



GCSE

4782/01

SCIENCE B

UNIT 2: Science and Life in the Modern World

FOUNDATION TIER

P.M. TUESDAY, 9 June 2015

1 hour plus your additional time allowance

Surname _____

Other Names _____

Centre Number _____

Candidate Number 0 _____

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	3	
2.	3	
3.	10	
4.	10	
5.	13	
6.	13	
7.	8	
Total	60	

ADDITIONAL MATERIALS

In addition to this paper you may require a calculator and ruler.

INSTRUCTIONS TO CANDIDATES

Use black ink, black ball-point pen or your usual method.

Write your name, centre number and candidate number in the spaces provided on the front cover.

Answer ALL questions.

Write your answers in the spaces provided in this booklet.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets at the end of each question or part-question.

You are reminded that assessment will take into account the quality of written communication used in your answer to question 7(ii).

A periodic table is printed as a separate insert.



A



B



C



D

Answer ALL questions.

- 1. The hazard symbols opposite are found in a medical physics laboratory.**

Use the correct letter to identify the hazard symbol found on containers of: [3]

(i) concentrated sulfuric acid

(ii) a radioactive source of iodine-131

(iii) concentrated potassium hydroxide

3

2. The pH scale is used to identify whether a solution is acidic or alkaline.

Colour	Red	Orange	Yellow	Green	Blue	Navy	Purple
pH Range	0-2	3-4	5-6	7-8	9-10	11-12	13-14

Use this information to complete the table below.

[3]

One row has been completed for you.

Substance	pH	Indicator Colour	Acid/Alkali/ Neutral
lemon juice	2	red	acid
vinegar	_____	orange	acid
water	7	green	_____
potassium hydroxide	14	_____	alkali

3(a) Use the periodic table on the separate insert to answer the following questions.

(i) Name the element with the symbol Br. [1]

(ii) Write the symbol for CHLORINE. [1]

(iii) State ONE industrial use of chlorine. [1]

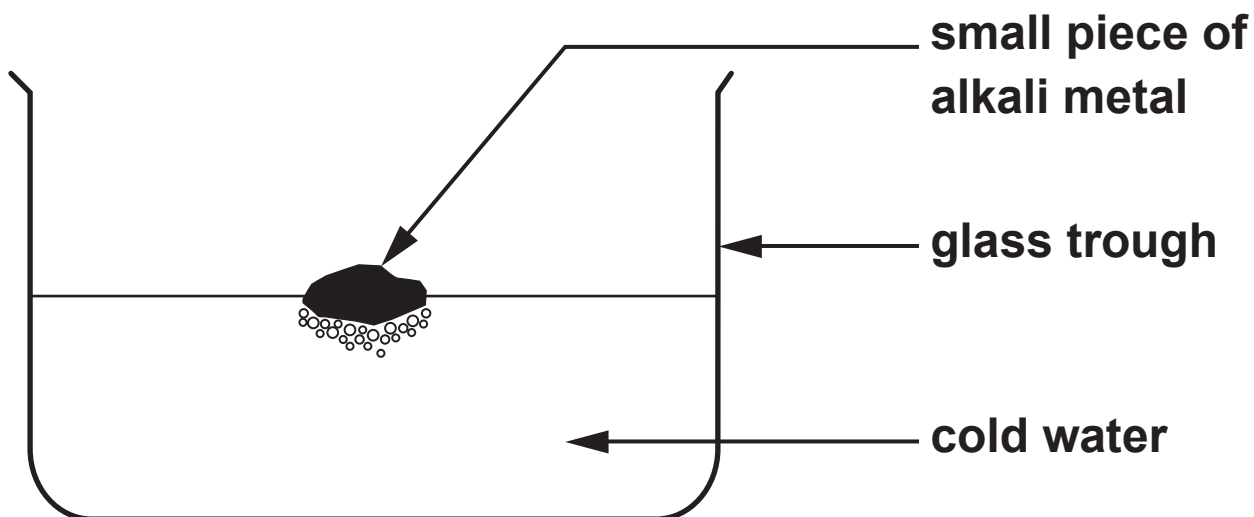
(iv) State the general name of elements found in group 7. [1]

3(b) A teacher is demonstrating the group 1 metals and how they react with water.

