Rewarding Learning

General Certificate of Secondary Education
2013–2014

Double Award Science: Chemistry

Unit C1

Higher Tier

[GSD22]

TUESDAY 25 FEBRUARY 2014, 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)	all soluble	[1]	
		(ii)	idea of nearly all soluble [1] except lead [1]	[2]	
		(iii)	nitrate **or** NO_3^-	[1]	
	(b)		soluble [1] soluble [1] soluble [1]	[3]	7
2	(a)	(i)	They (all) decrease in solubility [1] as the temperature rises [1] second mark dependent on first; idea of negative correlation, unqualified gains [1]	[2]	
		(ii)	gases	[1]	
		(iii)	They increase in solubility with temperature [1] NaCl stays the same or increases only slightly with temperature [1]	[2]	
		(iv)	16° C ± 0.5 units needed	[1]	
	(b)	(i)	oxygen levels decrease	[1]	
		(ii)	salmon depend on oxygen for breathing/respiration [1] they will have less energy/could die [1]	[2]	9
3	(a)		Metal X is a mixture of more than two elements [1] it includes metal elements [1]	[2]	
	(b)	(i)	addition of all other elements = 2.7%	[1]	
		(ii)	100 – 2.7 [1] e.c.f. 97.3% [1] (for correct method but wrong answer award [1])	[2]	
	(c)	(i)	good corrosion resistance/stronger [1] low atomic mass/lighter [1] any suitable	[2]	
		(ii)	ships, cars, any suitable linked to properties given in the passage and the table	[1]	8

AVAILABLE MARKS

4 (a) (i) A – diamond [1] B – graphite [1] [2]

(ii) (carbon) atoms [1]

(b) Indicative content

Compare

- High melting point for diamond
- High melting point for graphite
- Insolubility in water
- Solids

Contrast

- Graphite conducts electricity
- Diamond does not
- Diamonds hard
- Graphite soft

Or other correct

Band	Response	Mark
A	Candidates use 5 or more indicative points above to describe the properties of both diamond and graphite. They use appropriate specialist terms and the spelling, punctuation and grammar and form and style are of a good standard.	[5]–[6]
B	Candidates use 3–4 indicative points above to describe the properties of diamond and graphite. They use appropriate specialist terms and the spelling, punctuation and grammar and form and style are of a satisfactory standard.	[3]–[4]
C	Candidates make reference to 1–2 indicative points above using limited spelling, punctuation and grammar and the form and style are of limited standard and they have made no use of specialist terms.	[1]–[2]
D	Candidates make no reference to the points above and offer no other suitable response.	[0]

[6]

(c) (i) sodium 2,8,1 arrangement [1]
sulfur 2,8,6 arrangement [1] [2]

(ii) correct sodium ion 2,8 arrangement [1]
correct sulfide ion 2,8,8 arrangement [1] [2]

(iii) electrostatic attraction/forces of attraction between oppositely charged ions [1]

(iv) Na_2S [1]

15

					AVAILABLE MARKS
5	**(a)**	**(i)**	dot/cross [1] correct sharing [1] correct total number of electrons [1]	[3]	
		(ii)	add anhydrous copper sulfate [1] colour change (from white) to blue [1] **or** anhydrous cobalt chloride/cobalt chloride paper [1] turns pink [1]	[2]	
	(b)	**(i)**	3 covalent bonds	[1]	
		(ii)	10 lone pairs	[1]	
	(c)		correct sharing [1] correct total number of electrons [1]	[2]	9
6	**(a)**	**(i)**	idea of correct transfer [1] calcium loses 2 electrons [1] chlorine gains 1 electron [1] idea of need for 2 chlorines [1]	[4]	
		(ii)	idea all halogens have 7 electrons/same number of electrons in outer shell [1] all halogens need to gain 1 electron/(to become stable) [1]	[2]	
	(b)	**(i)**	colourless solution (of potassium bromide) [1] turns yellow/orange [1] (not brown unqualified) as bromine is released [1]	[3]	
		(ii)	$2KBr + Cl_2 \rightarrow 2KCl + Br_2$ left-hand side [1] right-hand side [1] balancing [1]	[3]	12
7	**(a)**		$Ca(OH)_2 + 2HCl \rightarrow CaCl_2 + 2H_2O$ LHS [1] RHS [1] Balancing [1]	[3]	
	(b)		$H^+_{(aq)} + OH^-_{(aq)} \rightarrow H_2O_{(l)}$ LHS [1] RHS [1] State symbols [1]	[3]	
	(c)	**(i)**	$Ca^{2+} + 2e^- \rightarrow Ca$ [1] [1]	[2]	
		(ii)	$2F^- - 2e^- \rightarrow F_2$ **or** $2F^- \rightarrow F_2 + 2e^-$ [1] [1] [1] [1]	[2]	10
				Total	**70**