



General Certificate of Secondary Education  
2018

Centre Number

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Candidate Number

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# GCSE Chemistry

Unit 1

Foundation Tier



[GCH11]

\*GCH11\*

WEDNESDAY 13 JUNE, MORNING

## TIME

1 hour 15 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 boxed area on each page or on blank pages.**

Complete in black ink only. **Do not write with a gel pen.**

Answer **all five** questions.

## INFORMATION FOR CANDIDATES

The total mark for this paper is 80.

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 **1(a)**.

A Data Leaflet, which includes a Periodic Table of the Elements, is included in this question paper.





**(b)** Lithium is found in Group 1 of the Periodic Table.

**(i)** How is lithium stored?

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

**(ii)** Before reacting lithium with water, a risk assessment is carried out.  
Give two safety precautions, apart from wearing safety glasses, which must be included in this risk assessment.

1. \_\_\_\_\_  
\_\_\_\_\_  
2. \_\_\_\_\_  
\_\_\_\_\_ [2]

**(iii)** Name the products when lithium reacts with water.

\_\_\_\_\_  
\_\_\_\_\_ [2]

**(iv)** State two ways in which the reaction of potassium with water is different from the reaction of lithium with water.

1. \_\_\_\_\_  
\_\_\_\_\_  
2. \_\_\_\_\_  
\_\_\_\_\_ [2]

**(v)** Write a balanced symbol equation for the reaction of potassium with water.

\_\_\_\_\_ [3]

**[Turn over**



(c) The table below shows some of the physical properties of the halogens.

(i) Complete the table.

	State at room temperature	Colour
fluorine	gas	yellow
chlorine	gas	
bromine		red-brown
iodine		

[4]

(ii) What is the name of the change of state when iodine is heated?

[1]





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**[Turn over**



**\*20GCH1105\***

- 2 Commercial cold packs used to treat sports injuries contain salts such as calcium nitrate and ammonium nitrate.



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- (a) Ammonium nitrate may be formed from the reaction of ammonia solution with nitric acid. Nitric acid is a strong acid.

- (i) Name one other strong acid.

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

- (ii) The table below shows two indicators. Complete the table to show the colour of the indicator with nitric acid and with ammonia solution.

Indicator	Colour with nitric acid	Colour with ammonia solution
blue litmus		
phenolphthalein		

[4]



**(b)** Calcium nitrate may be formed in the neutralisation reaction between calcium hydroxide solution and nitric acid. Calcium hydroxide solution is commonly known as limewater.

**(i)** Write the chemical formula for calcium hydroxide.

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

**(ii)** What is observed when carbon dioxide gas is bubbled into limewater?

\_\_\_\_\_  
\_\_\_\_\_ [2]

**(c)** Calcium nitrate may also be formed from the reaction of solid calcium carbonate with nitric acid.

**(i)** Write a balanced symbol equation for the reaction of calcium carbonate with nitric acid.

\_\_\_\_\_ [3]

**[Turn over]**



(ii) Describe how you would prepare a **solution** of calcium nitrate from solid calcium carbonate and nitric acid.

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[4]





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**[Turn over**



**\*20GCH1109\***

- 3 The model of the atom as we know it today has developed over many years. Several scientists contributed to this model.

(a) Fill in the missing words to complete the sentences below.

One of the earliest atomic models was suggested by JJ Thomson. This model contained a positive sphere embedded with \_\_\_\_\_ electrons and was known as the \_\_\_\_\_ model.

