



Centre Number

71

Candidate Number

General Certificate of Secondary Education
2012

Science: Single Award (Modular)

Materials and their Management

Module 4

Foundation Tier

[GSC41]



TUESDAY 13 NOVEMBER 2012, MORNING

TIME

45 minutes.

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 seven** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 45.

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 provided for your use.

For Examiner's
use only

Question Number	Marks
1	
2	
3	
4	
5	
6	
7	

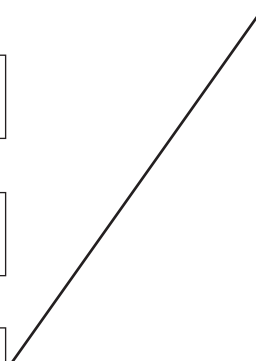
Total
Marks

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1 (a) Materials have many important uses.

Match each material, using lines, to **one** of its uses.
One has been done for you.

Material		Use	
linen		aeroplanes	
glass		pottery	
aluminium		clothing	
ceramics		windows	
polythene		bridges	
		plastic bags	

[4]

(b) Bottles can be made from glass or plastic. Give **two** advantages of using plastic to make bottles.

1. _____

 2. _____

- [2]

Examiner Only	
Marks	Remark

- 2 The table below gives the percentage of different types of waste found in a bin.

Type of waste	Percentage
paper	35
glass bottles	
cans	10
plastic packaging	29
fruit and vegetables	6
other waste	5

- (a) Calculate the percentage of glass bottles in the bin.

(Show your working out.)

_____ % [2]

Putting one tonne of waste into landfill costs £84. However, it only costs £8 to recycle one tonne of waste from a recycling bin.

- (b) Calculate how much money is saved when one tonne of waste is recycled instead of going to landfill.

£ _____ [1]

- (c) Fruit and vegetables are examples of biodegradable materials. Explain fully the term **biodegradable**.

