



Rewarding Learning

**General Certificate of Secondary Education
2015**

GCSE Chemistry

Unit 2

Foundation Tier

[GCH21]

WEDNESDAY 17 JUNE, MORNING

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, the 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.

			AVAILABLE MARKS	
1	(a)	(i) H ₂ O	[1]	
		(ii) 2 H/hydrogen (atoms) 1 O/oxygen (atom)	[1] [1]	[2]
		(iii) anhydrous copper(II) sulfate/cobalt chloride paper Accept anhydrous copper sulfate correct colour change for anhydrous copper(II) sulfate = white [1] to blue [1] for cobalt chloride paper = (pale) blue [1] to pink [1] correct colours wrong way round allow [1]	[1] [2] [3]	
		(iv) ice	[1]	
	(b)	(i) water which does not lather readily with soap water which does not lather with soap = [1]	[2]	
		(ii) temporary hardness is removed by boiling permanent hardness is not removed by boiling	[1] [1]	[2]
		(iii) tastes better/better for specified health benefit, e.g. teeth, bones	[1]	12

2 (a) **Indicative content**

- sugar/glucose (or source of sugar such as fruit)
- in solution
- yeast (or zymase)
- absence of air/anaerobic conditions
- warm conditions
- carbon dioxide also produced

Response	Mark
Candidates must use appropriate specialist terms to explain fully the process of fermentation (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 must use appropriate specialist terms to explain fully the process of fermentation (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 explain briefly and partially the process of fermentation (using 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 limited standard.	[1]–[2]
Response not worthy of credit	[0]

[6]

(b) (i) compound containing **only** carbon and hydrogen atoms

[1]

(ii) C₈H₁₈

[1]

(iii) carbon dioxide [1]
water [1]

[2]

(c) (i) $\frac{24}{46} [1] \times 100 = 52.17 [1] \%$

[2]

(ii) carbon monoxide produced [1] is toxic [1]

[2]

AVAILABLE
MARKS

14

3	(a) (i) hydrogen	[1]	
	(ii) gas syringe	[1]	
(b)	(i) 80 (s) (allow 78–82)	[1]	
	(ii) $\frac{1}{80}$ [1] = 0.0125 [1]	[2]	
	allow consequential marking from (b)(i)		
	(iii) 30	[1]	
(c)	(i) D	[1]	
	faster reaction/steeper slope	[1]	
	finishes at same gas volume	[1]	[2]
	(ii) B	[1]	
	(iii) A	[1]	
	half mass used so half volume produced/less gas produced	[1]	[2]
	less mass used so less volume produced		
(d)	(i) cobalt nitrate	[1]	
	shortest time/fastest reaction	[1]	[2]
	(ii) KNO ₃	[1]	

AVAILABLE MARKS
15

- 4 (a)
- | Property \ Gas | Sulfur dioxide | Nitrogen |
|--------------------------|---------------------|--------------------|
| Formula | SO ₂ [1] | N ₂ [1] |
| Colour | colourless [1] | colourless [1] |
| Acidic, basic or neutral | acidic [1] | neutral |
- (b) to manufacture fertilisers/to manufacture HNO₃ [5]
- (c) (i) nitrogen [1]
- (ii) hydrogen [1]
- (iii) a pressure in range 200–1000 atm, e.g. 200 atm [1]
- (iv) N₂ + 3H₂ → 2NH₃
 correct formulae of reactants [1]
 correct formula of product [1]
 correct balancing [1] [3]
- (v) iron [1]
- (vi) a temperature in range 350 °C–550 °C, e.g. 450 °C [1]
- (vii) cooled [1]

AVAILABLE
MARKS

15

5	(a) (i) continental drift	[1]	
	(ii) Idea that Wegener could not explain how it happened	[1]	
(b)	(i) oxygen/air moisture/water	[1] [1]	[2]
	(ii) any two from: painting coating in a suitable metal, e.g. chromium galvanising oiling/greasing coating in rubber or plastic sacrificial protection	[2]	
	(iii) red-brown [1] flaky [1] solid [1]	max [2]	
(c)	(i) FeSO ₄	[1]	
	(ii) Fe + 2HCl → FeCl ₂ + H ₂ correct formulae of reactants correct formulae of products correct balancing	[1] [1] [1]	[3]
	(iii) iron gains oxygen gain of oxygen is oxidation	[1] [1]	[2]
	(iv) apply lit splint [1] pop [1]		[2]
	(v) displacement		[1]

AVAILABLE MARKS
17

6 (a)		Item	Natural	Synthetic		AVAILABLE MARKS
		Glass bottle		✓ [1]		
		Woollen rug	✓ [1]			
		Plastic bucket		✓ [1]		
		Iron nail		✓ [1]	[4]	
(b)	(i)	any two from the following:				
		<ul style="list-style-type: none"> • reduces landfill • conserves raw materials • cheaper than extraction • saves energy 			[2]	
	(ii)	plastics/glass/paper/cardboard/food cans			[1]	
(c)	(i)	decomposition (of an ionic compound) using (a direct current of) electricity			[1] [1]	[2]
	(ii)	bauxite			[1]	
	(iii)	cathode			[1]	
(d)	(i)	$\text{Fe}_2\text{O}_3 + 3\text{CO} \rightarrow 2\text{Fe} + 3\text{CO}_2$ correct formulae of reactants correct formulae of products correct balancing			[1] [1] [1]	[3]
	(ii)	loss of oxygen/gain of electrons/gain of hydrogen			[1]	
	(iii)	haematite			[1]	
(e)		iron			[1]	17
					Total	90