



Rewarding Learning

**General Certificate of Secondary Education
2014**

GCSE Chemistry

Unit 1

Foundation Tier

[GCH11]

TUESDAY 10 JUNE, AFTERNOON

**MARK
SCHEME**

General Marking Instructions and Mark Grids

Introduction

Mark schemes are intended to ensure that the GCSE examination is marked consistently and fairly. The mark schemes provide markers with an indication of the nature and range of candidates' responses likely to be worthy of credit. They also set out the criteria that they should apply in allocating marks to candidates' responses. The mark schemes should be read in conjunction with these marking instructions.

Quality of candidates' responses

In marking the examination papers, examiners should be looking for a quality response reflecting the level of maturity which may reasonably be expected of a 16-year-old which is the age at which the majority of candidates sit their GCSE examinations.

Flexibility in marking

Mark schemes are not intended to be totally prescriptive. No mark scheme can cover all the responses which candidates may produce. In the event of unanticipated answers, examiners are expected to use their professional judgement to assess the validity of answers. If an answer is particularly problematic, then examiners should seek the guidance of the Supervising Examiner.

Positive marking

Examiners must be positive in their marking, giving appropriate credit for description, explanation and analysis, using knowledge and understanding and for the appropriate use of evidence and reasoned argument to express and evaluate personal responses, informed insights and differing viewpoints. Examiners should make use of the whole of the available mark range of any particular question and be prepared to award full marks for a response which is as good as might reasonably be expected of a 16-year-old GCSE candidate.

Awarding zero marks

Marks should only be awarded for valid responses and no marks should be awarded for an answer which is completely incorrect or inappropriate.

Types of mark scheme

Mark schemes for questions which require candidates to respond in extended written form are marked on the basis of levels of response which take account of the quality of written communication.

Other questions which require only short answers are marked on a point for point basis with marks awarded for each valid piece of information provided.

- 1 (a) (i) using pH meter/limited range pH paper [1]
 (ii) colourless [1]
 (iii) 3 (minutes) [1]
 (b) (i) pH in the range of a strong acid
 accept completely ionised **in water/solution** [1]
 (ii) limewater [1] allow calcium hydroxide solution
 changes from colourless [1] to milky [1] [3]
 (iii) $\text{CaCO}_3 + 2\text{HCl} \rightarrow \text{CaCl}_2 + \text{H}_2\text{O} + \text{CO}_2$
 [1] for the correct formulae of the reactants
 [1] for the correct formulae of the products
 [1] for the correct balancing [3]

(c)

Test	Result for a positive test	
1. Flame test	(golden) yellow	[1]
2. Add 5 drops of silver nitrate solution to a solution of the salt.	white [1] ppt [1]	[2]

(d) **Indicative content**

- calcium chloride formed in both
- water is other product in reaction of calcium hydroxide with hydrochloric acid
- hydrogen is other product in reaction of calcium with hydrochloric acid
- observations for calcium hydroxide and hydrochloric acid – test tube gets warm/heat (released) (any incorrect extra observation loses this mark) allow solution **remains** colourless
- observations for calcium and hydrochloric acid – any **two** from:
 - bubbles/effervescence/gas produced
 - test tube gets warm/heat released
 - solid disappears
 - colourless solution formed

Response	Mark
Candidates must use appropriate specialist terms throughout to fully compare and contrast these two reactions (using 5–6 points of indicative content). They use good spelling, punctuation and grammar and the form and style are of a high standard.	[5]–[6]
Candidates use some appropriate specialist terms to compare and contrast these two reactions (using 3–4 points of indicative content). They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	[3]–[4]
Candidates briefly and partially compare and contrast these two reactions (using 1–2 points of indicative content). They use limited spelling, punctuation and grammar and they have made little use of specialist terms. The form and style are of a limited standard.	[1]–[2]
Response not worthy of credit	[0]

[6]

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2 (a) (i) Hg [1]

(ii) Any **two** from:

- helium
- neon
- argon
- krypton
- xenon
- radon
- hydrogen
- nitrogen
- oxygen
- fluorine
- chlorine

[2]

(b) (i) (a change in state) from solid to gas [1]

(ii) black/(dark) grey solid [1] produces purple/violet/vapour/gas [1] [2]

(c) (i)

Group number	Name of group	Number of electrons in the outer shell of an atom
1	alkali metals [1]	1 [1]

[2]

(ii) reactivity increases going down the group [1]

(iii) Any **three** from:

- floats/on surface
- moves around
- fizzing
- lilac flame
- metal disappears
- colourless solution forms
- heat released

[3]

