Rewarding Learning

General Certificate of Secondary Education
2014–2015

Double Award Science: Chemistry

Unit C1

Foundation Tier

[GSD21]

THURSDAY 14 MAY 2015, 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)**	hydrogen – popping sound copper oxide – reacts to produce a salt + water only aluminium sulfate – white solid copper carbonate – green solid carbon dioxide – turns limewater milky	[5]	
	(b)	correct symbol accept diagram which shows liquid dropping on to hand/surface	[1]	6
2	**(i)**	sugar – dissolves	[1]	
	(ii)	water – condenses	[1]	
	(iii)	ice cream – melts	[1]	
	(iv)	iodine crystals – sublime	[1]	4
3	**(a)**	**(i)** lead nitrate/potassium iodide	[1]	
		(ii) water	[1]	
	(b)	lead iodide	[1]	
	(c)	Apparatus shows filter paper [1] filter funnel [1] flask/beaker/test tube [1] 3 correct labels – at least 2 for apparatus [1] If apparatus unassembled: 1 piece = 0 2 pieces = 1 3 pieces = 2	[4]	7

					AVAILABLE MARKS
4	**(a)**	**(i)**	gold, silver, copper and chromium all four correct [2] two or three correct [1]	[2]	
		(ii)	it is a **mixture** of two (or more) **elements** [1] including a **metal** [1] Mixture of metals allowed for [1] Mixture must be explicit for any credit	[2]	
	(b)	**(i)**	66.7 + 16.7 + 4.6 = 88.0 [1] 100 – 88 = 12% [1]	[2]	
		(ii)	Three correct columns [2] any two correct [1] apply cm for nickel	[2]	
	(c)		Iron: bridges, structures or other correct [1] Copper: wiring, plumbing, coinage or other correct [1]	[2]	
	(d)		idea of being light/low density or idea of not corroding/reacting or other correct, e.g. strong **Not** cost related answer Ignore malleable/ductile **Not** does not rust	[1]	11
5	**(a)**	**(i)**	1 **or** sodium **or** Na	[1]	
		(ii)	4 **or** chlorine **or** Cl	[1]	
		(iii)	3 **or** chromium **or** Cr	[1]	
		(iv)	2	[1]	
	(b)	**(i)**	2,7	[1]	
		(ii)	Period 3	[1]	
	(c)		It has 8 electrons in its outer shell/it has a full outer shell	[1]	7

AVAILABLE MARKS

6 (a)

	solution	pH range	Colour with universal indicator	Strength acid/ alkali
A	sodium hydroxide	12–14	**purple**** [1]	strong alkali
B	hydrochloric acid	**0/1–2** [1]	red	strong acid
C	ammonia	8–11	blue	**weak alkali** [1]
D	**ethanoic acid*** [1]	3–6	orange	weak acid

* or any other correct weak acid, e.g. citric acid, carbonic acid
allow vinegar; do not allow orange juice or lemon juice
** accept dark blue, violet, indigo [4]

(b) B and D are both acids [1] they will both turn red/both turn the same colour [1] [2]

6

7 (a) Indicative Content

- Protons
- Electrons
- Neutrons
- Correct numbers of protons
- Correct number of electrons
- Correct number of neutrons
- Protons in nucleus
- Neutrons in nucleus
- Electrons in shells

Response	**Mark**
Candidates must use appropriate scientific terms throughout to describe the structure of a carbon atom using 7–9 of the points in the indicative content. They use good spelling, punctuation and grammar and the form and style are of a high standard.	[5]–[6]
Candidates use 5 or 6 points from the indicative content to describe the structure of a carbon atom using some scientific terms. They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	[3]–[4]
Candidates use 3 or 4 of the points from the indicative content to describe the structure of a carbon atom. They use limited spelling, punctuation and grammar and make little use of scientific terms.	[1]–[2]
Response not worthy of credit.	[0]

[6]

(b) isotopes [1]

(c) covalent; **Not** simple molecular; **Not** simple covalent; **Not** giant covalent [1]

8

				AVAILABLE MARKS
8	**(a)**	calcium chloride	[1]	
	(b)	the gas/carbon dioxide leaves the flask/escapes **Not** gas released/given off/produced	[1]	
	(c)	idea of making sure all the acid was used up/neutralised	[1]	
	(d)	use a pH meter/sensor/probe **Not** pH paper/scale	[1]	
	(e)	No gas would be formed [1] a salt and water is produced [1] **or** no gas would be formed [1] ∴ nothing could escape [1] **or** it would **only** produce a salt and water [1] – only is explicit	[2]	6
9	**(a)**	**(i)** 169 (mg per 100 g water)	[1]	
		(ii) nitrogen	[1]	
		(iii) it decreases	[1]	
		(iv) explicit idea that fish need **oxygen** to breathe/respire [1] allow idea of suffocation idea that warm water contains less **oxygen** (not less gas) [1]	[2]	
	(b)	it increases	[1]	6

10 (a) electrolysis [1]

(b) (molten) lead bromide [1]

(c) conducts **electricity** [1]
does not react/idea of high melting point [1] [2]

(d)

name of substance	**observations at anode**	**observations at cathode**	**product at anode**	**product at cathode**
lead bromide	**bubbles of reddish brown gas*** [1]	beads of metal	bromine	lead
lithium chloride	bubbles of greenish/yellow gas	beads of metal	**chlorine** [1]	lithium
potassium iodide	bubbles of purple vapour	**beads of metal** [1]	**iodine** [1]	**potassium** [1]

* Brown/orange-brown/yellow-brown/orange
Not yellow; **Not** red [5]

AVAILABLE MARKS

9

Total **70**