

New
Specification



Centre Number

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Candidate Number

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General Certificate of Secondary Education
2018

GCSE Chemistry

Unit 1

Foundation Tier



[GCM11]

GCM11

WEDNESDAY 13 JUNE, MORNING

TIME

1 hour.

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 60.

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(b)(ii)**.

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

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16GCM1101

1 Many scientists have contributed to ideas about the structure of the atom as we know it today.

(a) (i) Name the scientist who proposed the 'Plum Pudding' model of the atom.

_____ [1]

(ii) Name the **two** subatomic particles found in the nucleus of an atom.

_____ [1]

(iii) Name the subatomic particle discovered by James Chadwick in 1932.

_____ [1]

(iv) An atom of aluminium has 13 electrons. Write the electronic configuration of an aluminium atom.

_____ [1]

(v) Draw the electronic configuration of an aluminium **ion** and state the charge on the ion.

[2]

(vi) Name the ion formed from an oxygen atom.

_____ [1]



(vii) Explain the meaning of the term anion.

_____ [1]

(b) Nanoparticles and their applications have been widely researched in recent years.

(i) State the size of a nanoparticle.

_____ [1]

(ii) Silver nanoparticles help to heal wounds. Silver is found in the Periodic Table as shown below.

108
Ag
47

Complete the table below giving information about an atom of silver.

Atomic number	
Mass number	
Number of protons	47
Number of electrons	
Number of neutrons	

[3]



2 (a) Lithium metal reacts with oxygen to form lithium oxide.

Write a balanced symbol equation for the reaction of lithium with oxygen.

_____ [3]

(b) Lithium metal also reacts with water.

A teacher carried out a demonstration of this reaction by removing some lithium from a jar, preparing it for the reaction and then adding it to a trough of water. Heat was released and the lithium moved on the surface of the water until it became smaller and disappeared.

(i) Describe **two** ways in which the lithium is prepared for this reaction.

1. _____

2. _____

_____ [2]

(ii) State **two** other observations which can be made during this reaction.

1. _____

2. _____

_____ [2]

(iii) Name the gas produced in this reaction.

_____ [1]



(c) Lithium reacts with elements of the group shown below.

fluorine
chlorine
bromine
iodine
astatine

Complete the paragraph below.

The group of elements shown above is known as the _____.

The element in this group which is a liquid at room temperature and pressure

is _____. The most reactive element in this group

is _____.

[3]

[Turn over



3 Indicators may be used to classify solutions as acidic, neutral or alkaline.

(a) (i) The table below gives information on a range of indicators. Complete the table.

Indicator	Solution to which indicator is added	Colour of indicator in solution	pH of solution	Classification of solution
phenolphthalein	sodium hydroxide		14	
blue litmus paper	lemon juice		3	

[4]

(ii) The pH of a solution was measured and found to be 12.4. Suggest how the pH of the solution was measured.

[1]

(b) Hydrochloric acid reacts with sodium hydroxide solution in a neutralisation reaction to form a salt and water.

(i) Write a balanced symbol equation for this reaction.

[2]

(ii) A student recorded the temperature during the reaction between hydrochloric acid and sodium hydroxide solution. The results obtained are shown below.

Time/s	0	15	30	45	60	75	90	105	120
Temperature/°C	21	23	26	27	29	30	28	26	24

Calculate the maximum temperature change in the reaction.

[1]



(iii) Explain why this reaction is described as exothermic.

_____ [1]

(c) Excess hydrochloric acid in the stomach causes indigestion. The excess acid can be neutralised by taking an antacid tablet containing calcium carbonate.

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

_____ [3]

(ii) State **two** observations made during the reaction.

1. _____

2. _____

_____ [2]

[Turn over



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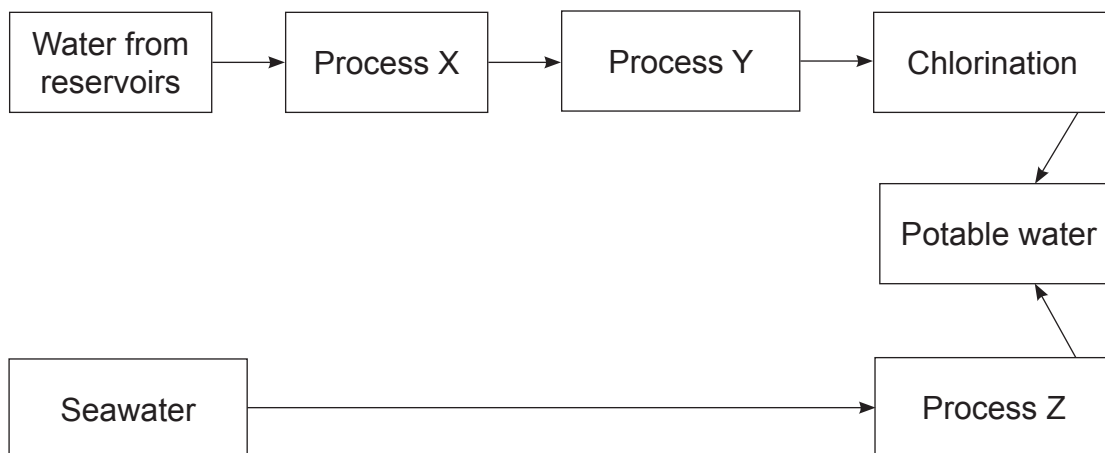
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4 (a) Water from reservoirs and seawater can be made potable as shown in the diagram.



(i) What is potable water?

_____ [1]

(ii) Using the words in the box below, name processes X, Y and Z.

crystallisation	distillation	evaporation
filtration	precipitation	sedimentation

Process X: _____

Process Y: _____

Process Z: _____ [3]

(iii) What is the purpose of chlorination?

_____ [1]

[Turn over





[6]

(c) A sports drink contains some dissolved magnesium chloride. When silver nitrate solution is added to a sample of the sports drink a precipitate is formed.

(i) Write the formula of magnesium chloride.

[1]

(ii) What colour is the precipitate?

[1]



5 Natron is a naturally occurring mixture of hydrated sodium carbonate ($\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$) and sodium hydrogencarbonate (NaHCO_3) along with small quantities of sodium chloride and sodium sulfate (Na_2SO_4).

(a) (i) Calculate the relative formula mass (M_r) of sodium hydrogencarbonate.

Relative formula mass (M_r) = _____ [1]

(ii) Calculate the percentage of oxygen, by mass, in sodium hydrogencarbonate.

Percentage of oxygen = _____ % [2]

(iii) Calculate the relative formula mass (M_r) of hydrated sodium carbonate.

Relative formula mass (M_r) = _____ [1]



(iv) Calculate the mass of one mole of sodium sulfate in grams.

Mass of sodium sulfate = _____ g [1]

(v) In a reaction to produce sodium chloride, the theoretical yield was 12.1 g. In the experiment only 3.50 g of sodium chloride were obtained. Calculate the percentage yield.

Percentage yield = _____ % [1]



(b) A student weighed out 4.90 g of a sample of hydrated sodium carbonate $\text{Na}_2\text{CO}_3 \cdot x\text{H}_2\text{O}$.

2.65 g of solid remained after heating to constant mass.

(i) Calculate the mass of water lost during heating.

Mass of water lost = _____ g [1]

(ii) Calculate the number of moles of water lost during heating.

Moles of water lost = _____ [1]

(iii) Calculate the number of moles of anhydrous sodium carbonate remaining after heating.

Moles of sodium carbonate = _____ [1]





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Question Number	Marks
1	
2	
3	
4	
5	

Total Marks	
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Examiner Number

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