Rewarding Learning

General Certificate of Secondary Education
2017–2018

Science: Single Award

Unit 2 (Chemistry)

Higher Tier

[GSS22]

THURSDAY 9 NOVEMBER 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)	As C-chain increases boiling point range increases/ability to catch fire decreases/state changes from gas to liquid to solid	[1]	
	(b)	It catches fire easily/releases energy quickly [1] it can be poured easily as it is a liquid [1]	[2]	
	(c)	The mixture is heated/evaporates/boils [1] each fraction (part) boils off at its own boiling point [1]	[2]	5
2	(a)	(i) Fluorine	[1]	
		(ii) Boron	[1]	
		(iii) Lithium	[1]	
		(iv) As atomic number increases metallic character decreases/ decreases from left to right	[1]	
	(b)	(i) LiF	[1]	
		(ii) Lithium hydroxide	[1]	
		(iii) Float/move on the surface of water/disappears/gives out heat	[1]	7

AVAILABLE MARKS

3 Indicative content

- type of fingerprint – arch, loop, whorl and composite (any one)
- use of carbon powder for white/light surfaces
- use of aluminium powder for dark surfaces
- dust off **excess** with brush
- use of sellotape **then** transfer to card
- **compare** fingerprints to the (AFIS) database
- fingerprints are unique

Band	Response	Mark
A	Candidates use **5 to 7** of the points given in the indicative content to explain, using appropriate specialist terms, and in a logical sequence, the method used to take fingerprints from different types of surfaces. They use good spelling, punctuation and grammar and the form and style are of a high standard.	[5]–[6]
B	Candidates use **3 or 4** of the points given in the indicative content to explain, using appropriate specialist terms, and in a logical sequence, the method used to take fingerprints from different types of surfaces. They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	[3]–[4]
C	Candidates use **1 or 2** of the points given in the indicative content to explain how fingerprints are taken. They use limited spelling, punctuation and grammar and they make little use of specialist terms. The form and style are of a limited standard.	[1]–[2]
D	Response not worthy of credit.	[0]

[6] 6

4 (a) Any **two** from:

- tastes good
- may prevent heart disease
- good for teeth and bones [2]

(b) (i) C and D (need both) [1]

(ii) D [1]

(iii) B [1]

(c) (i) Thermal decomposition is breakdown of a substance [1] using heat [1] [2]

(ii) Calcium carbonate [1]

8

		AVAILABLE MARKS
5	**(a)** Lighter and stronger [1] explanation of either property [1] [2]	
	(b) Cheaper [1]	3
6	**(a)** **(i)** 2 $NaHCO_3 \rightarrow Na_2CO_3 + H_2O + CO_2$ [1]	
	(ii) Makes cakes rise/makes the texture lighter [1]	
	(b) **(i)** sodium hydrogencarbonate + citric acid → **sodium citrate** + **water** + carbon dioxide [2]	
	(ii) Limewater [1]	5
7	**(a)** **(i)**	

Area	Feature
A	Mountains [1]
B	Volcanoes [1]
C	Earthquakes

[2]

	(ii) Tectonic plates try to move past each other/build up of pressure [1] **sudden** release of pressure [1] [2]	
	(b) **(i)** Archbishop Ussher [1]	
	(ii) 6000 **years** [1]	
	(iii) Counted the generations [1]	7

			AVAILABLE MARKS
8	**(a)**	Aluminium [1] low density [1] reasonable electrical conductivity [1] [3]	
	(b)	Melting point/conductivity [1] suitable explanation [1] [2]	
	(c) **(i)**	0.000000001 m/1 × 10^{-9} m [1]	
	(ii)	(Protect skin but) remain invisible/do not leave white streaks on skin [1]	
	(iii)	Wound dressing/sterilising spray [1]	
	(d) **(i)**	Can change their **properties** [1] with changes in the surroundings (e.g. light or heat) [1] [2]	
	(ii)	Thermochromic/photochromic [1]	11
9	**(a)**	Two (or more different) elements [1] **chemically** joined/combined [1] [2]	
	(b) **(i)**	1 [1]	
	(ii)	3 [1]	
	(c)	A sodium atom donates/gives/transfers [1] one electron [1] to the chlorine atom [1] [3]	
	(d)	Protons = 20 (11 + 9) [1] Electrons = 20 (11 + 9) [1] Neutrons = 22 (12 + 10) [1] [3]	10

10 Indicative content

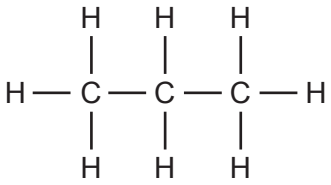
- don't look directly at flame/reaction
- hold the metal with tongs
- magnesium is silver coloured before reaction
- it turns white/grey after reaction
- it burns with a bright white light/glows
- oxidation reaction
- magnesium oxide

Band	Response	Mark
A	Candidates use **6 to 7** of the points given in the indicative content to explain, using appropriate specialist terms, the reaction taking account of safety precautions. They use good spelling, punctuation and grammar and the form and style are of a high standard.	[5]–[6]
B	Candidates use **4 to 5** of the points given in the indicative content to explain, using appropriate specialist terms, the reaction taking account of safety precautions. They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	[3]–[4]
C	Candidates use **1 to 3** of the points given in the indicative content to explain the reaction taking account of safety precautions. They use limited spelling, punctuation and grammar and they make little use of specialist terms. The form and style are of a limited standard.	[1]–[2]
D	Response not worthy of credit.	[0]

[6]

AVAILABLE MARKS

6

				AVAILABLE MARKS
11	**(a)**	Made of the elements hydrogen and carbon [1] only [1]	[2]	
	(b)		[1]	
	(c)	Alkanes	[1]	
	(d)	$C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$ [1] mark for reactants [1] mark for products [1] mark for balancing equation	[3]	7
			Total	**75**