

Centre Number					
Can	didat	e Nu	mber		

General Certificate of Secondary Education 2015–2016

Double Award Science: Chemistry

Unit C1

Higher Tier

[GSD22]

THURSDAY 19 MAY 2016, MORNING

TIME

1 hour, plus your additional time allowance.

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 boxed area on each page or on blank pages.

Complete in blue or black ink only.

Answer **all eight** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 70.

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 Question 4.

A Data Leaflet, which includes a Periodic Table of the elements is provided.

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- 1 Newlands and Mendeleev, along with other chemists, helped to produce the modern Periodic Table.
 - (a) Place a tick (\checkmark) in each correct box to show the area each chemist worked on.

Area worked on	Newlands only	Mendeleev only	Both Newlands and Mendeleev	Neither Newlands nor Mendeleev
stated the Law of Octaves				
arranged elements in order of relative atomic mass				
included noble gases				
left gaps for undiscovered elements				

[4]

(b) A student is given a Periodic Table.

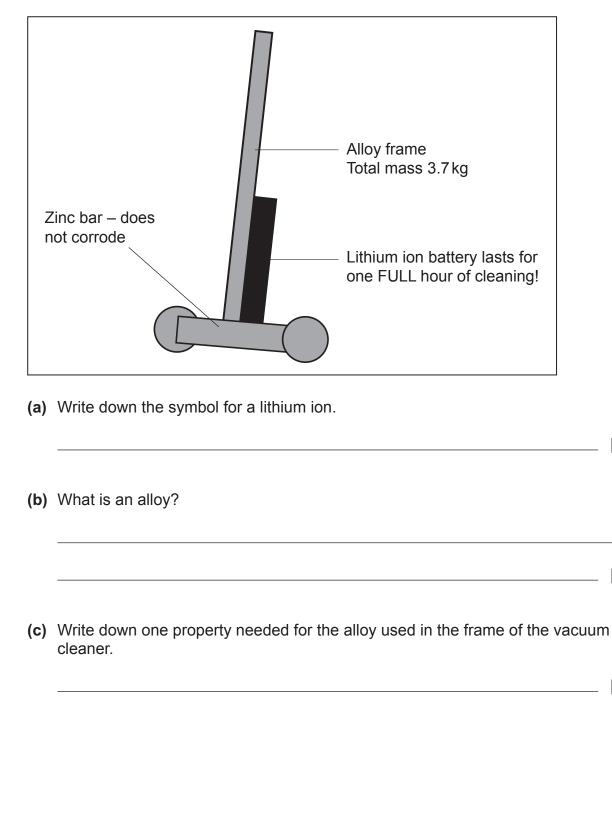
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C	ircle the correc	ct answer in	each of the five q	uestions below.	
(i) The elemen	its in Colum	n A are:		
	alkali m	etals	Group 2	Period 2	[1]
(i	i) The physica	al state at ro	om temperature o	f all the elements in Column B i	S:
		solid	liquid	gas	[1]
(i	ii) The elemen	its N, O, F, C	CI, Br and I are all:	:	
	ga	ses	diatomic	inert	[1]
(i	v) The elemen	its in Colum	n B all have:		
only 3	electrons	3 electro	ons in outer shell	3 electrons in first shell	[1]
(\	<i>i</i>) The solid bl	ack line sep	arates:		
metals	and gases	sol	lids and liquids	metals and non-metals	s [1]
(c) (i) Name the e	lement whic	h is in Period 2 ar	nd Group 4.	
					[1]
(i	 i) Name an el outer shell. 	ement whos	e atoms have thre	ee shells and five electrons in the	е
					[1]
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10178.04 ML					

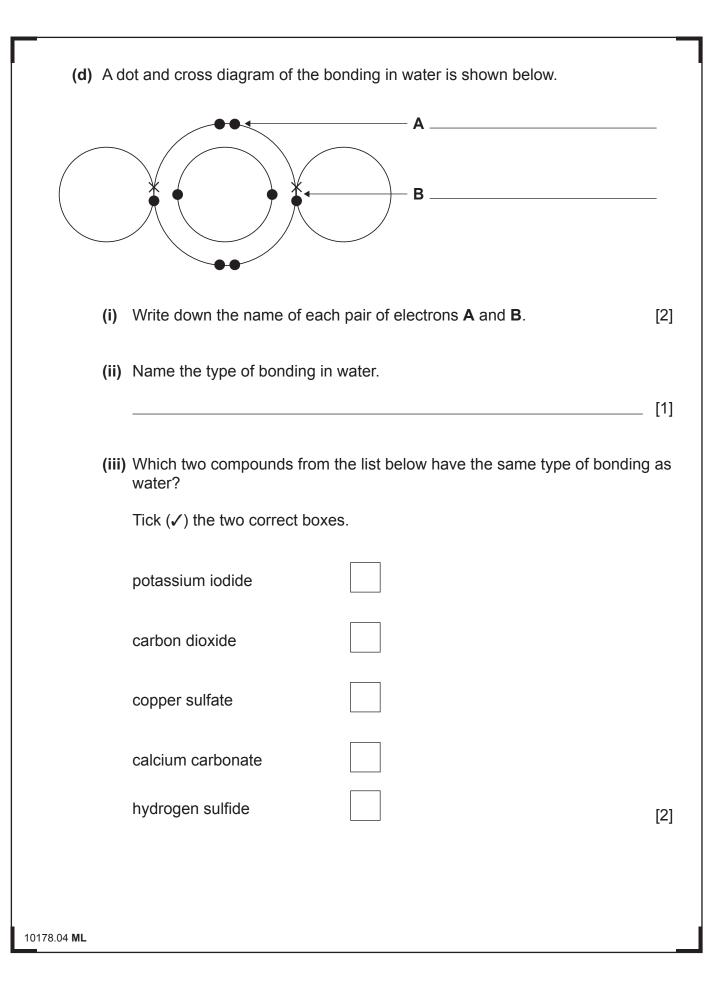
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P2

