1]
to produce carbon dioxide – unless wrongly qualified [1]
2 × [1] [2]

(e) any **two** of:
idea of fewer CO_2 emissions/less greenhouse gases
idea of **energy** saving
idea of less waste
idea of less bauxite/ore needed
or other correct
2 × [1]
Not answers linked to cost [2] 7

Total **70**