Rewarding Learning

Centre Number

71	

Candidate Number

General Certificate of Secondary Education
2013–2014

Science: Single Award

Unit 2 (Chemistry)

Foundation Tier

[GSS21]

ML

THURSDAY 14 NOVEMBER 2013, MORNING

TIME

1 hour, plus your additional time allowance.

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 60.
Quality of written communication will be assessed in Question **9**.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
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	
10	
Total Marks	

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Examiner Only	
Marks	Remark

1 Hazard symbols tell us of danger.

The hazard symbol below is found on a bottle of bleach.

(a) Write down the name of this hazard symbol.

_____ [1]

(b) Draw the hazard symbol that you would see on a flammable liquid like petrol.

Do this in the space below.

[1]

Examiner Only	
Marks	Remark

2 Aluminium is used to make aeroplanes.

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(a) Why is aluminium a good material to use in aeroplanes?
Tick (✓) **two** properties from the list below.

- ☐ Low density
- ☐ Strong
- ☐ Electrical conductor
- ☐ Soft
- ☐ Heat conductor

[2]

(b) Cotton, wool and silk are all examples of natural materials. What do we mean by **natural material**?

_____

_____ [1]

(c) Glass fibre can be used to make car bodies. It combines the properties of two or more materials to make a more useful material.

What is the name of this type of material?

Put a circle around the correct answer below.

ceramic : **composite** : **nano-material** [1]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

3 Fingerprints can be used to help fight crime.

(a) What are the names of the two types of fingerprints shown below?

Choose from:

whorl **composite** **loop** **arch**

(i)

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_____ [1]

(ii)

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_____ [1]

(b) Write down the name of a powder used to dust for fingerprints on a **white** surface.

_____ [1]

(c) Explain fully why fingerprint evidence is useful in solving a crime.

_____

_____

_____ [2]

(d) Write down **three** features that banks use to protect their bank notes against forgery.

1. _____

2. _____

3. _____ [3]

(e) A flame test can be used to identify the metal present in a sample collected from a crime scene. What colour of flame would you expect if the sample contained potassium?

_____ [1]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

4 **(a)** Below are some chemicals and household substances. Match each chemical to the household substance in which it is found. Use lines to do this. The first one has been done for you.

Chemical	Household substance
magnesium hydroxide	Milk of Magnesia
ethanoic acid	lemon juice
citric acid	drain cleaner
sodium hydroxide	vinegar

[2]

(b) The table below shows the soil pH that some plants grow best in.

Name of plant	pH of soil
Apple	5.0 – 6.5
Blackcurrant	7.5 – 8.5
Potato	5.5 – 6.5
Beetroot	6.0 – 8.0
Cabbage	9.0 – 10.0

(i) Write down the name of the plant that grows best in the most alkaline soil.

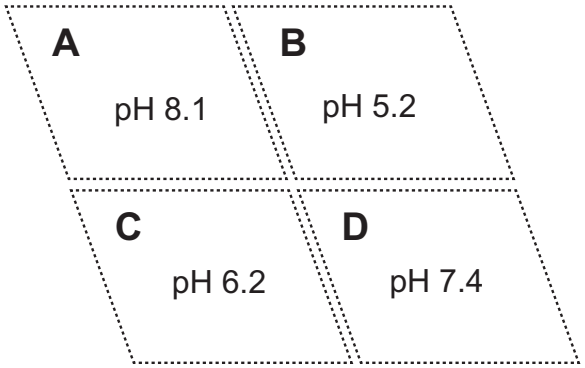
_____ [1]

(ii) Write down the name of the plant that is best suited to grow in both acid and alkaline soils.

_____ [1]

Examiner Only	
Marks	Remark

A farmer tested the pH of the soil in his fields (**A**, **B**, **C** and **D**). His results are shown below.



(iii) He wants to grow potatoes. Which field (**A**, **B**, **C** or **D)** should he use? Explain your answer.

Field _____

_____

_____ [2]

(iv) He also wants to grow strawberries in field **B**. Strawberries grow best in soil with a pH of 7.

Explain fully why he needs to add lime to the soil in field **B**.

_____

_____

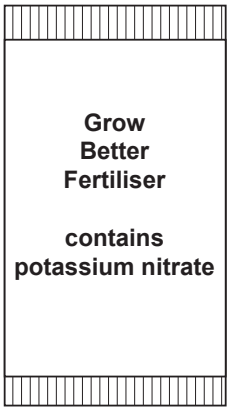
_____ [2]

(v) What is the name given to a substance with a pH of 7?

_____ [1]

(c) Farmers add fertiliser to their soil to help their plants grow better.

