Surname	Centre Number	Candidate Number
Other Names		0

GCSE

4782/01

SCIENCE B

UNIT 2: Science and Life in the Modern World
FOUNDATION TIER

A.M. TUESDAY, 14 January 2014

1 hour

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	**4**	
2.	**6**	
3.	**8**	
4.	**8**	
5.	**12**	
6.	**10**	
7.	**6**	
8.	**6**	
Total	**60**	

4782
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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 **8**.

A periodic table is printed on page 20.

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Examiner only

Answer **all** *questions.*

1. Complete the tables below.

Element	Symbol	Metal/non-metal
iron	Fe	metal
magnesium	Mg	.....
.....	S	non-metal

[2]

Compound	Formula
ammonia	NH_3
potassium hydroxide	.....
.....	NaCl

[2]

4

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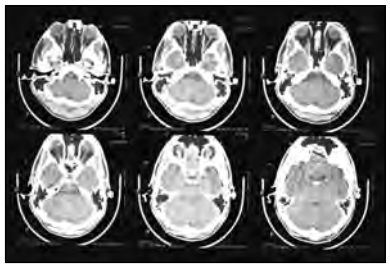
2. *(a)* Draw **one** line to match each image with the correct scanning device. *The first one has been done for you.* [2]

Image	Scanning device
	CAT Scan
	Gamma camera
	Ultrasound
	X-ray

Examiner only

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

.....

(ii) State **one** of the risks associated with using X-rays. [1]

.....

(iii) State **one** precaution a radiographer takes to reduce exposure to X-rays. [1]

.....

(iv) Identify the hazard symbol found in all X-ray rooms.
Tick (✓) the correct symbol below. [1]

☐

☐

☐

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3. Eating too many foods that contain animal fat can cause obesity and a build-up of cholesterol in the blood.

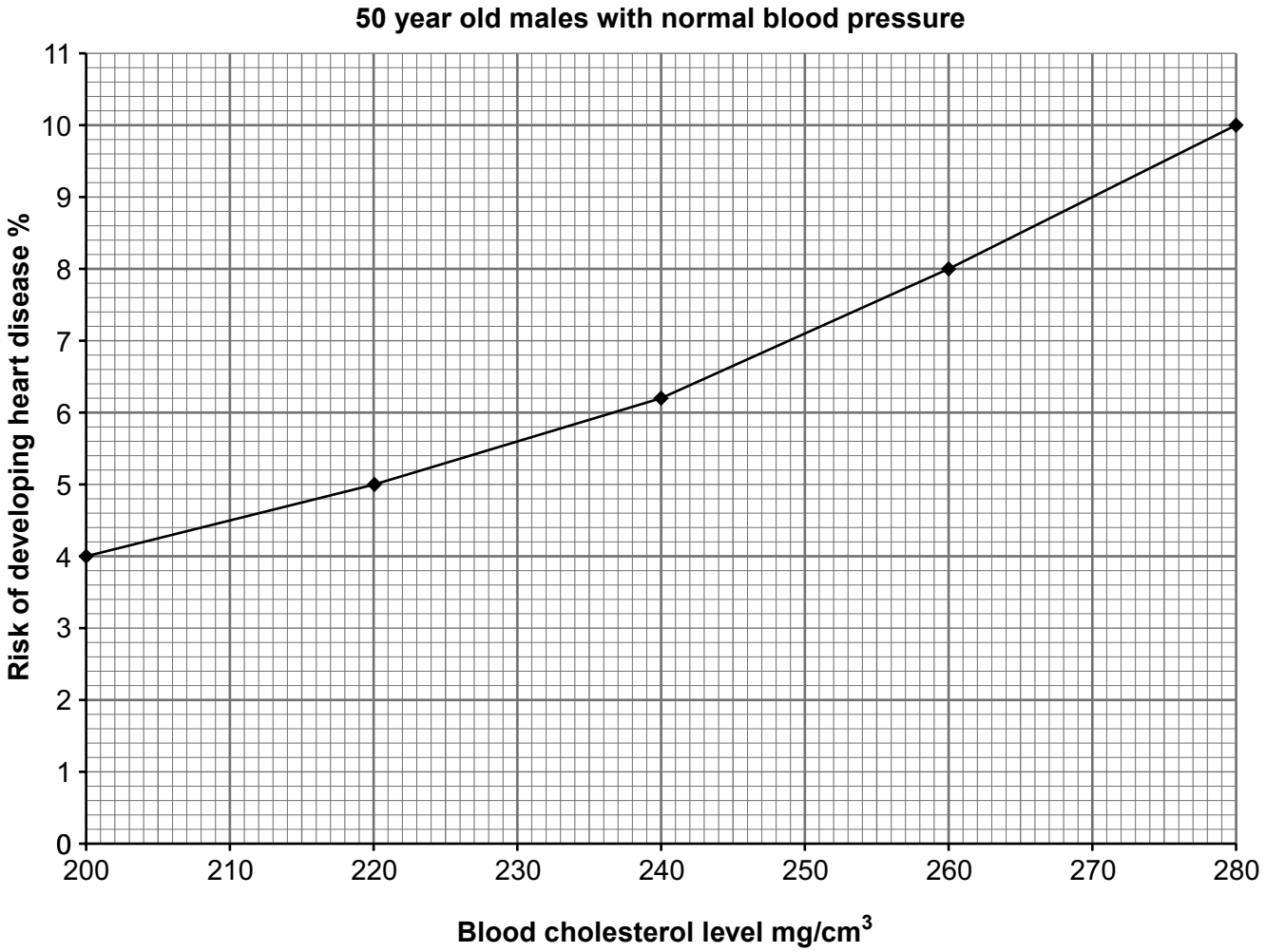
A recent study was carried out by a Welsh hospital where all volunteers were **50 year old males** with **normal blood pressure**. The study investigated the risk of developing heart disease and blood cholesterol levels.

