

Centre Number						

**Candidate Number** 

General Certificate of Secondary Education 2014

### **GCSE** Chemistry

Unit 1

**Higher Tier** 

[GCH12]

\*GCH12\*

### **TUESDAY 10 JUNE, AFTERNOON**

TIME

1 hour 30 minutes.

#### INSTRUCTIONS TO CANDIDATES

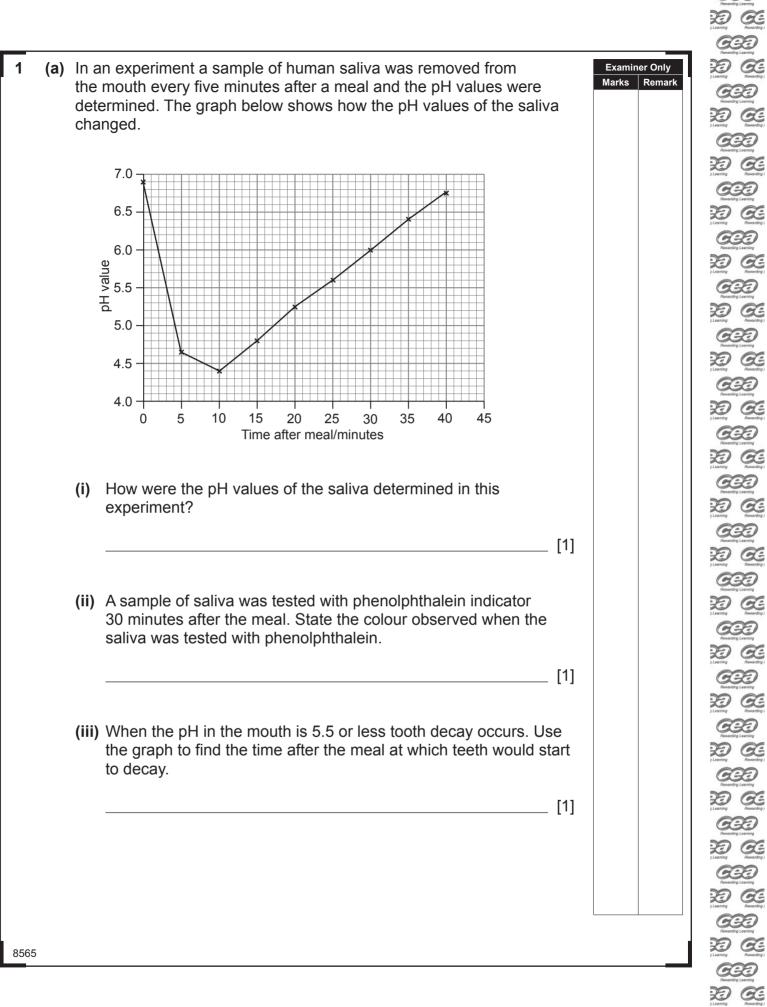
Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

You must answer the questions in the spaces provided. Do not write outside the box, around each page or on blank pages. Complete in blue or black ink only. Do not write with a gel pen. Answer all five questions.

#### INFORMATION FOR CANDIDATES

The total mark for this paper is 100. Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question. Quality of written communication will be assessed in Questions **1(d)** and **2(b)**. A Data Leaflet, which includes a Periodic Table of the Elements, is included in this question paper.





CCC Reserving Learning CCCC CCCC

H	the stomach food is digested by the action of hydrochloric acid. /drochloric acid is a strong acid. Excess stomach acid can cause burning sensation called indigestion which is treated using antaci blets to neutralise some of the acid.	
(i	Explain what is meant by the term <b>strong</b> acid.	
		[1]
(i	) Write an ionic equation for neutralisation. Include state symbols	s. [3]
(i	<ul> <li>i) Calcium carbonate is often present in antacid tablets. Write a balanced symbol equation for the reaction of hydrochloric acid with calcium carbonate.</li> </ul>	
(ii	<ul> <li>Describe a chemical test for the gas produced during the react</li> </ul>	[3]
('	between calcium carbonate and hydrochloric acid. State what y would observe for a positive test.	
		[3]
5		[Turn ov