Examiner Only	
Marks	Remark

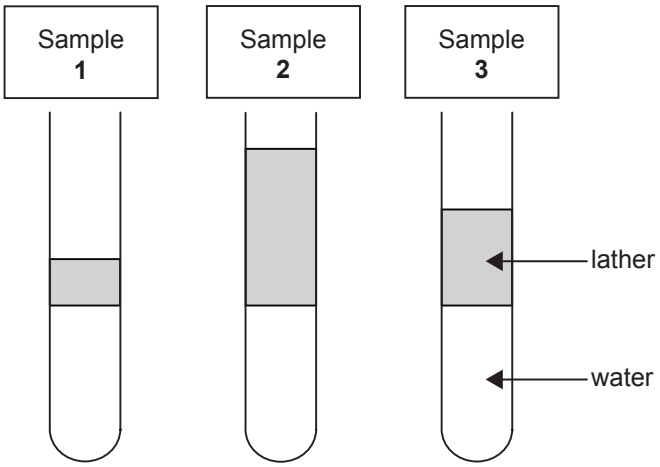


Potassium nitrate (KNO_3) contains potassium and two other elements.
Write down the names of the other **two** elements.

_____ and _____ [2]

Examiner Only	
Marks	Remark

5 A student investigated the hardness of three samples of water. She added 5 drops of soap solution to 10 cm^3 of water and shook each sample for 10 seconds. Her results are shown below.



(a) Explain **one** way that the student made this a fair test.

_____

_____ [1]

(b) Write down the name of a piece of apparatus she could have used to measure 10 cm^3 of water.

_____ [1]

(c) Which sample (**1**, **2** or **3**) had the hardest water?

_____ [1]

(d) Put a circle round the compound that may cause hard water.

calcium sulfate : **iron sulfate** : **copper sulfate** [1]

Examiner Only	
Marks	Remark

6 Look at the table below. It shows some waste materials produced in Belfast in one year.

Material	Waste produced/ tonnes
paper	16 500
plastic bottles	4 500
glass	6 000
food and garden waste	33 000
aluminium cans	3 500
cardboard	7 500

(a) In Belfast 50% of the paper waste is recycled.

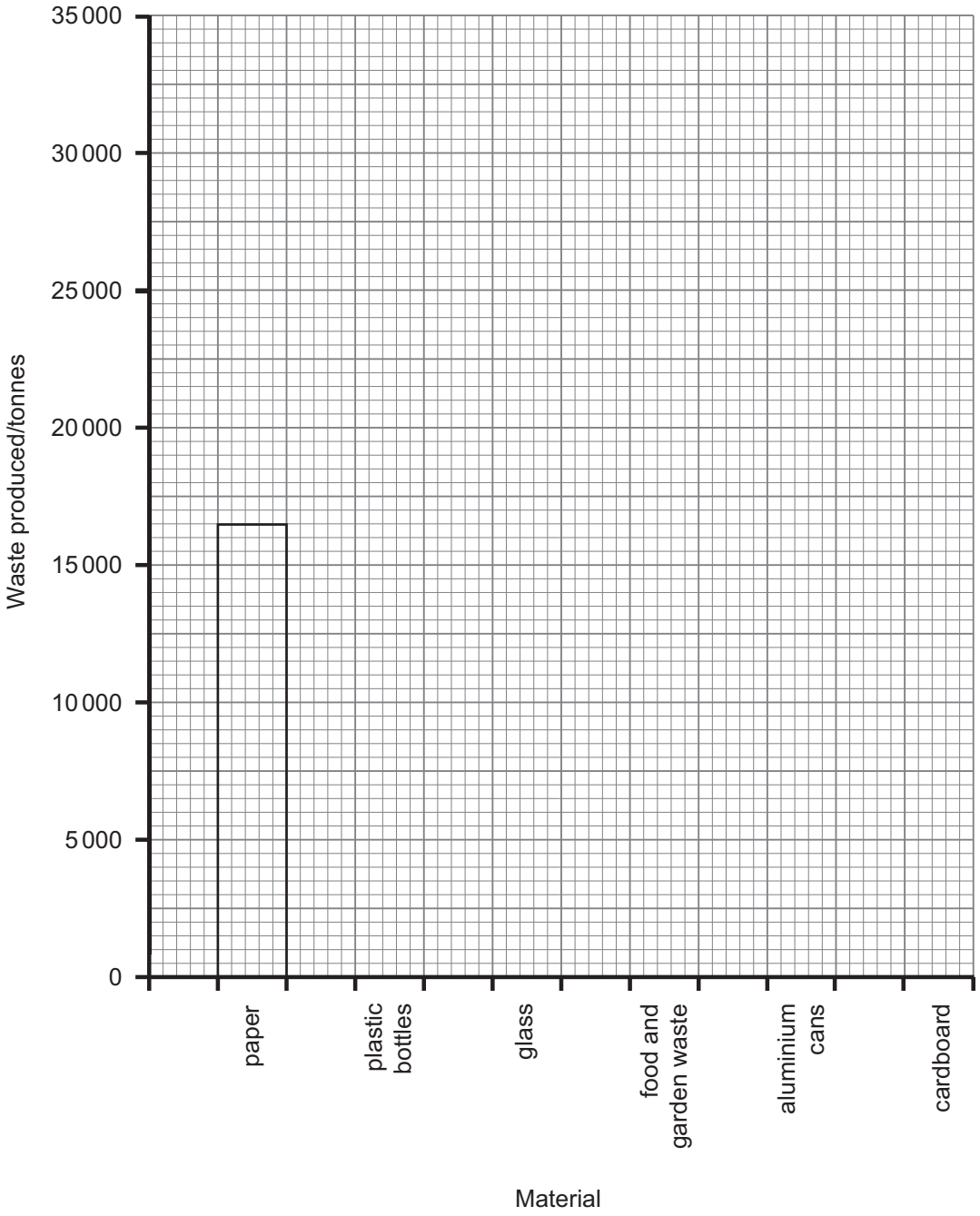
Calculate the number of tonnes of paper waste that is recycled in one year.
(Show your working out.)

