

Surname	Centre Number	Candidate Number
Other Names		0



New GCSE

4782/01

SCIENCE B

**UNIT 2: SCIENCE AND LIFE IN THE MODERN WORLD
FOUNDATION TIER**

A.M. THURSDAY, 12 January 2012

1 hour

For Examiner's use only		
Question	Maximum mark	Mark Awarded
1.	4	
2.	5	
3.	3	
4.	8	
5.	6	
6.	10	
7.	8	
8.	6	
9.	10	
Total	60	

ADDITIONAL MATERIALS

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

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet.

If you run out of space, use the continuation pages at the back of the booklet, taking care to number the question(s) correctly.

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 **9(d)**.

Answer all questions.

1. Rebecca is an apprentice laboratory technician at a local factory. She is learning about elements.

(a) Complete the table below.

[3]

Element	Symbol	Metal/Non-metal
sodium	Na
carbon	non-metal
.....	Zn	metal

(b) The following table describes the properties of four elements.

Property	Element W	Element X	Element Y	Element Z
melting point	-7.3°C	1084°C	7.2°C	650°C
electrical conductor	No	Yes	No	Yes

Which **two** elements are metals?

[1]

Element and element

2. This question is about lifestyle and health.

(a) **Four** causes of diseases are:

- 1 Fatty foods
- 2 Smoking
- 3 Alcohol
- 4 X-rays

For each disease below, identify a possible cause from the list above by putting a **number** from above in each box. [3]

Disease

Cause



Bronchitis



Liver Disease



Obesity

(b) It is important to control the amount of salt in our diet. Select the correct health risk from the box below to complete the sentences which follow.

high blood pressure asthma muscle cramps blindness

(i) Too **much** salt in the diet can lead to [1]

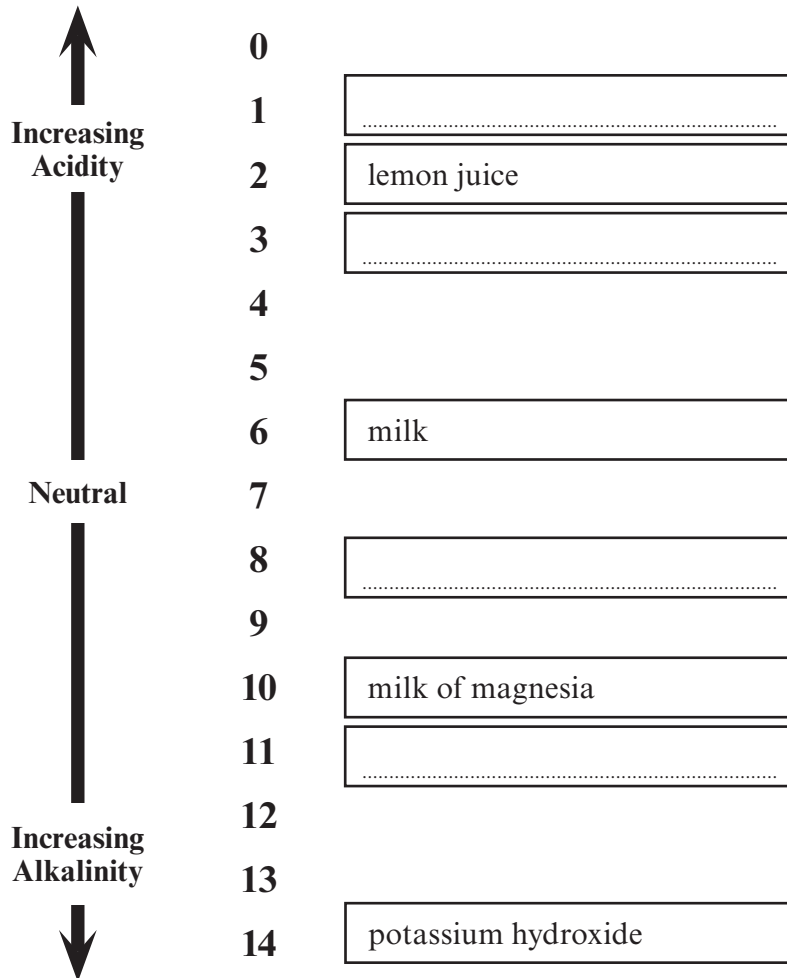
(ii) Too **little** salt in the diet can lead to [1]

5

3. Llinos works for an analytical laboratory. One test she carries out is to measure the pH of different samples.

On the pH scale below write in the boxes the positions of the following substances. [3]

hydrochloric acid ammonia baking soda vinegar (*a weak acid*)



