



Centre Number

71

Candidate Number

General Certificate of Secondary Education
2009–2010

Science: Single Award (Modular)

Materials and their Management
Module 4

Foundation Tier

[GSC41]



FRIDAY 21 MAY 2010, 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 six** 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 you.

For Examiner's
use only

Question Number	Marks
1	
2	
3	
4	
5	
6	

Total
Marks



1 (a) The following words describe some important uses of materials.

electrical wire : bridges : bags :

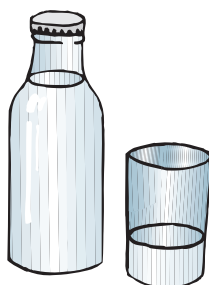
wall insulation : floor tiles : shirts

Choose words from the list above to complete the table below. The first one has been done for you.

Material	Use
plastic	bags
ceramic	
copper	
fibre	
iron	

[4]

(b) Many containers for liquids are made from glass.



What makes glass a good container for storing liquids?
Tick (✓) **three** correct boxes.

Glass is brittle	
Glass is strong	
Glass is lightweight	
Glass is unreactive	
Glass is transparent	
Glass has a low melting point	

[3]

Examiner Only

Marks Remark

(c) Many bottles are now made of plastic.

Give two reasons why plastic has replaced glass to make bottles.

1. _____
2. _____ [2]

2 (a) Below are four fractions obtained from crude oil. Match each fraction to **one** use.
One is already done.

Fraction	Use
Naphtha	Lubricants
Refinery gas	Roads
Paraffin	Gas cookers
Tar	Chemicals
	Liquid fuel for heating [3]

(b) Name the process used to separate the different hydrocarbons in crude oil.
Circle the correct answer.

filtration : chromatography : fractional distillation [1]

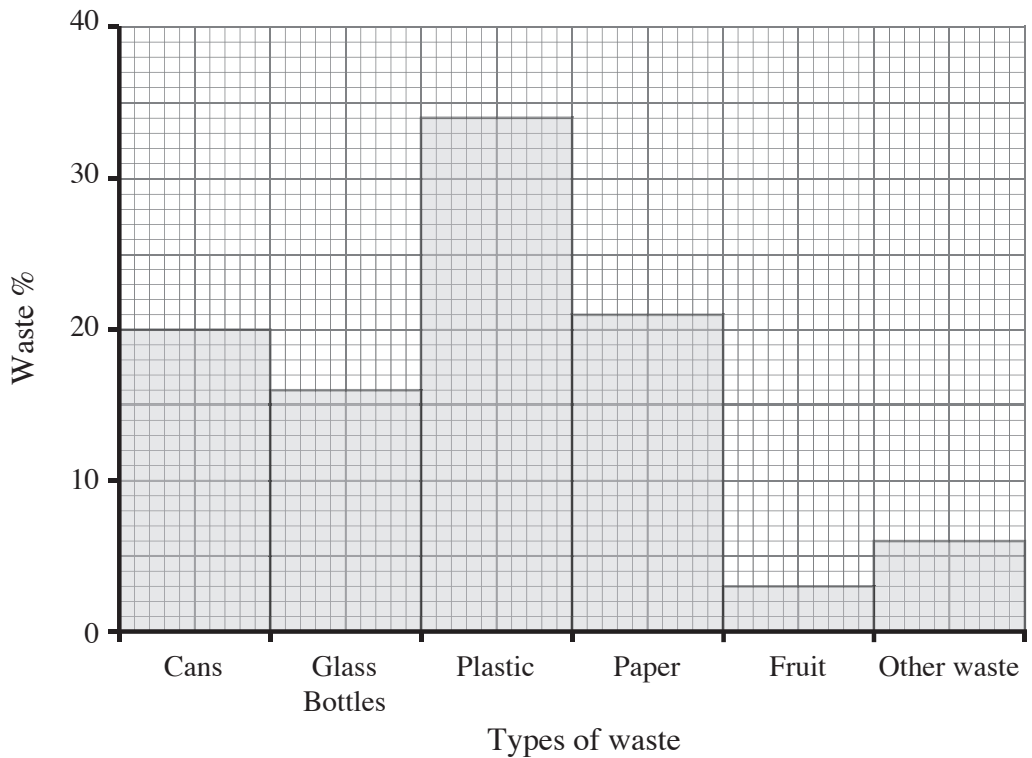
(c) Methane (CH₄) is one of the gases present in refinery gas.