(c)		e digested food from the stomach is passed into the small intesti dium chloride is a salt which is absorbed in the small intestine.	NC. Examiner Only Marks Remark
	(i)	What is meant by the term salt?	
			[3]
	(ii)	Describe how you would test the salt to prove that it contained chloride ions.	
			[3]

PD CC ricarday CCC

Rearding Learning

Describy Learning

\*20GCH1204\*


D C -333 ÐŒ GGÐ ÐŒ COD DŒ CEED DŒ 633 ÐŒ COD ÐŒ CCC DO GOD ÐŒ

\*20GCH1205\*

Group number	Name of group	Number of electrons in the outer shell of an atom			
1					
(ii) State th	e trend in reactivity in Gro	[2]			
	[1]				
	What would be observed when a piece of potassium is added to				
cold wa	ter?				
		[3]			
		[3]			
		[3]			
		[3]			
		[3]			
		[3]			
		[3]			

200 CCC 2 Learning CCC Researcing Learning

COO Reventing Learning

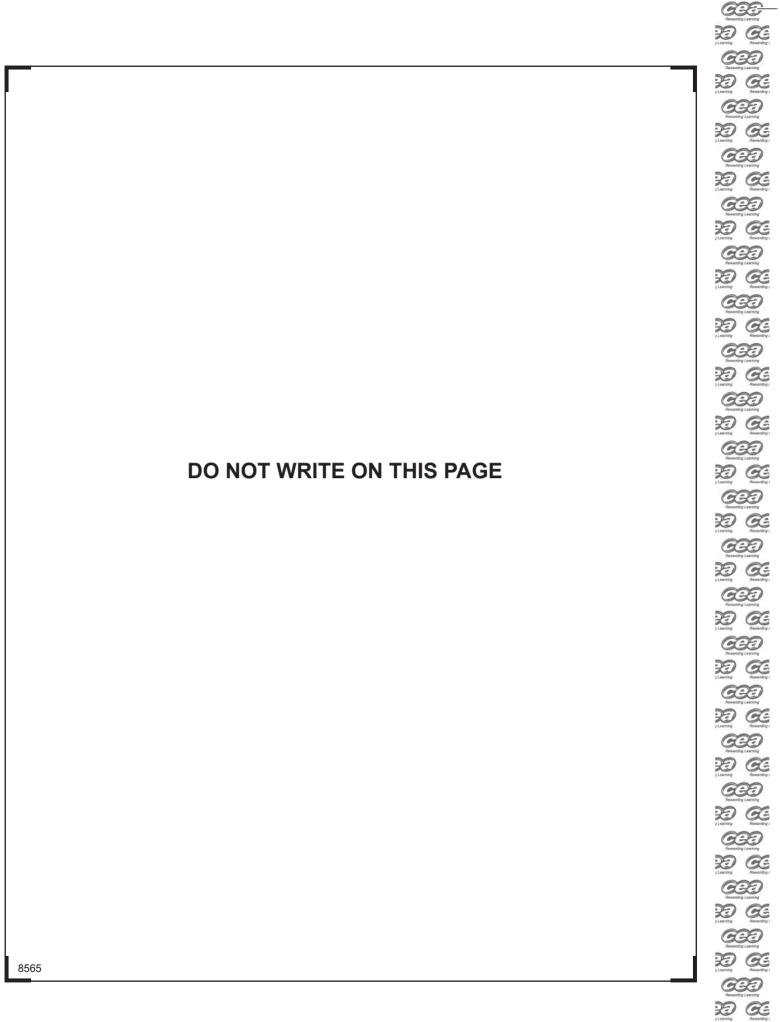
\*20GCH1206\*

( )	During the reaction of potassium with water a potassium atom forms potassium ion.	4	Marks
	Compare a potassium atom with a potassium ion in terms of:		
	<ul> <li>electronic configurations</li> <li>the half equation for the formation of a potassium ion from a potassium atom</li> <li>relative stability (include an explanation).</li> </ul>		
	In this question you will be assessed on your written communication skills including the use of specialist scientific		
	terms.		
		[6]	
(c)	Elements and compounds may be detected using modern instrumental analysis. Name <b>two</b> methods of modern instrumental analysis.		
	1		
	2	[2]	Total Que
5			[Turn