She places a few drops of universal indicator into the water. She then adds a small amount of lithium.

She then repeats the experiment for sodium and potassium.

REACTION OF ALKALI METALS WITH COLD WATER



STUDENT OBSERVATIONS

GROUP 1 METAL

- The metal floats
- It forms a silver ball and moves rapidly about the surface of water
- The metal reacts in 30 seconds
- The universal indicator turns purple

lithium

- The metal melts
- It burns with a violet flame
- All the metal reacts in 10 seconds
- The universal indicator turns purple

sodium

- The metal keeps its shape
- The metal floats
- It reacts slowly
- The universal indicator turns blue

potassium

3(b) (i) The students record their observations.

Draw straight lines to identify the metals from the student observations opposite. [2]

(ii) Write the order of reactivity for these metals using the student observations. [2]

Most reactive



Least reactive

(c) Complete the word equation for the reaction of potassium with water. [2]

potassium + water \longrightarrow _____ + _____

Element	Melting point (°C)	Boiling point (°C)	Density (g/cm³)
iodine	114	184	4.9
aluminium	660	2519	2.7
cobalt	1495	2870	8.9
sulfur	113	445	2.1
iron	1538	2862	7.9

4. The table opposite shows some properties of five elements.

(a) Use the information in the table to answer the questions.

(i) Give TWO reasons why cobalt is classified as a metal. [2]

1. _____

2. _____

(ii) Identify ONE non-metal from the table and give ONE reason for your choice. [2]

Non-metal _____

Reason _____

4(b) The table opposite shows some information about three alloys of iron.

- (i) Complete the table, using ONLY the words in the list below. [4]
You will not need to use all the words.**

mild steel

rust resistant

hard but brittle

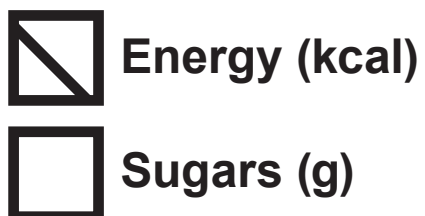
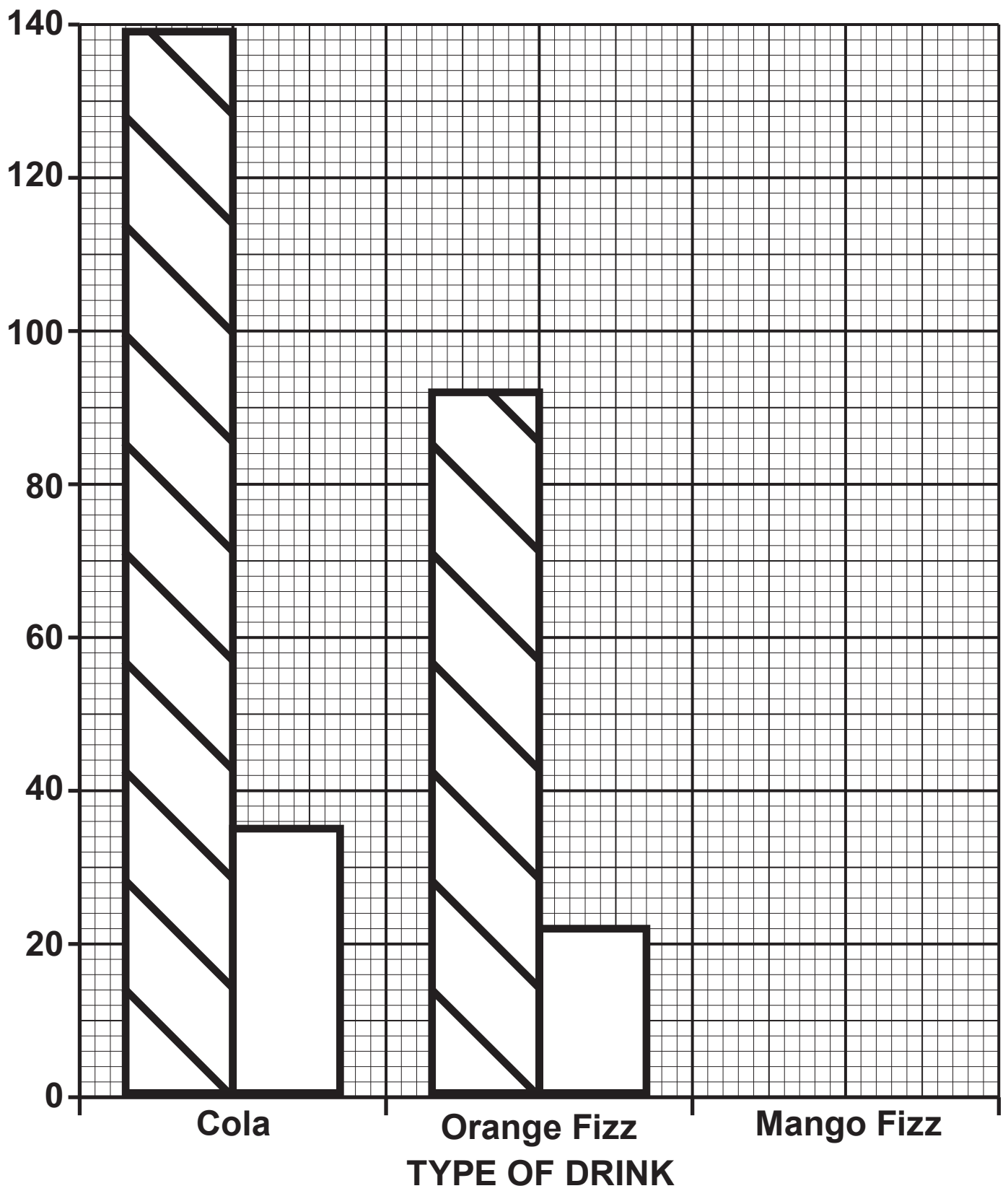
pig iron

