Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2014–2015

Double Award Science: Chemistry

GSD21

Unit C1
Foundation Tier

[GSD21]

WEDNESDAY 25 FEBRUARY 2015, 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 nine** 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**.
A Data Leaflet, which includes a Periodic Table of the Elements, is included in this question paper.

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
Total Marks	

Examiner Only	
Marks	Remark

1 **(a)** Metals have many uses. Draw a line to match each use to a metal.
One has been done for you.

use	metal
bridges	magnesium
plumbing	iron
flares	copper
jewellery	aluminium
overhead cables	silver

[3]

(b) An alloy is a mixture of elements at least one of which is a metal.
Coins are good examples of materials made from alloys.
Which **two** of the following statements are true?
Tick two correct boxes.

In an alloy the elements are chemically bonded together. ☐

A mixture of carbon and sulfur could be described as an alloy. ☐

An alloy would be expected to conduct electricity. ☐

A mixture of copper and zinc could be described as an alloy. ☐

[2]

(c) How would you separate a mixture of iron and sulfur?

_____

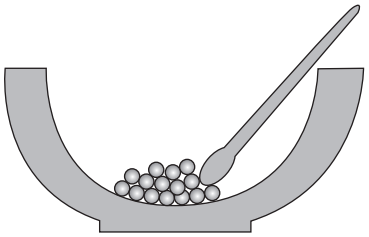
_____

_____

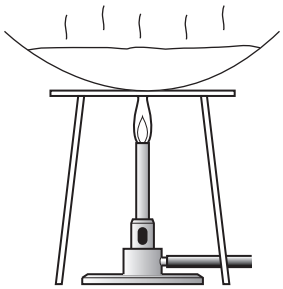
_____ [2]

Examiner Only	
Marks	Remark

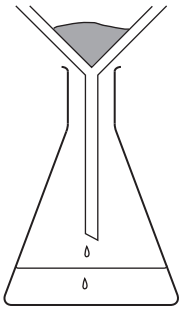
2 The diagrams below show different steps in the separation of a sample of pure salt from rock salt which is a mixture of salt and sand. The steps shown are **not** in the correct order.



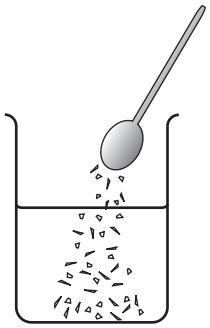
A



B



C



D

(a) Starting from grinding up the rock salt in Step **A**, put the other three steps **B**, **C** and **D** in the correct order for preparing pure salt from rock salt.

Step A is followed by Step _____ then by Step _____

and finally Step _____. [2]

(b) **(i)** Label a **filtrate** on one of the diagrams **A**, **B**, **C** or **D**.

(ii) Label a **residue** on one of the diagrams **A**, **B**, **C** or **D**. [2]

(c) In which Step, **A**, **B**, **C** or **D** is the process of evaporation taking place?

_____ [1]

(d) Give one hazard or risk when carrying out Step **B** and give a safety precaution you would take to remove this hazard or risk.

Hazard or risk:_____

Safety precaution: _____ [2]

Examiner Only	
Marks	Remark

3 **(a)** The following question is about potassium.

Circle the correct word from each box below to complete the sentences.

Potassium has to be stored in | oil / water / acid | because it is very | dense. / reactive. / soft.

When taken out of the container potassium appears | yellow / dull / shiny | on the surface.

Potassium looks | shiny / dull / white | when freshly cut.

[4]

(b) Describe **four** things that happen when potassium is added to cold water.

1. _____

2. _____

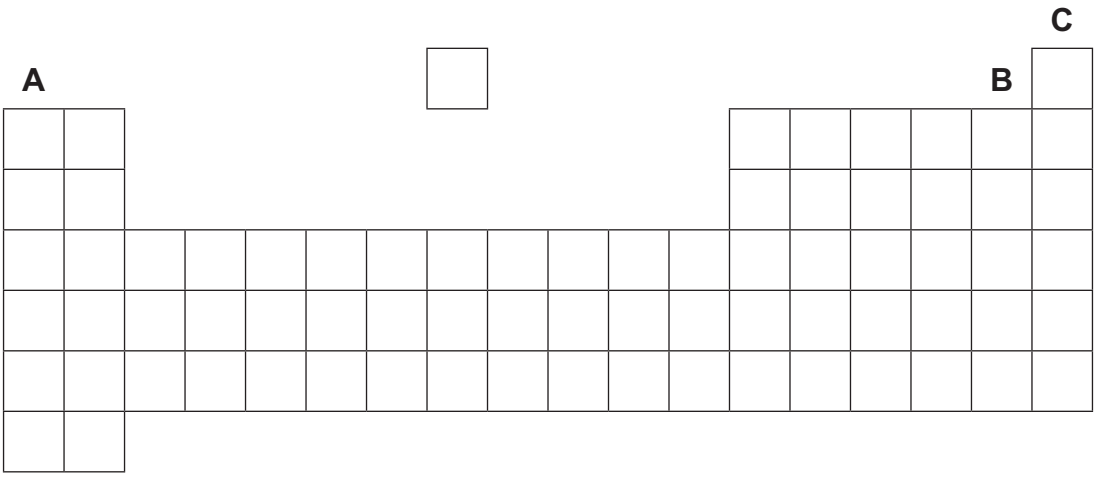
3. _____

4. _____ [4]

(c) Potassium is corrosive. In the space below draw the hazard symbol which would be found on a bottle of potassium.