ÐŒ -333 ÐŒ GGÐ ÐŒ CED DŒ GEÐ D CE C2D ÐŒ CEI æ œ CED ÐŒ œ ÐŒ œ ÐŒ GOD D CE CED D CE G Z Z DŒ CE D ÐŒ CEE DŒ Ͼ D CE GGÐ DŒ ÐŒ CEE ÐŒ 

2 carrier 

2 Learthy Constrained CODD Reservice Learthy CODD Reservice Learthy Learthy Learthy CODD Reservice Learthy 

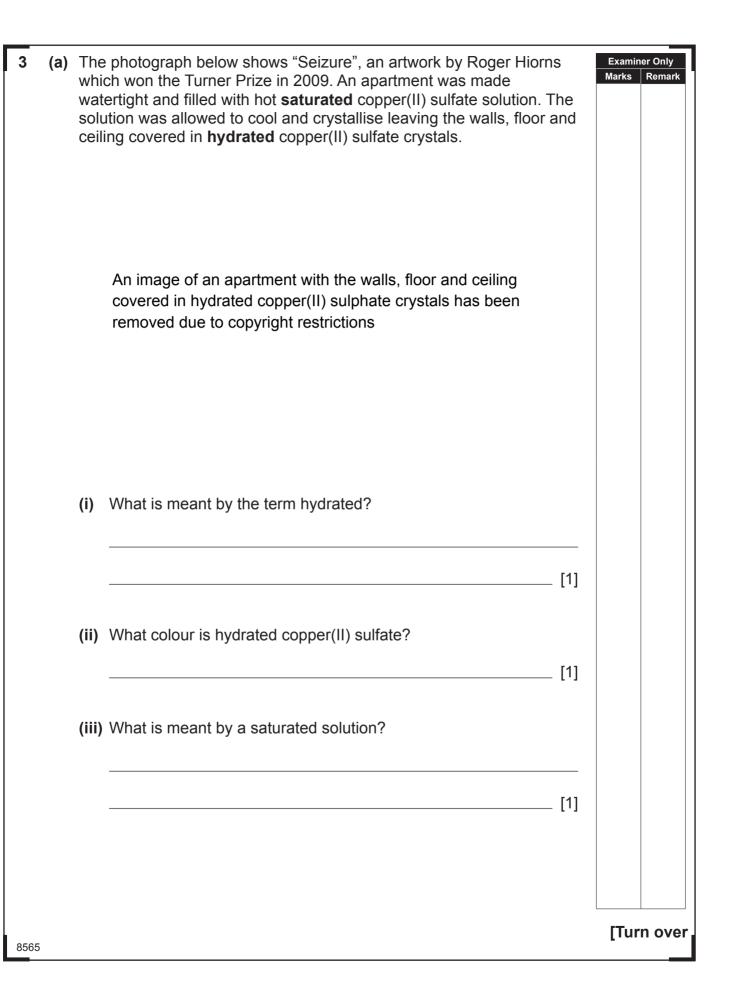


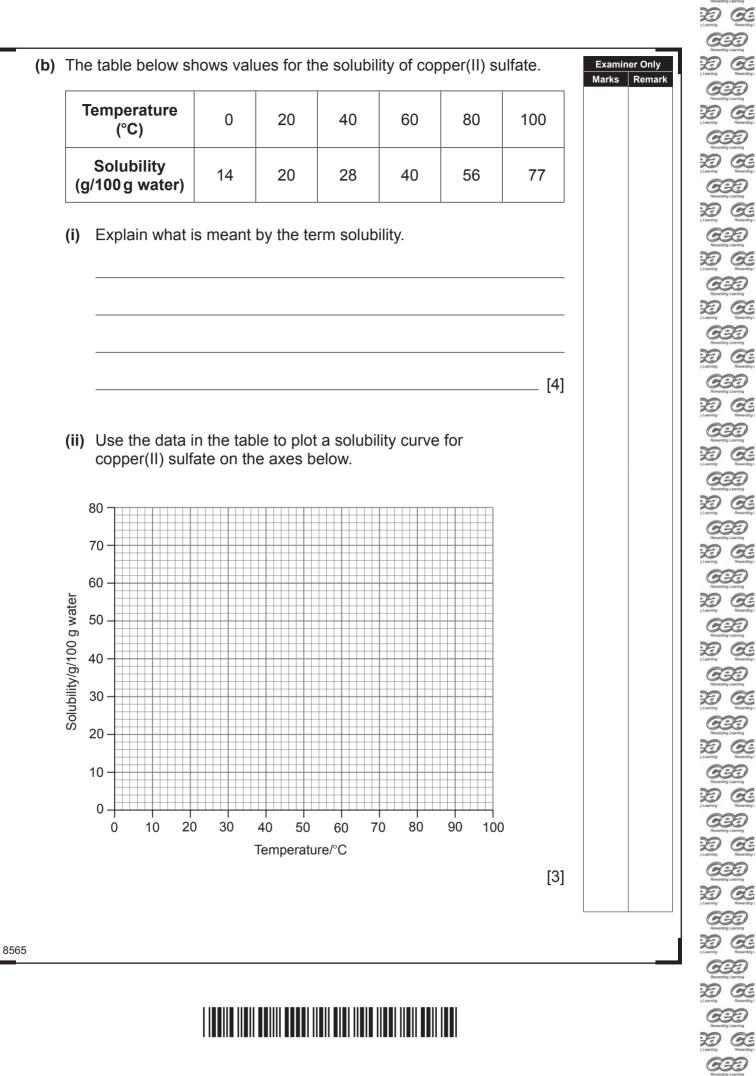
ÐŒ

20 CC 2 Learning Researching I COCC Researching Learning 20 CC

# 

\*20GCH1208\*





20 GG 2 Lawing Description COCO-Reserving Learning 20 GG

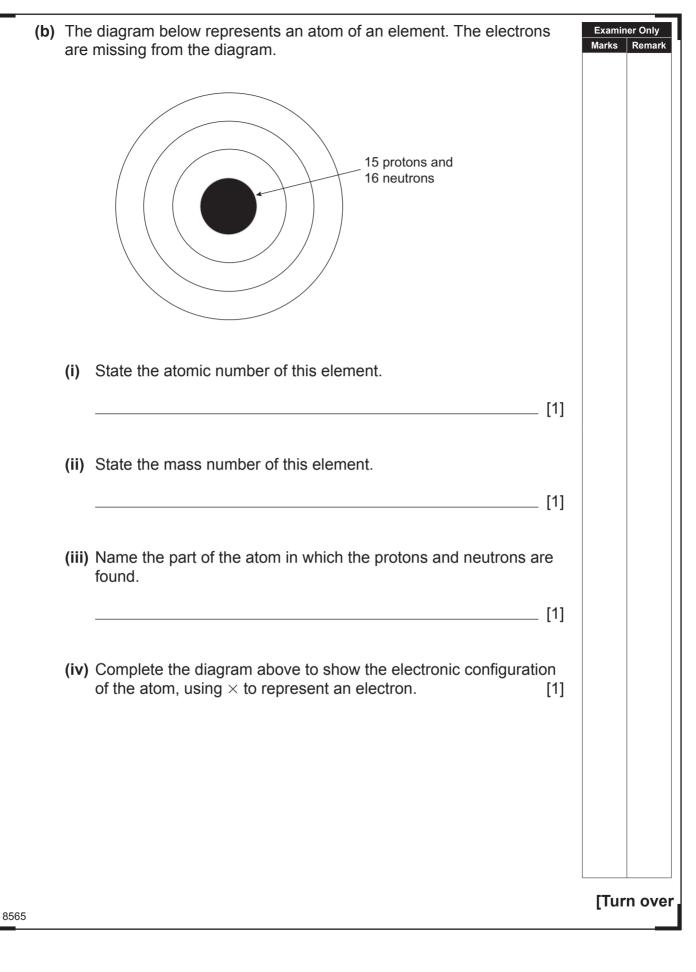
\*20GCH1210\*

(c)	Use	e the graph in <b>(b)(ii)</b> to answer the following questions.		Examin Marks	er Only Remark
	(i)	What is the maximum mass of copper(II) sulfate which will dissolve in 10g of water at 70°C?			
		Mass of copper(II) sulfate =	g [2]		
	(ii)	Calculate the mass of copper(II) sulfate which will crystallise of solution if a saturated solution of copper(II) sulfate containin 200 g of water is cooled from 75 °C to 45 °C.			
		Mass of copper(II) sulfate =	g [4]		
				Total Qu	estion 3
8565				[Tur	n over

