



Centre Number				
71				

Candidate	Number

General Certificate of Secondary Education 2011–2012

Double Award Science: Chemistry

Unit C1

Foundation Tier

[GSD21]

MONDAY 21 MAY 2012, MORNING



TIME

1 hour.

INSTRUCTIONS TO CANDIDATES

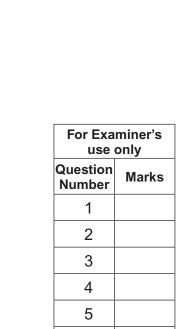
Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

Write your answers in the spaces provided in this question paper. Answer **all ten** 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 **8(c)**. A Data Leaflet which includes a Periodic Table of the elements is provided.



6

7 8

Total	
Marks	
I Warks	



(a)	Etha	anoic acid is a co i	rosive liquid.		Examiner Only Marks Remark
	(i)		symbol, in the box be of ethanoic acid.	elow, which should be	
					[1]
	(ii)	Give two reasons printed words.	s why a hazard symb	ool is used rather than	
		1			
					_ [2]
(b)	Vine	egar is a mixture c	f ethanoic acid and v	water.	
	Circ	le the term which	describes the water	in the mixture.	
	solu	ıte	solvent	solution	[1]
(c)		en blue litmus pap er changes to red		egar the colour of the litm	nus
	Wha	at does this tell yo	u about vinegar?		F41
					_ [1]
(d)		en universal indica cator changes to y		inegar the colour of the	
	Wha	at does this tell yo	u about vinegar?		[4]
					_ [1]

2	Connor	aluminium	and	magnasium	oro vor	v uooful	motolo
_	Copper,	alummum	anu	magnesium	are ver	y useiui	metais

Examiner Only

Marks Remark

(a) Complete the table below which shows some of the uses of these metals. The first one is done for you.

Matal	Use				
Metal	electrical wiring	coins	aircraft alloys		
copper	✓	✓			
aluminium					
magnesium					

[3]

(b)	Give two properties of copper which make it suitable for use in
	electrical wiring.

4				
1				
	٠.			

2	[2
Ζ.	12

(c) Copper.	aluminium	and	magnesium	are	elements.

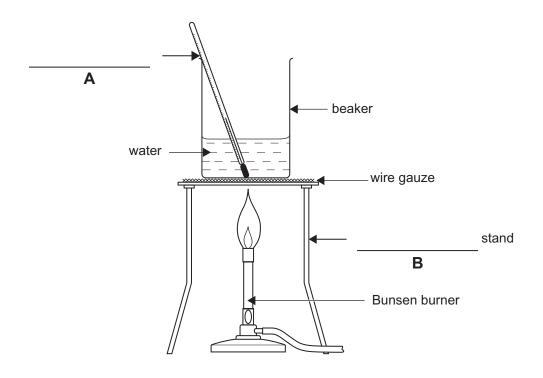
Explain the meaning	of the term element	

[1]

(d)	Circle a	word from	n the list	below v	which bes	t describes	an aircrat	ft allov.

element	mixture	compound	salt	[1]

3 The apparatus below can be used to find the boiling point of water.



- (a) Complete the labels A and B in the diagram above. [2]
- **(b)** Give **one** safety precaution, apart from wearing safety glasses, you would take when carrying out this experiment.

_____[1]

(c) What is the boiling point of water?

_____ °C [1]

(d) Which of the following chemicals can be used to test for water?

Place a tick (✓) in the correct box.

sulfuric acid

anhydrous copper(II) sulfate

universal indicator

hydrated iron(III) oxide [1]

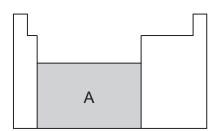
(e) Potassium chloride is a typical ionic compound. Is potassium chloride soluble or insoluble in water?

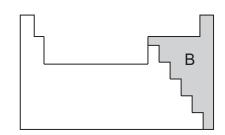
______[1]

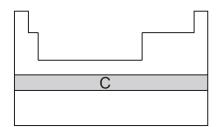
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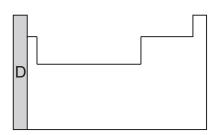
(Questions continue overleaf)

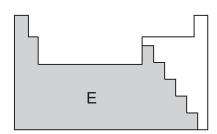
4 The diagrams below show the outline of the modern Periodic Table. A different area A, B, C, D and E, is shaded in each diagram.