high carbon steel

easily pressed into shape

**4(b) (ii) Calculate the percentage (%) of chromium in stainless steel. [1]
Space for workings.**

(iii) State ONE way of changing the composition of an alloy of iron to make it harder. [1]



5. The table below compares the energy and sugar content in one can of different soft drinks.

Name of soft drink	Energy (kcal)	Sugars (g)
Cola	139	35
Orange Fizz	92	22
Mango Fizz	136	33

- (a) (i) Complete the graph opposite by plotting the information for Mango Fizz. [2]
- (ii) Calculate the GDA for sugar given that Orange Fizz provides 25% of your GDA. [2]

_____ g

5(b) The table shows the energy used for different exercises.

(i) Complete the table below. [2]

Type of exercise	Energy used (kcal/min)	Length of exercise (minutes)	Total energy used (kcal)
Jogging	8.5	50	425
Cycling	5.5	60	_____
Swimming	5.3	_____	212

It is claimed that ‘a student needs to jog for 15 minutes to use up the energy in ONE can of cola’.

5(b) (ii) Use the information given to explain if this statement is correct. [3]

5(c) Researchers found that the risk of diabetes increased by 22% for people having one can of any of these soft drinks a day.

(i) Name the hormone that controls sugar levels in the body. [1]

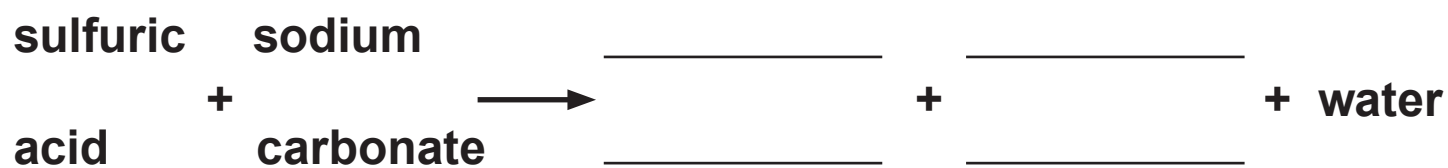
(ii) Explain why these soft drinks are not suitable for diabetics. [2]

5(d) Suggest ONE way of making these drinks healthier without affecting the taste. [1]