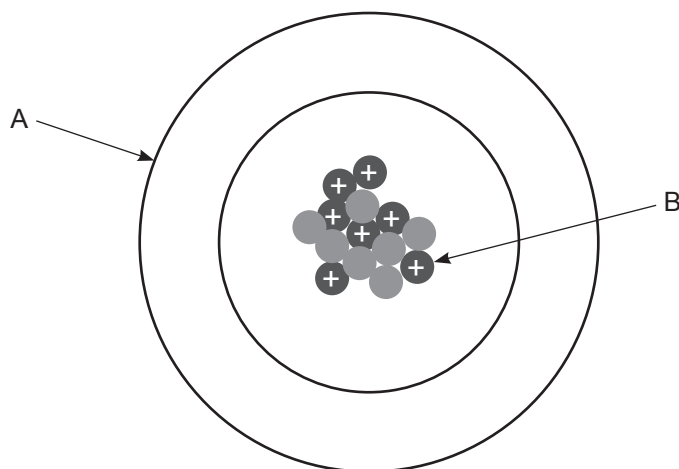
In the early 20th Century, Ernest \_\_\_\_\_ proposed that the atom was made up of a positive \_\_\_\_\_ surrounded by orbiting electrons.

In 1932 James Chadwick discovered the \_\_\_\_\_.

[5]



- (b) The diagram below represents an atom of nitrogen without showing the electrons.



- (i) What label should be placed at A?

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

- (ii) Name the particle with a positive charge labelled B.

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

- (iii) Complete the diagram to show the electronic configuration of a nitrogen atom.

[1]

- (iv) What is the mass number of this nitrogen atom?

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

[Turn over]



(c) Some elements have isotopes.

Explain the meaning of the term isotopes.

\_\_\_\_\_  
\_\_\_\_\_ [2]

(d) Complete the table below giving information on some atoms and ions.

Formula of atom or ion	Particle	Number of protons	Number of electrons	Number of neutrons
Ca	calcium atom		20	20
	oxide ion	8		8
		13	10	14

[5]

(e) Calcium reacts with oxygen to form the compound calcium oxide.

(i) Write a balanced symbol equation for the reaction of calcium with oxygen.

\_\_\_\_\_ [3]

(ii) State the type of bonding present in calcium oxide.

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





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**[Turn over**



**\*20GCH1113\***

- 4 Iodine is an important mineral for health, especially during pregnancy as it plays a vital role in the development of a baby's brain. A supplement containing potassium iodide is often recommended for adults with iodine deficient diets.

(a) The solubility of potassium iodide at 20 °C is 144 g/100 g H<sub>2</sub>O.

(i) What is meant by the term solubility?

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[4]

(ii) Calculate the mass of potassium iodide required to make a saturated solution using 25 g of water at 20 °C.

Mass of potassium iodide \_\_\_\_\_ g [1]

(iii) Determine if a solution containing 680 g of potassium iodide in 500 g of water at 20 °C is saturated or unsaturated.

**Show evidence to support your answer.**

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[2]



**(b)** Describe how a flame test is carried out on a sample of solid potassium iodide and state the expected result.

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[4]

**(c)** Describe a chemical test to show that iodide ions are present in a sample of solid potassium iodide and state the result for a positive test.

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[3]

[Turn over



- 5 (a) Iron has a relative atomic mass of 56 and is found in many different compounds and ores.

(i) What is meant by the term relative atomic mass?

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[2]

(ii)  $\text{Fe}_3(\text{CO})_{12}$  is a compound which contains iron. What is the empirical formula of this compound?

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[1]

(iii) 1 mole of hydrated iron(II) sulfate contains 7 moles of water of crystallisation. Write the formula of hydrated iron(II) sulfate.

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[1]

- (b) The relative formula mass of  $\text{FeX}_3$  is 296. Calculate the relative atomic mass of X and use your Data Leaflet to identify element X.

Relative atomic mass of X \_\_\_\_\_

Identity of X \_\_\_\_\_ [3]



(c) In industry, iron is obtained from iron(III) oxide ( $\text{Fe}_2\text{O}_3$ ).

Calculate the number of moles present in 16 kg of  $\text{Fe}_2\text{O}_3$ .

(Relative atomic masses: O = 16; Fe = 56)

Moles of  $\text{Fe}_2\text{O}_3$  \_\_\_\_\_ [3]

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Question Number	Marks
1	
2	
3	
4	
5	

Total Marks	
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Examiner Number

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