



Ce	ntre Number
71	
Cano	didate Number

General Certificate of Secondary Education 2012–2013

Double Award Science: Chemistry

Unit C1

Higher Tier

[GSD22]

TUESDAY 13 NOVEMBER 2012, MORNING

	GSD22
	0



1 hour.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page. Write your answers in the spaces provided in this question paper. Answer **all seven** 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.



For Exa use	miner's only
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
Total Marks	

(a) Newlands stated that when the elements were arranged in order of atomic mass similar properties occurred every 8th element. [1] (i) What is the name of this law stated by Newlands? [1] (ii) Give one reason why this pattern was not taken seriously by many scientists. [1] (iii) Give one reason why this pattern was not taken seriously by many scientists. [1] Mendeleev also arranged the elements in order of atomic mass but his pattern was taken more seriously than that of Newlands. [1] (b) Give two reasons why the table of elements prepared by Mendeleev was better than the one prepared by Newlands. [2] 1. [2] The modern Periodic Table contains more elements than the Periodic Table and Mendeleev. [2] (c) Give two other differences between the modern Periodic Table and Mendeleev's Periodic Table. [2] 1. [2]	In tl scie at tl	he 18 entist hat ti	860s, John Newlands and Dmitri Mendeleev were two of the ts who tried to bring order to the vast amount of information kno ime about the elements.	wn	Examin Marks	er Only Remarl
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1.	(C)	Mei	e two other differences between the modern Periodic Table and ndeleev's Periodic Table.	נ		
2[2]		1				
[2]		2				
				[2]		

Part of the modern Periodic Table is shown below.

Part of	the mode	rn Perioc	dic Tabl	e is sho	own be	low.				Examin Marks	er Only Remark
	н							Не			
		Be				0		Ne			
	Na			Si		S	CI				
	К										
(d) Us qua (i)	e only the estions. Give the tempera	e elemen e symbol ture and	ts show for a nc is gree	n abov on-meta n in col	ve to an al eleme lour.	iswer tł ent whi	ne follo ch is a	wing gas at	room		
									[1]		
(ii)	Which t	wo eleme	ents are	e storec	l under	oil?			[4]		
(iii) Name th	ne eleme	nt whicl	n has fo	our elec	ctrons i	n its ou	ter she	['] ell.		
									[2]		

Soc bet	lium oxide is an ionic compound which can be formed by the reactio ween sodium and oxygen.	DN Examiner O Marks Ren
(a)	Complete the diagrams below to show all the electrons in a sodium atom and an oxygen atom.	1
	sodium atom oxygen atom	[2]
(b)	Explain how an oxide ion is formed from an oxygen atom.	
		. [2]
(c)	What is the charge on a sodium ion?	
		. [1]
(d)	How many sodium atoms react with one atom of oxygen?	[4]
		. [']
(e)	Use your answer to part (d) to write the formula for the compound sodium oxide.	
(e)	Use your answer to part (d) to write the formula for the compound sodium oxide.	. [1]
(e) (f)	Use your answer to part (d) to write the formula for the compound sodium oxide.	. [1]
(e) (f)	Use your answer to part (d) to write the formula for the compound sodium oxide. Sodium oxide is a typical ionic solid. Give two physical properties you expect sodium oxide to have.	. [1]
(e) (f)	Use your answer to part (d) to write the formula for the compound sodium oxide. Sodium oxide is a typical ionic solid. Give two physical properties you expect sodium oxide to have. 1	. [1]

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(Questions continue overleaf)

3 Read the following information carefully.

Copper oxide, a black solid, reacts with sulfuric acid and ethanoic acid to form two different salts. Salt is a general name given to one of the compounds formed when an acid is neutralised. The salt formed between copper oxide and sulfuric acid is called copper sulfate. Examiner Only Marks Remark



(e)	Name the acid which will react with copper oxide to form copper nitrate.		Examin Marks	er Only Remark
		_ [1]		
Coj 1 m	oper oxide reacts faster with 1 mol/dm ³ of sulfuric acid than with nol/dm ³ of ethanoic acid.			
(f)	What does this tell you about the strength of sulfuric acid and etha acid of the same concentration?	noic		
		_ [2]		

ln inc	Question 4 you will be assessed on your written communication skills cluding the use of specialist science terms.	S	Examine Marks	r Only Remark
4	Aluminium is manufactured by the electrolysis of a mixture of molten aluminium oxide and cryolite.			
	Describe and explain, using half equations for the reactions at the electrodes, the industrial production of aluminium.			
	Include in your answer reasons for the addition of cryolite and the replacement of the anode.			
	I	0]		

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(Questions continue overleaf)

5 The pie chart below shows the percentage (%) of the different gases in a sample of dry air.

Examiner Only

san	nple	of dry air.	Marks	Remark
	carb	on dioxide and argon oxygen 20.947% nitrogen 78.084%		
(a)	Calo sam	culate the percentage (%) of carbon dioxide and argon in this type of dry air.		
(b)	Car mol (i)	bon dioxide, oxygen and nitrogen are present as diatomic ecules with multiple bonds. Argon is present as an atom. What is meant by the term diatomic?		
	(ii)	Explain, in terms of electrons, why argon is present as an atom.		



d d p	The diagrams below show the structure of two allotropes of carl iamond and graphite. Diamond is a hard substance which is us utting tools. Graphite is a soft shiny grey substance which is us encil lead.	bon, Examiner Only ed in Marks Remark ed as
		B T T
	diamond graphite	
(8	a) What are allotropes?	
		[2]
/1	a) What is represented on the diagrams by:	
(1	(i) the black dots labelled A ?	
		[1]
	(ii) the solid lines labelled B?	
		[1]

(c)	Usi	ng the structure of diamond and graphite explain why:		Examine Marks	er Only Remark
	(i)	diamond is used in cutting tools			
	(ii)	graphite is used in pencil lead.	[2]		
			[2]		
8231		13		[Turr	n over

Zind	c is a metal. It will react with acids to produce hydrogen gas.	Examine Marks
(a)	Draw a labelled diagram of the structure of a metal such as zinc.	
	Use your diagram to explain the metallic bonding in zinc.	
		[4]
(b)	Write a balanced symbol equation for the reaction between zinc an hydrochloric acid.	d [3]
(c)	Give two ways you would know that a reaction between excess zir and hydrochloric acid was completed.	
		[2]
(d)	Explain how you would test the gas produced to prove it was hydrogen.	
(e)	Write a balanced symbol equation for the reaction described in part (d).	[1]
		[3]

THIS IS THE END OF THE QUESTION PAPER

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