3

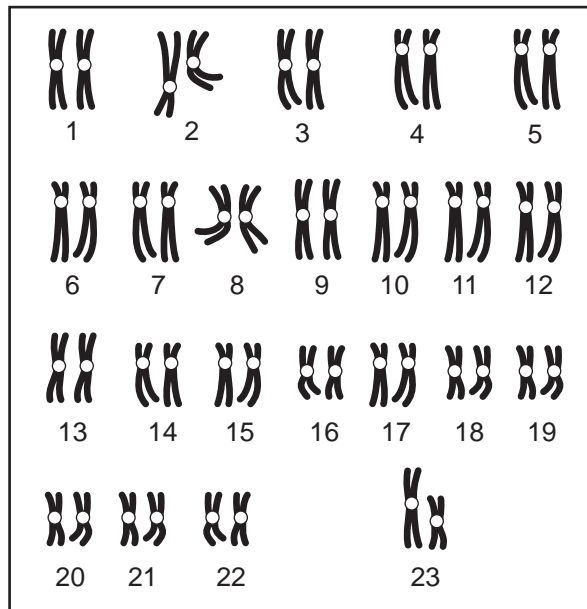
4. Medical technicians need a good understanding about how cells work. It is important when investigating the causes of many diseases.

(a) Choose words from the box below to complete the sentences that follow.

chromosomes genes organs nucleus tissue

Each body cell contains a which controls the cell's activities and characteristics. This contains pairs of which are made up of many sections of DNA called [3]

(b) The diagram below shows human chromosomes taken from a male skin cell.



(i) How many chromosomes are in the nucleus of a male skin cell? [1]

.....

(ii) Describe a difference between a skin cell and sperm cell. [2]

.....

(iii) State how the diagram of the chromosomes would be different for a female. [1]

.....

(c) In genetic diseases like cystic fibrosis we see changes in the genes of the chromosomes. State the term we use that describes these changes. [1]

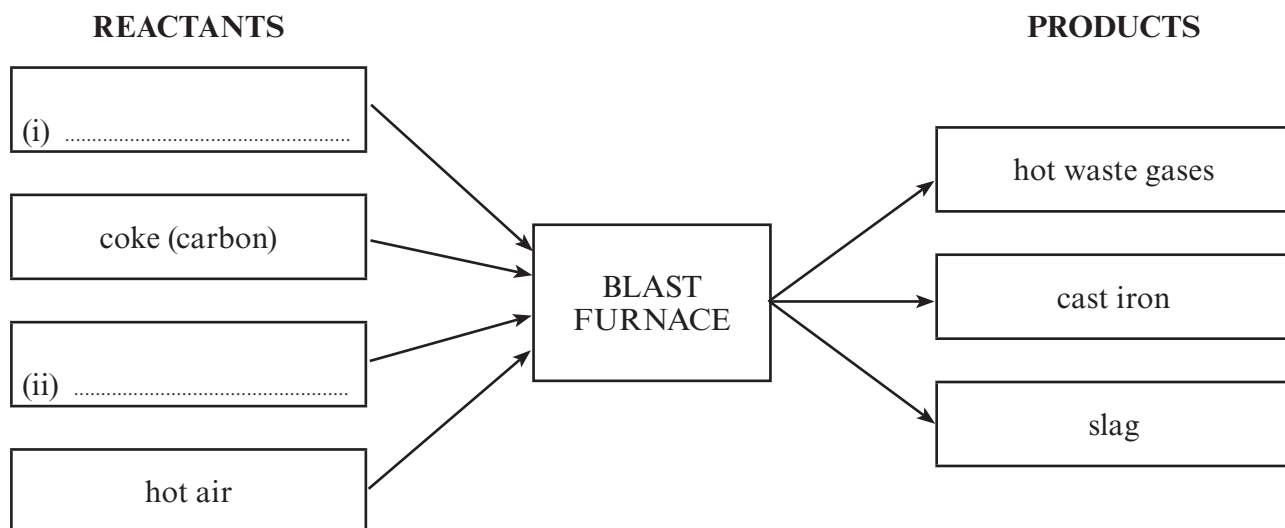
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5. Port Talbot in South Wales is home to one of the largest steel works in the UK. In this steel works iron is extracted in a blast furnace. The melting temperature of iron is 1535°C.

(a) A number of substances are added to the blast furnace to extract the iron from its ore. The diagram below shows what materials are fed into a blast furnace and the products of the reactions that occur in the furnace.

Add the missing reactants to the boxes below needed for the reaction. [2]



(b) (i) Carbon monoxide is formed by burning coke (carbon). Complete the **word** equation for this process. [1]

carbon + → carbon monoxide

(ii) The carbon monoxide then reacts with iron ore. The equation for the reaction is given below.



Name the compound that is reduced in this reaction. [1]

.....

(c) What should the **minimum** temperature of the blast furnace be? Give a reason for your answer. [2]

Minimum temperature °C

Reason for your answer.

.....

.....



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6. Neutralisation reactions occur when acids and alkalis react to form a salt and water. This question concerns the neutralisation of potassium hydroxide with hydrochloric acid.