_____ tonnes [2]

(b) Write down **one** advantage of recycling.

_____ [1]

(c) Use the information from the table to finish the bar chart below.



[2]

Examiner Only	
Marks	Remark

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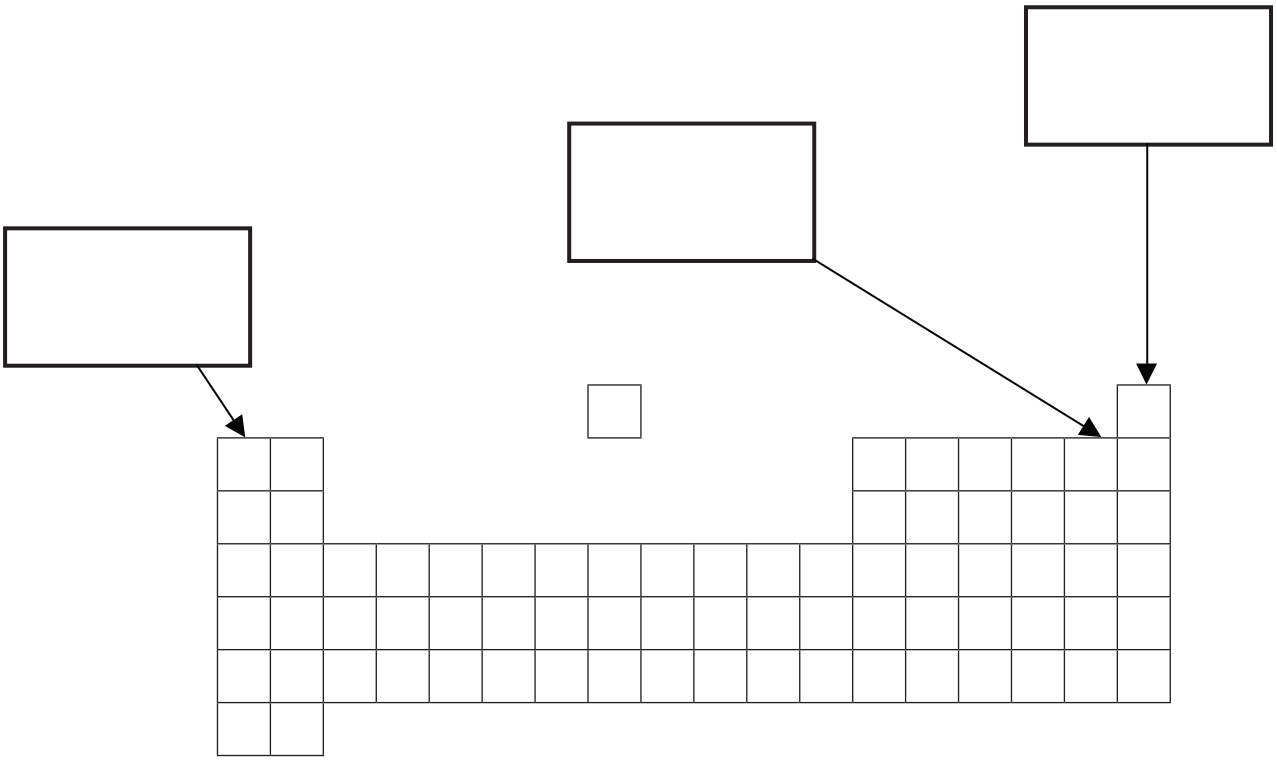
7 Below is an outline of the Periodic Table.



