New Specification

Rewarding Learning

General Certificate of Secondary Education
2018–2019

Single Award Science
Chemistry

Unit 2

Higher Tier

[GSA22]

THURSDAY 8 NOVEMBER 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)	Carbon [1] hydrogen and carbon (either order) [1] hydrocarbon [1] [3]	
	(b) (i)	75% [1]	
	(ii)	Any similarity, e.g. each chart has same percentage of oil/largest percentage comes from fossil fuels [1] Any difference, e.g. each chart has different percentages of nuclear/coal [1] (must refer to USA/Europe) [2]	6
2	(a)	A material that changes its properties [1] when there is a change in the environment/surroundings (**heat/light**) [1] [2]	
	(b) (i)	S [1]	
	(ii)	Any **two** from: • Plastic R changes colour 70 °C • When the bottle is green milk can be added • When the bottle is red it is not safe to add milk [2]	5

AVAILABLE MARKS

3 (a) Indicative Content:

- fingerprints are unique
- fingerprints can be **matched** to a suspect/database
- use **carbon** powder
- brush/dust on the powder
- remove the **excess** powder
- use sellotape to lift the print
- photograph/scan the print/stored in database
- alternative light source/chemical developers/U.V. light

Band	Response	Mark
A	Candidates must use appropriate specialist terms throughout to describe how to collect fingerprints using **six to eight** 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 how to collect fingerprints using **four to five** 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 how to collect fingerprints 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]

(b) Description of use of fingerprint to unlock a mobile phone/open security door [1] — 7

4 (a) (i) Covalent [1]

(ii) Two non-metals [1]

(b) Group 0 elements already have a full outer shell of electrons [1] — 3

5 (a) (i) Conductor of electricity [1]

(ii) 2,4 drawn [1]

(b) Any similarity, e.g. both have 3 elements present/both have 1 lithium atom [1]

Any difference, e.g. $LiCoO_2$ has 2 oxygen atoms and the other has 4 [1] [2] — 4
$LiMn_2O_4$ has more atoms

					AVAILABLE MARKS
6	(a)	(i)	All correct points plotted [2] (6 points [1]) points joined correctly with a smooth curve [1]	[3]	
		(ii)	The number of units/bottles stays the same from 1990–1992/3 [1] From 1992/3 the number of units/bottles increases [1]	[2]	
	(b)	(i)	Polythene	[1]	
		(ii)	Double bond in polymer circled and explanation of to form a polymer the double bond must break (to allow monomers to join)	[1]	
	(c)	(i)	Advantage: very little space required/very little waste left after/heat can be used/other suitable Disadvantage: causes **air** pollution/more CO_2/more Greenhouse gases/ contributes to Global Warming/other suitable	[2]	
		(ii)	Landfill	[1]	
	(d)		C_3H_6 [1] Correct structure drawn [1] State at room temperature: Gas [1]	[3]	13
7	(a)	(i)	Line B [1] the line is steeper/the reaction would be faster [1] the line on the graph finishes at the same volume (as the same amount of reactants were used) [1]	[3]	
		(ii)	Line E	[1]	
	(b)		As the concentration increases the number of reactant particles increases [1] there will be more successful collisions [1] in a given period of time [1]	[3]	
	(c)	(i)	Gas syringe	[1]	
		(ii)	Measured the decrease in mass over time/ time for magnesium to disappear	[1]	
	(d)		$2\,HCl + Mg \rightarrow MgCl_2 + H_2$ (reactants [1], products [1], correct balancing [1])	[3]	12

				AVAILABLE MARKS
8	(a)	(i)	Electrolysis [1]	
		(ii)	Bauxite [1]	
	(b)		Aluminium ions (move to the cathode) [1] They gain [1] three electrons [1] [3]	
	(c)	(i)	Glowing splint [1] Relights [1] [2]	
		(ii)	The oxygen reacts with the electrode (to produce carbon dioxide) [1] Causing it to wear away [1] [2]	
	(d)		Recycling only uses a fraction of the energy needed for extraction/saves waste/save landfill sites [1]	10
			Total	**60**