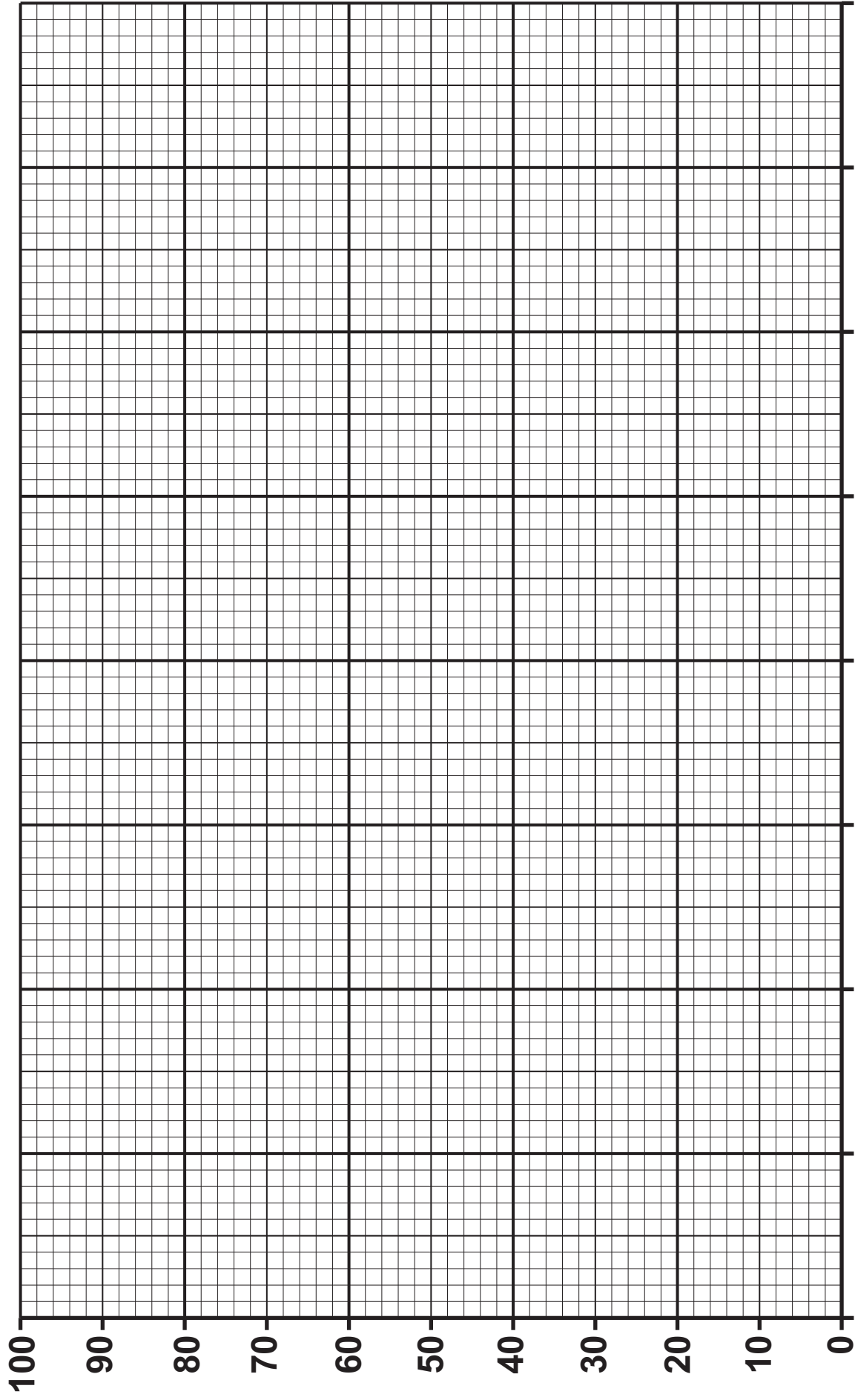
13

6. Dilute sulfuric acid reacts with sodium carbonate. This reaction forms a salt, a gas and water.

(a) Complete the word equation for this reaction. [2]



volume of gas collected (cm³)



time (s)

6(b) A student performed the reaction on page 17 and measured the volume of gas given off.