[1]

4 The diagram below shows an outline of the Periodic Table.



(a) Give the names of the Groups in the Periodic Table which are labelled **A**, **B** and **C**.

Group **A** _____

Group **B** _____

Group **C** _____ [3]

(b) On the diagram shade the area of the Periodic Table where the **transition metals** are found. [1]

(c) Circle the word, from the list below, which is needed to complete the sentence:

Mendeleev arranged the elements in order of their atomic _____.

mass **structure** **number** **size**

[1]

(d) Give **two** other features of the Periodic Table developed by Mendeleev.

1. _____

2. _____ [2]

Examiner Only

Marks	Remark

5 The table below gives the colours of four indicators at different pH values.

Indicator \ pH	1	3	5	7	9	11	13
Red litmus	R	R	R	R	B	B	B
Blue litmus	R	R				B	B
Universal	R	O	Y	G	B	I	V
Methyl red	R	R	Y	Y	Y	Y	Y

Key: R – red; O – orange; Y – yellow; G – green; B – blue; I – indigo; V – violet

(a) Use the information given to answer the following questions:

(i) Use the letters in the key to complete the table for blue litmus. [1]

(ii) What colour is universal indicator in sodium chloride solution (pH 7)?

_____ [1]

(iii) Explain why methyl red indicator cannot be used to tell you if a solution is a weak alkali or a strong alkali.

_____ [1]

(iv) A chemist has a solution that is strongly acidic. He wants to add an alkali to neutralise the acid and end up with pH 7. Which indicator would be best for this task? Explain your answer.

Indicator: _____

Explanation: _____ [2]

(b) Suggest a way of measuring the pH of a solution which is more accurate than using an indicator.

_____ [1]

(c) Complete the equation for neutralisation.

acid + alkali → + [2]

Examiner Only

Marks	Remark

6 This question is about atomic structure.

Examiner Only

Marks	Remark

(a) Use your knowledge of atomic structure to complete the table below.

Atom/ion	Mass number	Number of protons	Number of electrons	Number of neutrons
A		3	3	3
B	27	13	13	
C	11		5	6
D		11	10	12
E		17	18	18

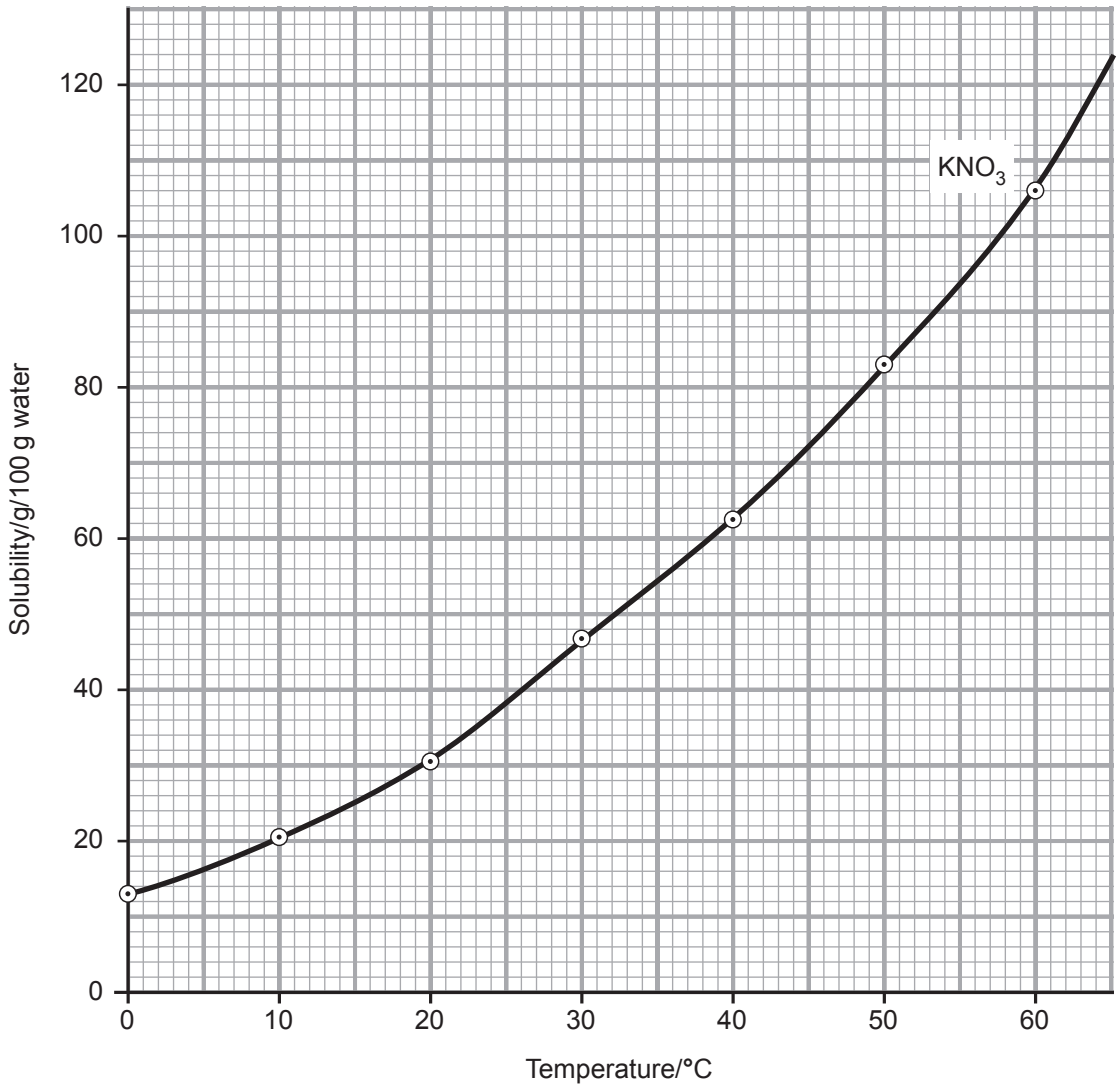
[5]