 _____ [2]

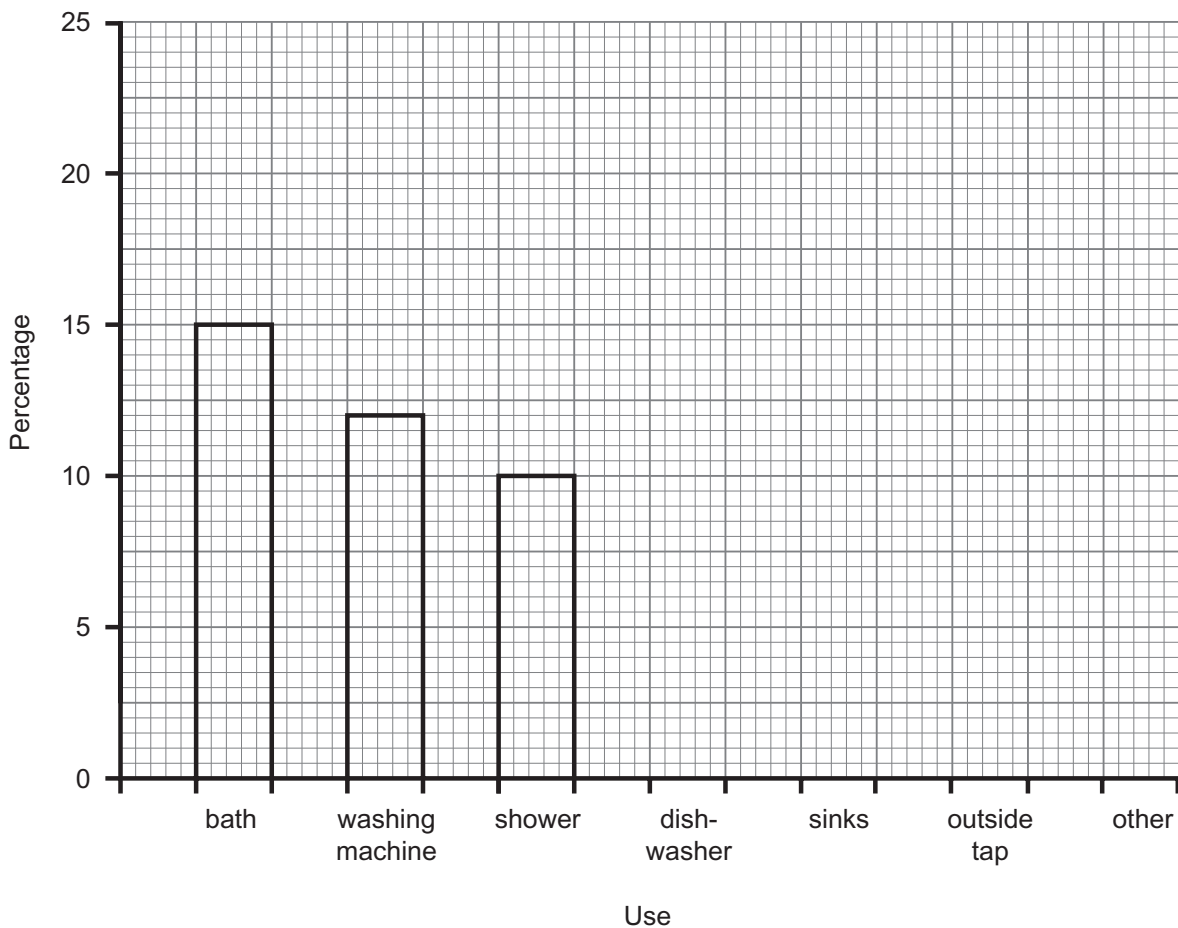
Examiner Only	
Marks	Remark

3 Below is a table showing how the average household uses water.

Use	Percentage
bath	15
washing machine	12
shower	10
dishwasher	6
sinks	22
outside tap	10
other	25

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Marks	Remark

(a) Complete the bar chart below for this information.



[2]

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- (b) Use the information given to calculate the difference between the percentage of water used in a bath and the percentage of water used in a shower.

_____ % [1]

- (c) Parts of Northern Ireland are described as hard water areas. What is meant by the term **hard water**?

_____ [2]

- (d) In the table below place a tick (✓) beside the **two** statements that are advantages of hard water.

tastes good	
gives kettle fur	
wastes soap	
good for strong teeth and bones	
stains clothes during washing	

[2]

Examiner Only

Marks Remark

4 Complete the table below giving the processes involved.

Choose from:

recycling : combustion : ion exchange

polymerisation : IR spectroscopy

Use	Process
detecting alcohol	
creating heat energy by burning a fuel	
softening hard water	
producing long chain molecules such as polythene	

[4]

Examiner Only	
Marks	Remark

5 Forensic scientists use the steps below to carry out a flame test. However, the steps are **not** in the correct order.

- A Record the colour of the flame produced.
- B Dip the flame test rod into acid and heat in a Bunsen flame.
- C Dip the flame test rod into the test material and put into the flame.
- D Repeat this until there is no colour change.

(a) Using the letters **A**, **B**, **C** and **D**, give the correct order.

_____ [2]

(b) Give **one** suitable safety precaution when carrying out flame tests.

_____ [1]

(c) Complete the table below.

Metal chloride	Flame colour
calcium	brick red
potassium	
sodium	
	blue/green
	pale blue

[4]

(d) A candle company wanted to make a Christmas candle that burnt with a brick red flame.

From the table, name a metal chloride that would be suitable to add to the candle wax mixture.