2 A labelled diagram for a cordless vacuum cleaner, is shown below.



				-
3	Wa	ter ha	as a melting point of 0 °C and it is a very good solvent.	
	(a)	Wha	at is meant by the chemical terms:	
		(i)	solvent?	
				[1]
		(;;)	molting point?	
		(11)	melting point?	
				[4]
	(b)		e down two other physical properties of water. Do not include that it has a ting point of 0 °C and is a very good solvent.	l
	Cor	προι	Ind A is soluble in water. It has a solubility of 2.9g/100g of water at 20°C.	
	(c)	Why wate	y is the temperature important when giving the solubility of a substance in er?	
				[1]
			ſŤur	n ov
)178.0	4 ML		[



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P2

Reason

4 In this question you will be assessed on your written communication skills including the use of specialist scientific terms.

Magnesium forms a 2^+ ion and oxygen forms a 2^- ion. Compare and contrast the Mg^{2+} ion and the O^{2-} ion.

You should include information about:

- the number and type of the particles present in each ion
- the electron configuration of each ion and
- how the ions are formed from their atoms.

10178.04 **ML**

_____ [6]

[Turn over

	tal oxides and metal carbonates will react with acids to form salts.	
(a)	Complete the word equation for the reaction between copper oxide and sulfuric acid.	
	copper oxide $+$ sulfuric acid \rightarrow $+$	[2]
(b)	Balance the symbol equation below.	
	$HCI + CuO \rightarrow CuCl_2 + H_2O$	[1]
(c)	Write a balanced symbol equation for the reaction between copper carbo and hydrochloric acid.	onate [3]
(d)	The reaction between adjum budravide and budraphlaria acid is known	
(u)	The reaction between sodium hydroxide and hydrochloric acid is known neutralisation reaction. Write an ionic equation to describe this neutralis Include state symbols.	ation.
(u)	neutralisation reaction. Write an ionic equation to describe this neutralis	
(4)	neutralisation reaction. Write an ionic equation to describe this neutralis	ation.
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	neutralisation reaction. Write an ionic equation to describe this neutralis	ation.
	neutralisation reaction. Write an ionic equation to describe this neutralis	ation.

- Learning
- **6** Air is a mixture of gases including nitrogen, N_2 , and very small amounts of methane, CH_4 .

Draw **dot and cross** diagrams to show the bonding in a molecule of methane and a molecule of nitrogen. **Show the outer electrons only.**

methane

nitrogen

[3]

[2]

[Turn over

10178.04 **ML**

30

- Reason a Ð Œ Ð Œ Ð Œ Ð Œ Ð a Ð a Ð a Ð G Ð Œ Ð Œ Ð a Ð Œ Ð Œ Ð Œ Ð Œ Ð Œ Ð a Ð Œ Ð a Ð Œ Ð Œ Ð
- 7 (a) The table below gives information about the physical properties of the halogens. Complete the table.

Name	Formula	State at room temperature	Colour
bromine			red-brown
chlorine		gas	
fluorine		gas	yellow
iodine			grey-black

[5]

(b) The sentence below describes the trend in melting points of the halogens as Group 7 is descended. Complete the sentence.

The melting points of halogens _	as Group 7 is
descended.	[1]

(c) Explain why the halogens all form ions with a single negative charge.

_ [2]

- (d) When chlorine is bubbled through a solution of sodium iodide the colour of the solution darkens.
 - (i) Write a balanced symbol equation for the reaction of chlorine with sodium iodide.

[3]

[2]

C.

(ii) Explain why the colour of the solution darkens in this reaction.

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(Questions continue overleaf)

10178.04 **ML**

[Turn over

(a)	Wh	at name is given to this process?	
			[
(b)	Exp	plain why molten calcium fluoride can conduct electricity.	
			[2
(c)	Wh	at happens to the molten calcium fluoride as the electricity passes through	ו?
			[′
Cal	cium	n is produced at the cathode.	
(d)	(i)	Why is calcium produced at the cathode ?	
			[2
	(ii)	Explain, in words , in terms of the electrons involved, how the calcium is produced at the cathode during the electrolysis.	
			[;

- (e) Graphite is a suitable material for the electrodes as it is a good conductor of electricity.

Write down two other properties of graphite which make it suitable for use as electrodes.

1. _____ 2._____

[2]

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10178.04 **ML**

2

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10178.04 **ML**

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Question Number	Marks
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2	
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8	
Total Marks	

Examiner Number

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