cor	ny scientists have contributed to the development of theories cerning the structure of the atom. The work of these scientists has led he structural model of the atom we use today.	Examiner Only Marks Remark	
(a)	Describe the differences between the "Plum Pudding" model of the atom and the model of the atom we use today.		
			Roase 2 Learning Roase
	[4]		
			Romer Romer Romer Romer
			X-
			Personal Provention Provention Provention Provention
5			G

22 CONTRACTOR

\*20GCH1212\*



(c) The table below shows some information for several atoms and simple ions. Complete the table.

Atom/Ion	Number of protons	Electronic configuration
	7	2, 5
O <sup>2-</sup>		
Al <sup>3+</sup>		
	12	2, 8

(d) Substances have different types of bonding and structure. A variety of substances is shown in the table below.

aluminium	carbon dioxide	diamond
graphite	iron	lithium oxide
potassium sulfide	iodine	water

Using ONLY the substances in the table, answer the following questions.

(i) Name one substance in which the bonding is ionic.

\_\_\_\_\_ [1]

[6]

(ii) Name one substance in which the bonding is metallic.

8565

\_\_\_\_\_ [1]

(iii) Name one substance in which the structure is described as giant covalent.

\_\_\_\_ [1]

	(iv)	Name one substance in which van der Waals forces of attraction exist.	Examine Marks	er Only Remark
		[1	]	
	(v)	Which substance has the lowest melting point?		
		[1	]	
	(vi)	Name one substance which will conduct electricity at room temperature.		
		[1	]	
(e)	Dia	mond is an allotrope of which element?		
		[1	]	
(f)		monia gas is a covalent compound formed from the reaction ween hydrogen and nitrogen.		
	(i)	Draw a <b>dot and cross</b> diagram to show the bonding in a molecule of nitrogen. You should show outer shell electrons only.	e	
		[3	3]	



(ii)	Write a balanced symbol equation for the formation of ammonia from hydrogen and nitrogen.	E	xaminer Only arks Remark	
		[3]		
(iii	) Draw a <b>dot and cross</b> diagram to show the bonding in a molect of ammonia. You should show outer shell electrons only.	ule		
		[3]		Towerdry ( ) ) ) ) ) ) ) ) ) ) ) ) )
				Den en e
		Tot	tal Question 4	J. Lawing Describing J. Lawing Describing Describing J. Lawing Describing Describing Describing
5				200 2 Lawing Do 2 Lawing Do 2 Lawing 2 Do 2 Lawing