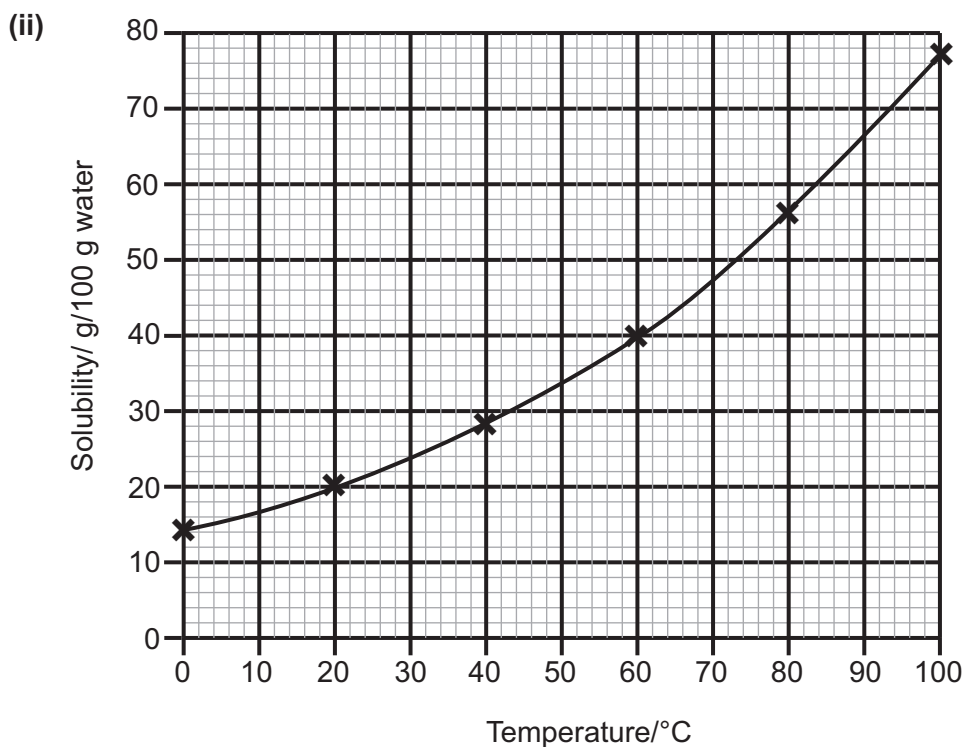
(iv) potassium hydroxide + hydrogen
[1] [1] [2]

(d) Mass Spectrometry [1]
High Performance Liquid Chromatography/HPLC [1] [2]

AVAILABLE
MARKS

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- 3 (a) (i) contains water of crystallisation [1]
- (ii) blue [1]
- (iii) no more solute/solid will dissolve [1]
- (b) (i) mass [1] which will saturate [1]
100 g of water [1] at a particular temperature [1] [4]
allow maximum for idea of saturate



- 5–6 points plotted correctly = [2]
3–4 points plotted correctly = [1]
1–2 points plotted correctly = [0]
smooth curve [1] [3]

- (c) (i) 34 [1] g/100 g water; allow ± 2
Apply consequential marking from graph [1]
- (ii) solubility at 30 °C = 24 [1] g/100 g water allow ± 2
in 10 g of water 2.4 [1] g would saturate [2]
Apply consequential marking from graph
- (iii) 85 [1] °C allow ± 2 [1]
- (iv) 0/zero [1] g [1]

AVAILABLE
MARKS

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- 4 (a) (i) 15 [1]
 (ii) 31 [1]
 (iii) nucleus [1]
 (iv) diagram showing 2,8,5 electrons [1]
- (b) (i) Noble gases [1]
 (ii)
- | Name of element | Electronic configuration of an atom of the element |
|-----------------|--|
| neon [1] | 2, 8 |
| helium [1] | 2 |
| argon | 2, 8, 8 [1] |
- [3]
- (c) (i) Br₂/O₂ [1]
 (ii) NO₃⁻ or SO₄²⁻ [1]
 (iii) S²⁻ [1]
- (d) (i) potassium sulfide/lithium oxide [1]
 (ii) graphite/diamond [1]
 (iii) carbon dioxide [1]
 (iv) aluminium/graphite/iron [1]
- (e) carbon [1]

AVAILABLE
MARKS

16

<p>5 (a) (i) 158</p> <p>(ii) 334</p> <p>(b) (i) strychnine has four elements/more than two elements [1] chemically combined [1]</p> <p>(ii) $C_{21}H_{22}N_2O_2$</p> <p>(iii) element = carbon [1] mass = 12 [1]</p> <p>(iv) toxic/poisonous</p> <p>(c) (i) $0.035 \times 158 = 5.53$ [1] g</p> <p>(ii) oxygen/gas [1] released to the surroundings [1] second mark dependent on first</p> <p>(iii) Bunsen burner/HEAT in correct position [1] tripod and pipeclay triangle [1] crucible without lid [1] No labels = [0]</p>	[1]	<div style="background-color: black; color: white; padding: 2px; font-weight: bold;">AVAILABLE MARKS</div>
	[1]	
	[2]	
	[1]	
	[2]	
	[1]	
	[1]	
	[2]	
	[3]	
	Total	
	14	
	80	