(a) Choose the shaded area, A, B, C, D or E which shows

[1]

Examiner Only

Marks Remark

[1]

(iii) the area where the non-metal elements are.

[1]

(b)		y are the elements nitrogen and phosphorus placed in the same up? Place a tick (✓) in the box beside the correct answer.	Examin Marks	er Only Remark
		ogen and phosphorus have the same physical earance.		
	Nitr	ogen and phosphorus have the same density.		
		ogen and phosphorus have similar chemical perties.		
	Nitr	ogen and phosphorus are both non-metals. [1]		
(c)	tow	e chemists John Newlands and Dmitri Mendeleev contributed ideas ards the development of the Periodic Table. John Newlands posed the "Law of Octaves".		
	(i)	Give one reason why some scientists did not accept the proposed Law of Octaves.		
		[1]		
	(ii)	In what order did Newlands and Mendeleev arrange the elements?		
		[1]		
	(iii)	Give two other ideas used by Mendeleev in the development of the Periodic Table.		
		1		
		2		
		[2]		

5	(a)	whe	e the information given for the substances X, Y and Z to state ether the substance is a solid, a liquid or a gas at room perature (20°C).	Examino Marks	er Only Remark
		(i)	X takes the shape of the bottom of its container. It has a definite volume.		
			Substance X is a [1]		
		(ii)	Y has a definite shape and volume.		
			Substance Y is a [1]		
		(iii)	Z takes the shape and volume of the container.		
			Substance Z is a [1]		
	(b)		estance B has a melting point of 16°C and a boiling point of 118°C. ubstance B a solid, a liquid or a gas at room temperature (20°C)?		
		B is	a [1]		
	(c)	Cor	mplete the diagram below by labelling the changes of state.		
			melting		
Sol	id	•	Liquid		
	L		[3]		

6	Chemists use symbols and formulae in chemical equations to give
	information about chemical reactions.

Examiner Only

Marks Remark

[1]

You may find your Data Leaflet helpful when answering this question.

(a) For each of the questions below four answers are given. Only one is correct. Circle the correct answer. The first one has been done for you.

The element with the symbol **P** is:

potassium phosphorus plutonium polonium

(i) Sr is the chemical symbol for:

silver tin strontium sulfur [1]

(ii) The compound with the formula $Ca(OH)_2$ is:

calcium calcium calcium calcium oxide hydride hydroxide oxide water [1]

(iii) The correct chemical formula for aluminium nitrate is:

 $AINO_3$ AI_3NO $AI(NO_3)_3$ $AI(NO)_3$ [1]

(iv) The formula $\mathbf{NH_3}$ means:

3 N atoms3 NH atoms1 N atom1 N atomandandand3 H atoms3 H atoms1 H atom

(b) Balance the chemical equation below which describes the reaction

between sulfuric acid and sodium hydroxide.

 $H_2SO_4 + NaOH \longrightarrow Na_2SO_4 + H_2O$ [1]

7 (a) Two common isotopes of chlorine are $^{35}_{17}\text{Cl}$ and $^{37}_{17}\text{Cl}$.

(i) Complete the table below to show the numbers of protons, neutrons and electrons in the $^{37}_{17}\text{Cl}$ isotope.

Isotope	Protons	Neutrons	Electrons
³⁷ CI			

[3]

[2]

(ii)	What are isotopes?

(b) (i) Complete the table below which gives information about electronic structures and their relation to the Group number of the Periodic Table.

