Rewarding Learning

General Certificate of Secondary Education
2017–2018

Science: Single Award

Unit 2 (Chemistry)

Higher Tier

[GSS22]

THURSDAY 17 MAY 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.

					AVAILABLE MARKS
1	(a)	(i)	B	[1]	
		(ii)	Lithium	[1]	
		(iii)	A and D (need **both**)	[1]	
	(b)	(i)	4	[1]	
		(ii)	2.2 drawn (allow error carry forward from **(b)(i)**)	[1]	
		(iii)	Group 2 [1] Period 2 [1] (allow error carry forward from **(b)(ii)**)	[2]	7
2	(a)	(i)	NaCl	[1]	
		(ii)	$MgCl_2$	[1]	
	(b)	(i)	3	[1]	
		(ii)	6	[1]	
		(iii)	Calcium sulfate	[1]	5

AVAILABLE MARKS

3 Indicative Content:

- indigestion is caused by excess stomach acid
- stomach acid is hydrochloric acid
- indigestion tablets contain an alkali/base
- alkali neutralises the acid/neutralisation reaction
- sodium chloride
- water
- carbon dioxide

Band	Response	Mark
A	Candidates must use appropriate specialist terms throughout to describe indigestion using **5 to 7** 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 indigestion using **3 to 4** 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 indigestion using **1 or 2** of the points above. 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	Response not worthy of credit.	[0]

[6] 6

4 (a) (i) Yellow [1]

(ii) Universal indicator [1]

(iii) Thymol blue [1]

(b) Any **two** from:

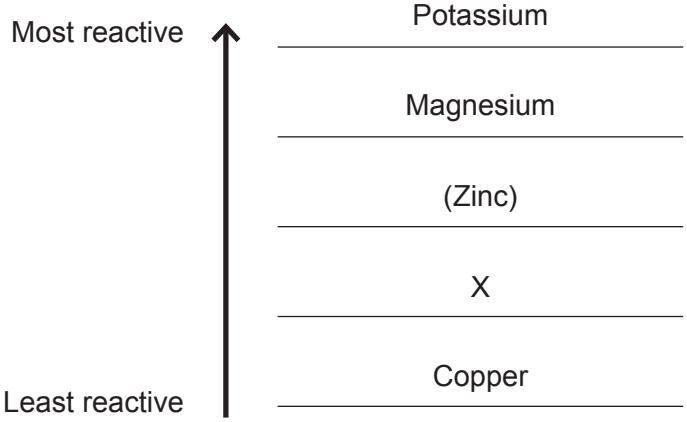
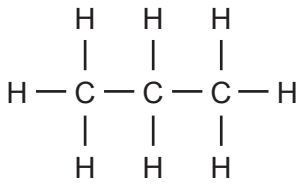
- it only shows if an alkali is present/does not indicate acid or neutral
- does not show strength of acid or alkali
- has only two colours [2]

(c)

sulfuric acid + [sodium hydroxide] → sodium sulfate + [water]

[2] 7

				AVAILABLE MARKS
5	(a)	Combines the **properties** of more than one material [1] to produce a **more useful** material (for a particular purpose) [1]	[2]	
	(b) (i)	Light [1] more fuel efficient/able to fly further without stops [1]	[2]	
	(ii)	More expensive	[1]	
	(c) (i)	Flexible/waterproof/strong	[1]	
	(ii)	Carbon fibre did not exist 100 years ago	[1]	7
6	(a)	Add soap and **shake** [1] only a **small amount** of soap is needed to make a lather [1]	[2]	
	(b) (i)	4	[1]	
	(ii)	(40 + 35.5 =) 75.5 mg [1] 75.5 mg × 2 = 151 mg [1]	[2]	
	(c)	$CaCO_3$ + CO_2 + H_2O [1] [1] both needed for 1 mark	[2]	7
7	(a)	More dense [1] high costs [1] correct explanation [1]	[3]	
	(b)	Electrical wires [1] as it is a good conductor (of electricity) [1]	[2]	5
8	(a) (i)	7.0–7.9	[1]	
	(ii)	Mexico is on the **boundary/edge** of two tectonic plates	[1]	
	(iii)	Earthquakes are very common/not always accurate/ impossible to predict	[1]	
	(b) (i)	There was originally one continent/"Pangaea" [1] it broke up/moved apart (forming continents) over **millions** of years [1]	[2]	
	(ii)	Shape of continents "fit" like a jigsaw/same rock types on **different** continents/same fossils on **different** continents	[1]	6

				AVAILABLE MARKS
9	**(a)**			
		4 correct = [2] marks, any 2 in correct order = [1]	[2]	
	(b)	Iron/tin/lead/chromium/cobalt/nickel	[1]	
	(c)	To prevent it **reacting** with **air/water/oxygen**	[1]	
	(d)	Gain of oxygen	[1]	5
10	**(a)**	**(i)** $C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$ [1] for both CO_2 and H_2O [1] for balancing	[2]	
		(ii) 	[1]	
		(iii) C_4H_{10}	[1]	
	(b)	**(i)** Polymerisation	[1]	
		(ii) Double bond (in ethene) breaks open [1] (many) **monomers** (of ethene chemically) join [1] to form (long) chains [1]	[3]	8

AVAILABLE MARKS

11 Indicative content

- Electronic configuration of sodium (2,8,1)
- Electronic configuration of chlorine (2,8,7)
- Correct direction of transfer (Na to Cl)
- Correct number of electrons transferred (one)
- Electron configuration of sodium ion (2,8)
- Electronic configuration of chloride ion (2,8,8)
- Sodium chloride formed

Band	Response	Mark
A	Using **6 to 7** of the points shown in the indicative content, candidates describe fully how the atoms of sodium and chlorine join to form sodium chloride in a logical sequence. They use good spelling, punctuation and grammar and the form and style are of a high standard.	[5]–[6]
B	Using **4 to 5** of the points shown in the indicative content candidates describe fully how the atoms of sodium and chlorine join to form sodium chloride 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 make reference to **1 to 3** of the points shown in the indicative content using limited spelling, punctuation and grammar. The form and style is of limited standard and they have made little use of the specialist terms.	[1]–[2]
D	Response not worthy of credit.	[0]

[6] 6

12 (a) Using electricity [1] to break down/decompose a substance [1] [2]

(b) Graphite [1]
good conductor of electricity/high melting point/unreactive [1] [2]

(c) Al^{3+} [1] + $3e^-$ [1] [2] 6

Total **75**