(b) Give the chemical symbol for each of the particles A, D and E.
They may be atoms or ions.

	Symbol
A	
D	
E	

[3]

7 The graph below shows the solubility curve for potassium nitrate, KNO_3.



(a) Use the data given in the table below to plot a solubility curve for potassium chloride, KCl, on the same grid as the solubility curve for potassium nitrate.

Temperature/°C	0	10	20	30	40	50	60
Solubility of potassium chloride/g/100 g water	28	31	33	36	39	42	45

[3]

Examiner Only

Marks	Remark

(b) Describe and compare the trends in solubility for potassium nitrate and potassium chloride.

_____

_____

_____

_____ [2]

(c) At what temperature do both salts have the same solubility?

_____ [1]

(d) **(i)** What is the solubility of potassium nitrate in 100 g of water at 43 °C?

_____ [1]

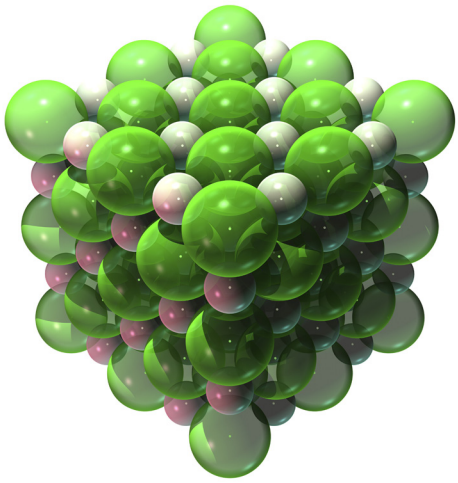
(ii) Calculate the difference in solubility between potassium nitrate and potassium chloride in 100 g of water at 43 °C.

_____ [2]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

8 Sodium chloride has an ionic crystal lattice structure like that shown in the diagram below.



© Russell Kightley / Science Photo Library

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

Predict and explain the physical properties you would expect sodium chloride to have.

[6]

9 The table below gives information about the salts formed when metal carbonates react with acids.

Metal carbonate	Acid used	Cation in salt	Anion in salt	Formula of salt produced
calcium	hydrochloric	Ca^{2+}		$CaCl_2$
sodium		Na^+	SO_4^{2-}	
	sulfuric	Cu^{2+}		$CuSO_4$
magnesium	nitric			$Mg(NO_3)_2$

(a) Complete the table. [4]

(b) One of the reactions shown in the table involves a colour change. Give the **colours** of the starting metal carbonate and the salt solution produced:

metal carbonate colour: _____

colour of salt solution produced: _____ [2]

(c) All of the reactions shown in the table produce the same gas. Name this gas and describe a test that is used to identify it.

Name: _____

Test: _____

_____

_____ [3]

THIS IS THE END OF THE QUESTION PAPER

Examiner Only

Marks	Remark

114853