_____ [1]

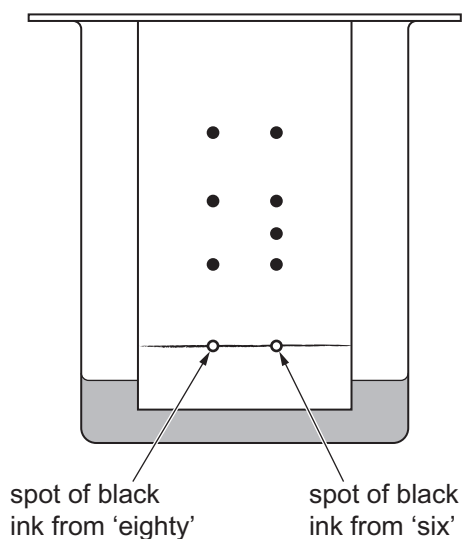
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Marks Remark

- 6 (a) On the cheque below it is suspected that Mr. Smith has added eighty to the value of the cheque.

CCEA BANK PLC	21-08-92
CCEA Bank plc, Town Street, Minton MA7 2AX	Date <u>21/10/2012</u>
Pay <u>S. Smith</u>	
<u>eighty six pounds only</u>	£ <u>86.00</u>
	A. JONES
	<u>A Jones</u>
⑈ 100205 ⑆ 21 0892 ⑆ 0060 3008 ⑆	

The ink from words 'eighty' and 'six' were tested using chromatography. The results are shown below.



- (i) How many dyes did the black ink from the 'eighty' contain?

_____ [1]

- (ii) From the results decide if there was a forgery and give a reason for your answer.

 _____ [1]

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Marks	Remark

(iii) In chromatography, the first step is to draw a pencil line 3 cm from one end of a piece of chromatography paper. Describe fully what is then done to produce the results.

[3]

(b) Forensic scientists can use fingerprints to help identify the person who has committed a crime.

(i) Name a powder that is used to dust for fingerprints on a white surface.

[1]

(ii) Explain fully why fingerprints found at the scene of a crime are useful to convict the person who has committed the crime.

[2]

Examiner Only	
Marks	Remark

7 Some hydrocarbons can be used as fuels to heat our homes.

(a) Which element does **not** take part in the burning of a hydrocarbon?

Circle the correct answer.

hydrogen : **oxygen** : **fluorine** : **carbon** [1]

(b) Ethanol (C_2H_5OH) is an organic molecule which can also be used as a fuel.

(i) How many different elements are contained in ethanol?

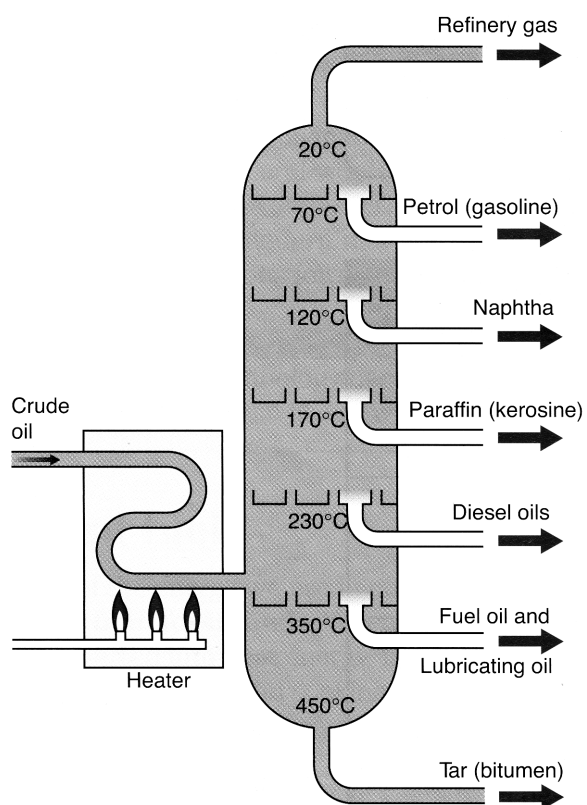
_____ [1]

(ii) Explain fully why ethanol is not a hydrocarbon.

_____ [2]

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(c) Crude oil contains many hundreds of different substances which can be separated by fractional distillation.



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Describe the separation of crude oil by fractional distillation.

[3]

THIS IS THE END OF THE QUESTION PAPER

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