



Rewarding Learning

**General Certificate of Secondary Education
2012– 2013**

Science: Single Award

Unit 2 (Chemistry)

Higher Tier

[GSS22]

MONDAY 20 MAY 2013, 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.

			AVAILABLE MARKS
1	(a) It is not flexible/it shatters easily (cheaper/high resistance marked wrong)	[1]	
	(b) Plastic B is cheaper/more flexible	[1]	
	(c) Plastic D (essential) [1] Any two		
	● Because it is resistant to alkali [1]		
	● It is not easily shattered/not flexible [1]		
	● Melting point is quite high [1]		
	In correct plastic but correct property/s gains [1] OR [2]	[3]	5
2	(a) <i>proton</i> 1 [1]		
	<i>electron</i> -1 [1]		
	<i>neutron</i> in the nucleus [1]	[3]	
	(b) (i) 11	[1]	
	(ii) 12	[1]	5

3 Indicative Content

Safety: (max 2)

- use a small piece of potassium
- handle with tongs
- use a large amount/trough of water
- use a safety screen/goggles

Observations: (max 2)

- Lilac Flame
- Potassium floats/stays on surface
- Potassium moves
- Fizzing/bubbles/gas given off
- Potassium dissolves/gets smaller/forms a ball/melts

Products

- Potassium Hydroxide
- Hydrogen accept correct word equation

Band	Response	Mark
A	Candidates must use appropriate specialist terms throughout to describe the demonstration using 5 or 6 of the above points. They use good spelling, punctuation and grammar and the form and style are of a high standard.	[5–6]
B	Candidates must use appropriate specialist terms throughout to describe the demonstration, using 3–4 of the above points. They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	[3–4]
C	Candidates describe the demonstration using only 1 or 2 of the above points. They use limited spelling, punctuation and grammar and they have made little use of specialist terms.	[1–2]
D	Response not worthy of credit.	[0]

AVAILABLE
MARKS

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		AVAILABLE MARKS			
4	(a) (i) Yellow	[1]	11		
	(ii) Red	[1]			
	(iii) Red	[1]			
	(b) (i) Neutralisation	[1]			
	(ii) Universal indicator [1] It is only indicator in the table to change colour at pH7/ have a different colour at pH7 [1]	[2]			
	(c) pH sensor/data logger	[1]			
	(d) Add red cabbage to water [1] Boil/grind with mortar and pestle [1] Filter/decant/remove cabbage [1]	[3]			
	(e) magnesium chloride	[1]			
	5	(a) 1500 – 1400 [1] = 100 [1]		[2]	7
		(b) (i) CaCO ₃		[1]	
(ii) Carbon dioxide		[1]			
(c) Indigestion tablet contains an alkali/base/named base [1] Alkali neutralises [1] acid [1]		[3]			
6		(a) <i>any two</i> ● hair ● skin ● blood ● semen ● other suitable	[2]	4	
	(b) Suspect B [1] The thicknesses and positions of the bands are the same/the bands in suspect B genetic fingerprint match the sample [1]	[2]			
	7	(a) radiometric dating	[1]		5
(b) a timescale that is difficult to comprehend		[1]			
(c) continental drift described [1] shapes of continents fit together [1] over time continents are further apart [1]		[3]			

- 8 (a) earth, fire and water [1]
- (b) (i) Every eighth element was similar/similar chemical properties/Law of Octaves [1]
- (ii) Two elements in the same position/assumed all elements were discovered/did not leave spaces [1]
- (c) Elements in order of mass [1]
Gaps left for undiscovered elements/he put elements together that were not alike [1] [2]
- 9 (a) *hydrogen* 1 [1]
oxygen 2.6 [1] [2]
- (b) Indicative content
- Electrons are shared
 - Hydrogen atom shares one electron
 - Oxygen atom shares two electrons/one electron with each hydrogen atom
 - There are two hydrogen atoms required for each oxygen atom
 - Bonding occurs to give each atom a full outer shell/make each atom stable
 - Covalent bonding is involved
 - Chemical formula for water is H₂O

Band	Response	Mark
A	Candidates must use appropriate specialist terms throughout to describe the bonding involved using 5, 6 or 7 of the above points. They use good spelling, punctuation and grammar and the form and style are of a high standard.	[5–6]
B	Candidates must use some appropriate specialist terms throughout to describe the bonding involved, using 3-4 of the above points. They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	[3–4]
C	Candidates describe the bonding involved using only 1 or 2 of the above points. They use limited spelling, punctuation and grammar and they have made little use of specialist terms.	[1–2]
D	Response not worthy of credit.	[0]

[6]

AVAILABLE
MARKS

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			AVAILABLE MARKS
10 (a)	Using electricity [1] To split up/break down/decompose a compound [1]	[2]	8
(b) (i)	3	[1]	
(ii)	fluorine	[1]	
(iii)	10	[1]	
(c)	Aluminium is less dense [1] Aluminium is cheaper [1] Suitable explanation e.g. it needs to be cheaper as there is a lot of aluminium needed for the wires in the National Grid [1]	[3]	
11 (a)	ethane [1] Correct structure for propane [1] C_4H_{10} [1]	[3]	
(b)	$C_3H_8 + 5O_2 \rightarrow 4H_2O + 3CO_2$ LHS [1] RHS [1] Correct balancing [1]	[3]	
(c) (i)	Many monomers/repeating units/small molecules [1] Joined to make a long chain [1]	[2]	
(ii)	$\left[\begin{array}{cc} \text{H} & \text{CH}_3 \\ & \\ -\text{C} & - \text{C}- \\ & \\ \text{H} & \text{H} \end{array} \right]_n$		
	single bond [1] brackets and correct atoms [1] correct position of "n" [1]	[3]	
Total			75