Examiner Only	
Marks	Remark

(a) Fill in the three boxes on the diagram above with the correct names of the groups of the Periodic Table.

Choose from:

alkaline earth metals : halogens : alkali metals : noble gases

[3]

(b) Write down the name of the scientist who developed a Periodic Table that is most similar to the one shown above.

_____ [1]

(c) Fill in the missing word in the sentence below to describe a **trend** in the Periodic Table.

The metallic character of the elements _____ from left to right across the Periodic Table. [1]

Examiner Only	
Marks	Remark

8 A pupil investigates the reactivity of four metals: iron, magnesium, zinc and tin.

He added 1 g of each powdered metal to equal volumes of copper sulfate solutions and measured the temperature rise. The larger the temperature rise the more reactive the metal.

The results are shown below.

Metal	Starting temperature/ °C	Highest temperature/ °C	Temperature rise/ °C
iron	20	52	32
magnesium	21		50
zinc	19	60	41
tin	20	41	21

(a) Calculate the highest temperature for the reaction with magnesium.

_____ °C [1]

(b) Write down the name of the metal in the table that is the **least** reactive.

_____ [1]

(c) **(i)** Fill in the missing parts of the word equation for the reaction between iron and copper sulfate.

iron + copper sulfate ⟶ [ ] + [ ]

[2]

(ii) What is the name of this type of reaction?

_____ [1]

(d) The pupil carried out the same experiment using 1 g of powdered silver metal. There was no temperature rise. Why do you think there was no temperature rise?

_____

_____ [1]

(e) The chemical formula for copper sulfate is $CuSO_4$.

(i) How many elements are there in copper sulfate?

_____ [1]

(ii) How many atoms are represented in this formula?

_____ [1]

Examiner Only	
Marks	Remark

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Marks	Remark

9 Indigestion can cause severe stomach pain.

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'Fasteze' indigestion tablets contain sodium hydrogencarbonate.

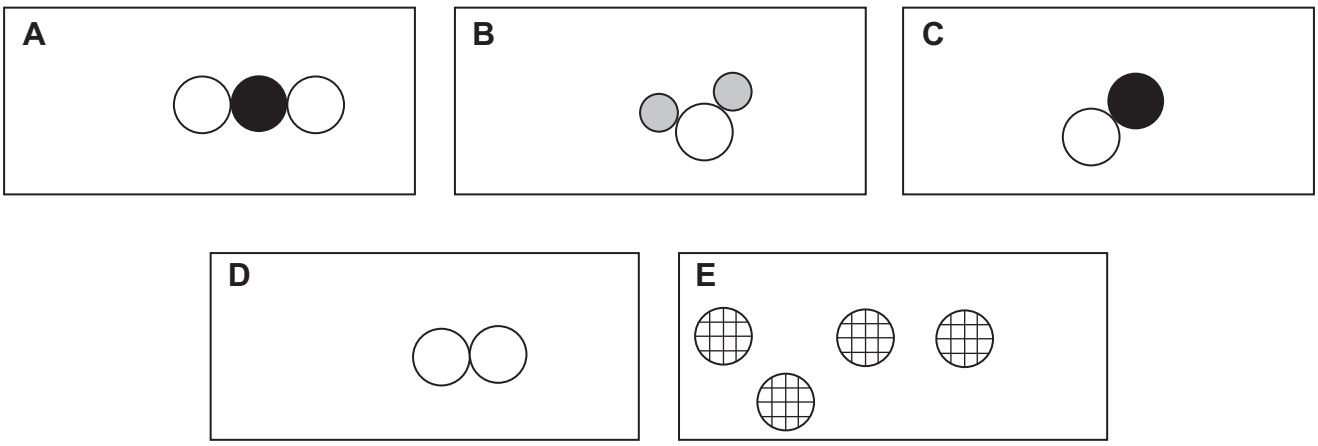
Explain how indigestion tablets like 'Fasteze' work. Your answer should include:

- the cause of stomach indigestion
- how indigestion tablets work
- the names of the chemicals produced during this reaction.

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

[6]

10 Shown below are some particle diagrams that represent elements or compounds.



Examiner Only	
Marks	Remark

(a) Which particle diagrams (**A, B, C, D** or **E**) show compounds? Explain your answer.

Diagrams _____

_____

_____ [2]

(b) Atoms of argon do not join with any other atoms. Which diagram (**A, B, C, D** or **E**) best represents argon?

_____ [1]

(c) Carbon monoxide has the formula CO. Which diagram (**A, B, C, D** or **E**) best represents carbon monoxide?

_____ [1]

(d) Hydrogen atoms are smaller than any other atoms. Which diagram (**A, B, C, D** or **E**) best represents water (H_2O)? Explain your answer.

_____

_____

_____ [2]

THIS IS THE END OF THE QUESTION PAPER