Element	Atomic number	Electronic configuration	Group of Periodic Table
А	17		7
В	5	2,3	
С		2,8,5	5
D	6		4

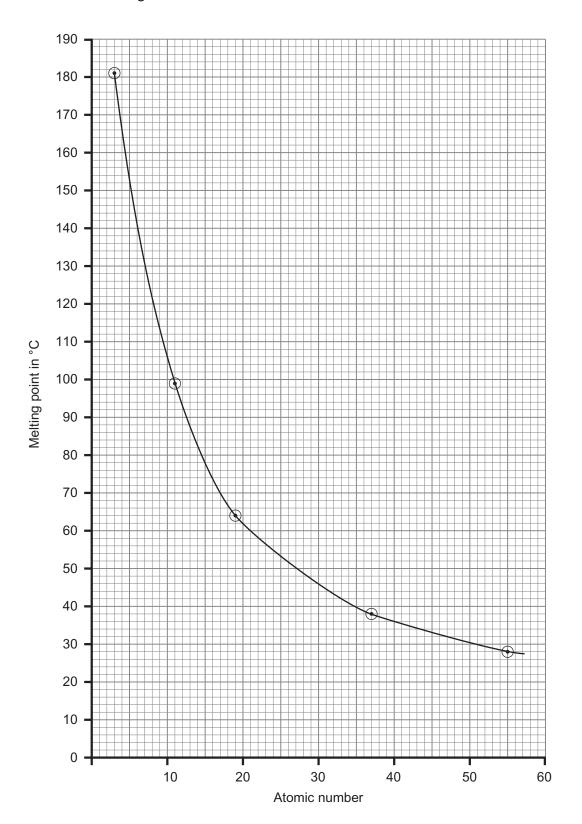
[4]

(ii)	What is the name of the element in Group 2 Period 3?	
		_ [1]

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(Questions continue overleaf)

8 The graph below shows how the melting points of the alkali metals change with increasing atomic number.



(a) Name the alkali metal with the highest melting point.

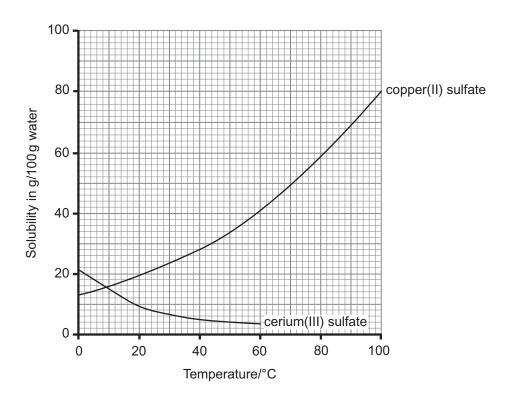
_ [1]

		at happens to the melting point of the alkali metals as the atoms ease in size?	Examin Marks	er On Rem
	11101	ease III 3126 :		
		[1]		
		(c) you will be assessed on your written communication skills		
CI	uair	ng the use of specialist science terms.		
	nee	scribe how potassium is stored in the laboratory and the steps that d to be taken before adding it to water. Include in your answer its earance at each stage and any safety precautions that need to be en.		
		[6]		
)	(i)	Suggest why rubidium (Rb) is not used in the school laboratory to show the reactions of the alkali metals.		
		[1]		
	(ii)	How many electrons would you expect rubidium to have in its outer shell?		
		[4]		
		111		i .
		[1]		

	gnesium reacts with chlorine to form an ionic compound, magnesiu oride.	Marks I
(a)	Complete the diagrams below to show all the electrons in a magnesium atom and a chlorine atom. The magnesium atom are the chlorine atom and a chlorine atom all the electrons in a magnesium atom are the chlorine atom.	[2]
(b)		
	How many chlorine atoms react with one atom of magnesium? How are the ions held together in the compound magnesium chloring the chloring t	[1]

8062 14

10 The solubility curves for the solids copper(II) sulfate and cerium(III) sulfate are drawn below.



Use the solubility curves to answer the following questions.

(a) How does the solubility of the cerium(III) sulfate change as the temperature increases?

______[1]

(b) What is the solubility of copper(II) sulfate at 26 °C?

_____ g/100 g water [1]

(c) At what temperature is the solubility of cerium(III) sulfate 8 g/100 g water?

_____ °C [1]

(d) At what temperature is the solubility of the cerium(III) sulfate equal to the solubility of copper(II) sulfate?

_____ °C [1]

(e) Name the solid which is more soluble at 0 °C.

_____[1]

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