

New
Specification



General Certificate of Secondary Education
2017–2018

**Single Award Science
Chemistry**

Unit 2
Higher Tier

[GSA22]

THURSDAY 22 FEBRUARY 2018, 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.

- 1 (a) Order of atomic mass [1]
- (b) Noble gases [1]
the Noble gases are unreactive/weren't discovered at the time [1] [2]
- (c) Copper/zinc/titanium/vanadium/astatine/selenium/chromium/manganese/
iron/cobalt/nickel/hydrogen [1]
- (d) 2,8,2 drawn [1]

AVAILABLE MARKS

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2 (a)

Reaction	Products formed			
	a salt	water	hydrogen	carbon dioxide
calcium hydroxide and hydrochloric acid				
calcium metal and hydrochloric acid	✓		✓	

[2]

- (b) Exothermic [1]

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- 3 (a) All points plotted correctly [2] (6 points plotted correctly [1])
correct curve [1] [3]
- (b) As the **time** increases, the **volume** of gas increases [1]
at 40 s/48 cm³ there is no longer any more gas produced [1] [2]
- (c) (i) Limewater [1]
- (ii) Colourless [1] to cloudy [1] [2]
- (d) (i) Four [1]
- (ii) Six [1]

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- 4 (a) Crude oil is formed over millions of years [1]
by the action of heat and pressure [1]
on dead animals and plants [1] [3]
- (b) butane + oxygen [1] \longrightarrow carbon dioxide + water [1] [2]
- (c) Any **two** from:
 - global warming
 - sea levels rise/polar ice cap melting
 - flooding
 - climate change
 - or other suitable [2]
- (d) (i)
- $$\begin{array}{cccc}
 & \text{H} & \text{H} & \text{H} & \text{H} \\
 & | & | & | & | \\
 \text{H} & - \text{C} & - \text{C} & - \text{C} & - \text{C} - \text{H} \\
 & | & | & | & | \\
 & \text{H} & \text{H} & \text{H} & \text{H}
 \end{array}$$
- [1]
- (ii) CH_4 [1]
 C_3H_8 [1] [2]
- (e) (i) Polymerisation [1]
- (ii) **Many** (small) glucose molecules [1]
bond together (to make a long chain) [1] [2]
- (f) (i)
- $$\left[\begin{array}{cc}
 \text{H} & \text{Cl} \\
 | & | \\
 - \text{C} & - \text{C} - \\
 | & | \\
 \text{H} & \text{H}
 \end{array} \right]_n$$
- C–C single bond [1]
brackets and n [1] [2]
- (ii) Vinyl chloride has **chlorine** as well as carbon and hydrogen (therefore cannot be a hydrocarbon) [1]

AVAILABLE
MARKS

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		AVAILABLE MARKS
5	(a) Gas syringe	[1]
	(b) (i) 77 ± 1 s	[1]
	(ii) 30 cm^3	[1]
	(iii) $0.4 \text{ cm}^3/\text{s}$	[1]
	(c) Increasing the temperature increases the speed/energy of particles [1] increasing the speed of particles increases the number of collisions/ increasing energy means more particles have the required energy [1] more likely to be more successful collisions [1]	[3]
	(d) Adding a catalyst/(increasing) concentration (of the acid)/ (increase) surface area	[1]
6	(a) B, E, A, C (any two in the correct order [1])	[2]
	(b) Sodium/potassium	[1]
	(c) C [1] it does not react with either hot or cold water [1]	[2]
7	(a) Electrolysis is using electricity [1] to break down/decompose a substance/compound [1]	[2]
	(b) (i) Anode	[1]
	(ii) $2\text{O}^{2-} \longrightarrow \text{O}_2$ [1] + 4e^- [1]	[2]
	(iii) The oxygen reacts with the carbon/graphite [1] the electrode is worn away [1]	[2]
		8
		5
		7

8 Indicative Content:

- proton: positive charge (+1)
- proton found in the nucleus
- neutron: no charge/neutral
- neutron found in the nucleus
- electron: negative charge (-1)
- electrons found in the electron shells/orbiting the nucleus
- number of electrons and protons are equal/no overall charge
- the atomic number tells us the number of protons
- the mass number tells us the total number of protons and neutrons

Band	Response	Mark
A	Candidates must use appropriate specialist terms throughout to describe the structure of an atom using seven to nine 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 the structure of an atom using four to six 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 the structure of an atom using one to three of the above points. 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]

[6]

TotalAVAILABLE
MARKS

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