Rewarding Learning

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]

GSC41

THURSDAY 25 FEBRUARY 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 is provided for use with this paper.

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
Total Marks	

Examiner Only	
Marks	Remark

1 **(a)** Electric kettles are often made of plastic.

Image of Kettle removed due to copyright issues.

Give three reasons why plastic is a suitable material for making kettles. Choose from:

flexible : strong : conductor : brittle

insulator : easy to mould

1. _____

2. _____

3. _____ [3]

(b) Give two reasons why the heating elements in kettles are made from stainless steel.

Images of heating elements removed due to copyright issues.

1. _____

2. _____ [2]

Examiner Only	
Marks	Remark

(c) Linen is a natural material made from flax while nylon is a man-made material made from oil. The picture below shows a linen tablecloth.

Image of linen tablecloth removed due to copyright issues.

(i) Linen is also used to make clothes. Name another natural material which could be used to make clothes.

_____[1]

(ii) Suggest two reasons why a traditional material like linen has been replaced with man-made materials like nylon.

1. _____

2. _____[2]

(d) Give **one** problem associated with many man-made plastics.

_____

_____[1]

Examiner Only	
Marks	Remark

2 **(a)** Flame tests were carried out on five metal chlorides and the colour of the flames were recorded in the table below. Complete the table.

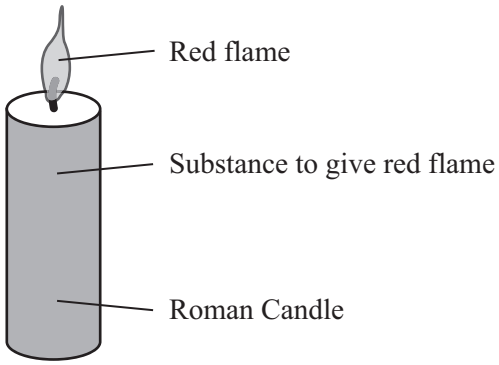
Choose from:

yellow : blue : lilac

Metal chloride	Flame colour
Potassium	
Calcium	Brick red
Sodium	
Lithium	Crimson
Lead	Blue-white

[2]

(b) A fireworks company wanted to make a Roman Candle firework to give a brick red flame.



From the table, name a metal chloride that would be suitable.

_____ [1]

(c) It is important that the flame test rod is clean. Name a liquid that is used in the cleaning process.

Circle the correct answer.

acid : water : alkali [1]

(d) The compound copper sulphate contains the elements, **copper**, **sulphur** and **oxygen** and produces a green flame in a flame test. Which of the elements in copper sulphate causes the flame to be green?

_____[1]

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

_____[1]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

3 This question is about hard and soft water.

(a) Choose words from the list to complete the sentences below.

salt : lather : magnesium chloride : soap

stalactites : stalagmites : calcium carbonate

Water is hard if it does not _____ with

_____ solution.

In hard water areas _____ form on the roof of caves.

Deposits of _____ are formed in kettles in hard water areas. [4]

(b) In the table below, tick the statements which show the **advantages** of hard water. One has been done for you.

Statement	**Place a tick**
Good for teeth and bones	✓
Tastes good	
Stains clothes	
Good for making beer	
Gives kettle fur	

[2]