(a) Complete the **word** equation for the neutralisation reaction below. [2]

hydrochloric acid + potassium hydroxide \longrightarrow +

(b) The following table shows the colours of universal indicator at different pH ranges.

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

The salt formed in this reaction is a **neutral** compound. What colour would universal indicator change to when added to a solution of the salt? [1]

.....

(c) Two methods have been suggested for making a salt by neutralising potassium hydroxide with hydrochloric acid.

<p>Method A</p> <p>Step 1 Pour 50 cm³ of dilute hydrochloric acid into a beaker.</p> <p>Step 2 Add dilute potassium hydroxide to the 100 cm³ mark of the beaker.</p>	<p>Method B</p> <p>Step 1 Pipette 25 cm³ of dilute potassium hydroxide into a conical flask.</p> <p>Step 2 Add a few drops of indicator.</p> <p>Step 3 Add dilute hydrochloric acid to the potassium hydroxide from a burette until the indicator changes colour.</p> <p>Step 4 Do the experiment again, without the indicator, adding the same volume of acid as in step 3.</p>
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(i) A student using **Method A** gets a solution which turns universal indicator paper yellow. Explain whether this method has given a **neutral** solution of the salt. [2]

.....

.....

.....

(ii) Why was an indicator used in **Method B**? [1]

.....

.....

(iii) Why was **Method B** done a second time without an indicator? [1]

.....
.....

(iv) **Name** a method that could be used to separate the salt from the water. [1]

.....

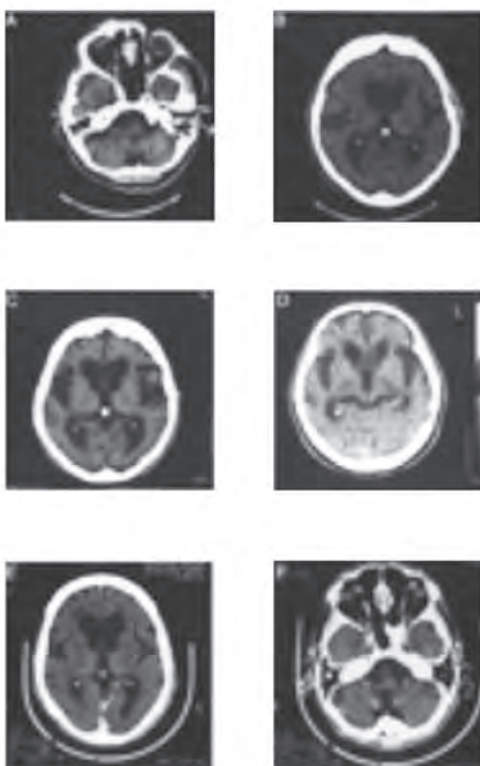
(d) The following hazard is printed on a bottle of hydrochloric acid.
Give **two** precautions to take when handling hydrochloric acid. [2]



.....
.....
.....

10

7. Huntington's is an inherited genetic disease caused by the dominant allele **D**. The CAT scan below shows images of the brain of a person suffering from Huntington's.



- (a) State **one** difference between an X-ray image and a CAT scan. [1]

.....

.....

- (b) X-rays and CAT scans use *ionising radiation*. State **one** of the risks associated with using such techniques. [1]

.....

(c) Daniel (**Dd**) is a 45 year old Huntington's sufferer. Angharad, Daniel's wife, is an **unaffected female**. Daniel and Angharad are thinking about having children.

(i) Complete the Punnet square below to show the possible genotypes of their children. [3]

.....
.....

(ii) What is the chance that one of their children will suffer from Huntington's? [1]

Chance = %

(iii) What advice would a genetic counsellor offer Daniel and Angharad in light of this information? [2]

.....

.....

.....

8. In a recent report by the National Obesity Forum high obesity rates were recorded in certain parts of the UK. The table below shows some of the 'best' and 'worst' areas of the country.

Best areas	Percentage registered with GP as obese (%)	Worst Areas	Percentage registered with GP as obese (%)
Camden (London)	3.9	Merthyr Tydfil (Wales)	10.6
Westminster (London)	4.8	Barnsley (North England)	10.8
Lambeth (London)	5.6	Rhondda (Wales)	11.1
Dagenham (Kent)	9.3	Shetland (Scotland)	15.5

- (a) All the 'best areas' are in the 'South of England'. Suggest why the 'South of England' may have less of an obesity problem than other parts of the UK. [2]

.....

- (b) There are approximately 22 000 people living in Shetland (Scotland).

- (i) Use the equation below to calculate the actual number of people living in Shetland who are registered with their GP's as obese. [2]

$$\text{Number of obese people} = \frac{\% \text{ of registered obese patients} \times \text{population of Shetland}}{100}$$

Total number of people in Shetland who are registered obese =

- (ii) State **one** assumption that has been made in your calculation of the number of obese people in Shetland. [1]

.....

- (iii) Suggest **one** method by which more accurate data for the number of obese people in the different regions could be obtained. [1]

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