(i) Name the **two** elements present in methane. You may find your Data Leaflet useful.
_____ and _____ [1]

(ii) Give **one** harmful environmental effect of burning methane gas.
_____ [1]

Examiner Only	
Marks	Remark

3 The bar chart below gives the percentage of different types of waste found in a town park.



(a) (i) What percentage of waste is glass bottles?

_____ % [1]

(ii) Suggest a material which you would expect to find included in 'other waste'.

_____ [1]

(b) Paper bags are an example of a biodegradable material.

(i) Explain fully the term **biodegradable**.

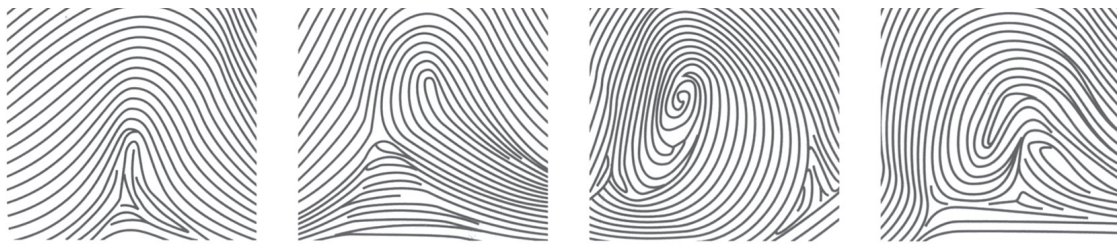
 _____ [2]

(ii) Give two environmental reasons why it is important that supermarkets use fewer plastic bags.

1. _____
 2. _____ [2]

Examiner Only	
Marks	Remark

4 Below are the four types of fingerprints.



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A

B

C

D

(a) From the fingerprints above (A, B, C or D) identify the:

(i) Loop _____

(ii) Whorl _____ [2]

(b) Describe how you could obtain your fingerprint on black glossy paper. Your description should include:

- how the fingerprint is put on the paper
- the powder used
- how to remove excess powder
- how to remove the fingerprint from the black surface.

_____ [4]

(c) Fingerprinting is used to help solve crime. Name another scientific technique used to help police solve crime.

_____ [1]

(d) It is important to protect valuables in the home. Give two ways that jewellery in the home can be protected from theft.

1. _____

2. _____ [2]

Examiner Only	
Marks	Remark

- 6 Many areas in Northern Ireland have hard water. Hardness is caused by certain salts of calcium and magnesium.



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- (a) (i) Explain fully what is meant by the term **hard water**.

_____ [2]

- (ii) Name a compound that forms permanent hard water.

_____ [1]

- (b) Four samples of water (A, B, C and D) were tested for hardness. The results are shown below.

Sample	A	B	C	D
Volume of soap solution required before boiling/cm ³	21	26	24	18
Volume of soap solution required after boiling/cm ³	11	12	24	13

From the results which sample (A, B, C or D) has:

- (i) the hardest water? _____
- (ii) permanent hard water only? _____
- (iii) the greatest problem with kettle 'fur'? _____ [3]

Examiner Only

Marks Remark

- (c) Temporary hardness in water is caused by calcium hydrogencarbonate. Complete the word equation to show how temporary hardness is removed by boiling.

Calcium hydrogencarbonate \rightarrow water + _____ + _____

[2]

Examiner Only	
Marks	Remark

THIS IS THE END OF THE QUESTION PAPER

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