The student followed this method:

1. measured 25 cm³ dilute sulfuric acid;
2. added the acid to a conical flask;
3. added the sodium carbonate to the acid (in excess) and started a stop watch;
4. collected the gas;
5. measured the total volume of gas produced every 20 seconds.

The results are shown in the table below.

Time (s)	0	20	40	80	100	120	140	160
Volume of gas collected (cm ³)	0	22	38	62	70	77	80	80

- (i) Plot the graph on the paper opposite to show the volume of gas collected. [4]

6(b) (ii) Use your graph to estimate the volume of gas collected after 1 minute. [1]

(iii) Predict the volume of gas you would expect to be collected after 3 minutes. [2]

Volume after 3 minutes _____ cm³

Give ONE reason for your answer.

6(c) If the student repeated this experiment, they would need the same volume and concentration of acid.

State TWO OTHER variables the student would need to control to ensure a fair test. [2]

1. _____

2. _____

(d) Dilute sulfuric acid has a pH of 2. Explain what happens to the pH during this reaction. [2]

7. The radio-isotope iodine-131 is used in the treatment of thyroid cancer. The iodine-131 is mixed with water and given to the patient to drink. Iodine-131 has a half-life of 8 days.
- (i) Explain what is meant by the statement 'iodine-131 has a half-life of 8 days'. [2]

7(ii) Patients who have undergone this treatment are given the following advice:

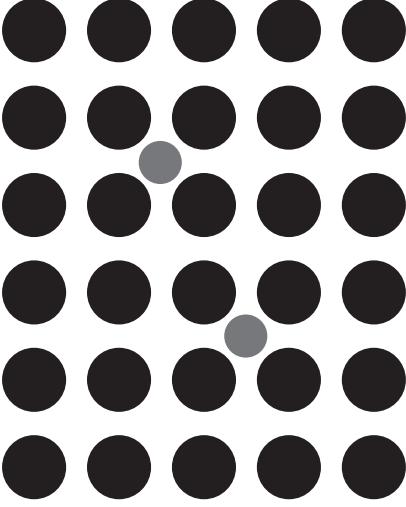
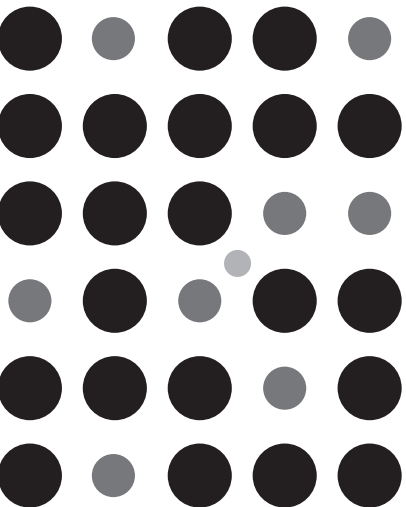
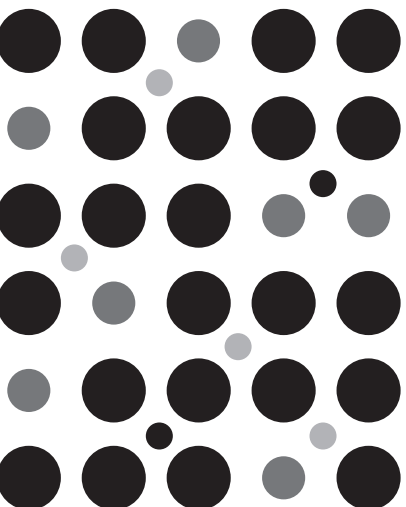
DO NOT:

- use public transport;
- share cups, glasses, utensils or towels;
- visit young children or pregnant mothers;
- spend more than 30 minutes with visitors;
- breast feed.

DO:

- travel alone;
- flush the toilet at least twice after use.

Explain why this advice should be strictly followed. [6 QWC]

Alloy of iron	Atomic arrangement	Composition	Properties
1. _____ _____ _____ _____		99.8% iron 0.2% carbon	_____ _____ _____ _____
2. _____ _____ _____ _____		98% iron 1.7% carbon 0.3% manganese	_____ _____ _____ _____
3. stainless steel _____ _____ _____ _____		74% iron 0.3% carbon _____ % chromium 7.7% nickel	_____ _____ _____ _____