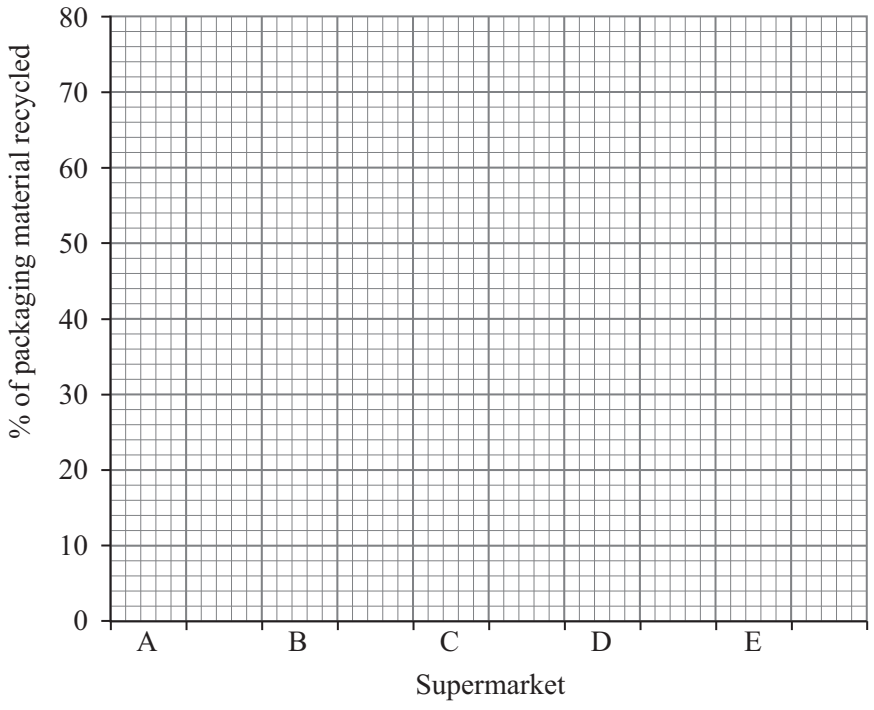
(c) Temporary hard water can be softened by boiling. Give **two** other suitable ways of softening temporary hard water.
Circle your answers.

filtering : distillation : chromatography : evaporating : ion exchange [2]

4 A group of students investigated the amount of packaging material which five supermarkets (A, B, C, D and E) recycle. The table below shows their results.

Supermarket	% of packaging material recycled
A	28
B	70
C	58
D	38
E	66

(a) On the grid below, draw a **bar chart** using the information in the table.



[2]

(b) Calculate the percentage difference between the supermarket which recycles most and the one which recycles least.
Show your calculation.

Percentage difference _____ % [2]

Examiner Only

Marks	Remark

(c) Name **one** packaging material that is commonly used in supermarkets.

_____[1]

(d) Give two reasons why supermarkets must improve the amount of packaging material they recycle.

1. _____

_____

2. _____

_____[2]

Examiner Only	
Marks	Remark

5 The diagram below shows two alcoholic drinks, each containing one unit of alcohol.

Half pint of beer
= 1 unit

Glass of wine
= 1 unit

(a) A person drinks **two** half pints of beer and **three** glasses of wine. Calculate the number of units of alcohol consumed and the increase in blood alcohol this produces if 1 unit of alcohol = 20 mg alcohol per 100 cm^3 of blood.

_____ units

_____ mg alcohol per 100 cm^3 of blood [2]

(b) A man has a blood alcohol level of 160 mg per 100 cm^3 of blood. Calculate his blood alcohol level after two hours if his body removes one unit of alcohol per hour.

(i) _____ mg alcohol per 100 cm^3 of blood. [1]

(ii) The legal limit to drive is 80 mg alcohol per 100 cm^3 of blood. Explain fully why it would still be dangerous for him to drive even after waiting two hours.

_____

_____

_____[2]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

6 **(a)** In an investigation to find how much energy is released, the same amount of four hydrocarbon fuels were burnt and the following results were obtained.

Hydrocarbon fuel	Formula	Energy released/kJ
Methane	CH_4	890
Ethane	C_2H_6	1560
Propane	C_3H_8	2220
Butane	C_4H_{10}	2880

(i) What was done in the investigation to make it a fair test?

_____[1]

(ii) Use the information to give one trend, shown by the results, when the fuels are burnt.

_____

_____[1]

(iii) Use the information in the table to suggest the value for the energy produced when pentane, C_5H_{12}, is burnt.
Circle your answer.

2900 kJ : 5100 kJ : 2400 kJ : 3510 kJ [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]

(iii) Complete the word equation to show what happens when ethane burns in excess oxygen.

ethane + oxygen → _____ + _____ [2]

(c) (i) Name the hydrocarbon molecule that is used to make polythene.

_____ [1]

(ii) Give **one** environmental problem caused by polythene.

_____

_____[1]

Examiner Only

Marks	Remark

THIS IS THE END OF THE QUESTION PAPER

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