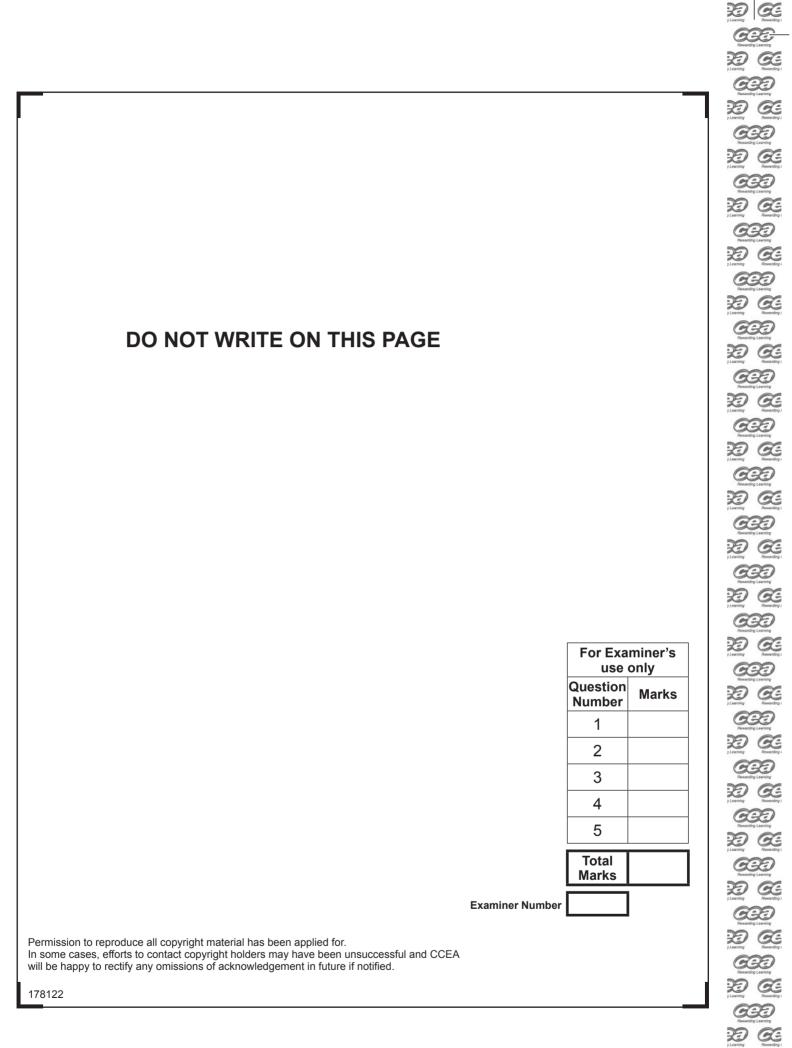
ÐŒ

5			Im permanganate, KMnO <sub>4</sub> , dissolves in water to form a purple . The solution can be used to counteract the lethal effects of ne, $C_{21}H_{22}N_2O_2$ .		Examin Marks	er Only Remark
	(a)	Stry	chnine, C <sub>21</sub> H <sub>22</sub> N <sub>2</sub> O <sub>2</sub> , is a compound.			
		(i)	Write the empirical formula for strychnine.			
				[1]		
		(ii)	The masses of all atoms are compared relative to the mass of isotope of a particular element. Name the element and state the mass of the isotope.			
			Element:			
			Mass:	[2]		
		(iii)	A bottle of strychnine would show the following symbol.			
			© Crown copyright			
			What do you understand by this symbol?			
				[1]		
					ſTur	n over
8565					•	-

	sample of potassium permanganate, KMnO <sub>4</sub> , was heated to onstant mass in a crucible and the following reaction occurred:	Examiner Only Marks Remark
	$2KMnO_4(s) \rightarrow K_2MnO_4(s) + MnO_2(s) + O_2(g)$	
(i)	Draw a labelled diagram of the assembled apparatus used to heat the sample of solid potassium permanganate in a crucible.	
(i	[3] ) 5.53 g of potassium permanganate were used in this experiment. Calculate the mass of oxygen, $O_2$ , which forms. Relative atomic masses: $O = 16$ ; $K = 39$ ; $Mn = 55$	
	Mass of O <sub>2</sub> g [5]	

CCC Reserving Learning CCC

		Total Qu	
Tł	HIS IS THE END OF THE QUESTION PAPER		
	Mass of solid remaining g [1]		
(iv)	Calculate the total mass of solid which remains in the crucible after heating the sample of KMnO <sub>4</sub> to constant mass.		
	[2]		
	heating.	Marks	Ren



\*20GCH1220\*