(a) Name **two** factors that made this study a fair test. [2]

(i) .....

(ii) .....

(b) The graph below shows the results of the study.



Use the graph to answer the following questions.

(i) Estimate the risk of developing heart disease if the blood cholesterol level is 230 mg/cm^3. [1]

.....

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(ii) Describe the link between blood cholesterol levels and the risk of developing heart disease. [1]

.....

.....

.....

(c) A patient has a high blood cholesterol level. Complete the table below to describe the effect of changing foods in their diet on their blood cholesterol level. [2]

Food	Intake	Effect on blood cholesterol
white rice	eat more	no effect
steak	eat less	.....
high fibre cereal	.....	reduce
chips	eat less	reduce

(d) You can reduce your risk of developing heart disease by changing your diet. State **two** *other* ways of reducing the risk of developing heart disease. [2]

1. .....

2. .....

8

Turn over.

Examiner only

4. A student was studying the effect of pH on the growth of different crops.

(a) The steps below outline how the student would measure the pH of a soil sample. These steps are in the wrong order.

Place the steps in the correct order. *The first one has been done for you*. [3]

A Collect about 50 g of soil from the allotment.

B Using a clean filter paper and funnel, filter the mixture into a beaker.

C Shake the water and soil together.

D Add some universal indicator to the filtrate and record the colour change.

E Carefully add about 50 cm^3 of water to the soil.

A				

(b) Use your knowledge and the information in the pH table to help you answer the questions below.

Colour	red	orange	yellow	green	blue	navy	purple
pH Range	0-2	3-4	5-6	7-8	9-10	11-12	13-14

(i) The student tested soil from the school allotment and found it gave a yellow colour. What is the pH of the soil? [1]

.....

(ii) The student needs to change the pH of the soil in the school allotment to neutral. **Circle** a suitable substance from the list below that could be used to do this. [1]

acid	alkali	water	neutral salt

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(iii) The table below lists the vegetables the student wants to grow and their preferred soil pH's.
Complete the table below which shows the preferred soil pH for some different vegetables. [2]

Crop	pH of soil	Colour of soil after testing
potatoes	6	yellow
sugar beet	9	blue
turnips	5	.....
beans	.....	green

(iv) Name **one** crop that would grow well in the school allotment. [1]

.....

8

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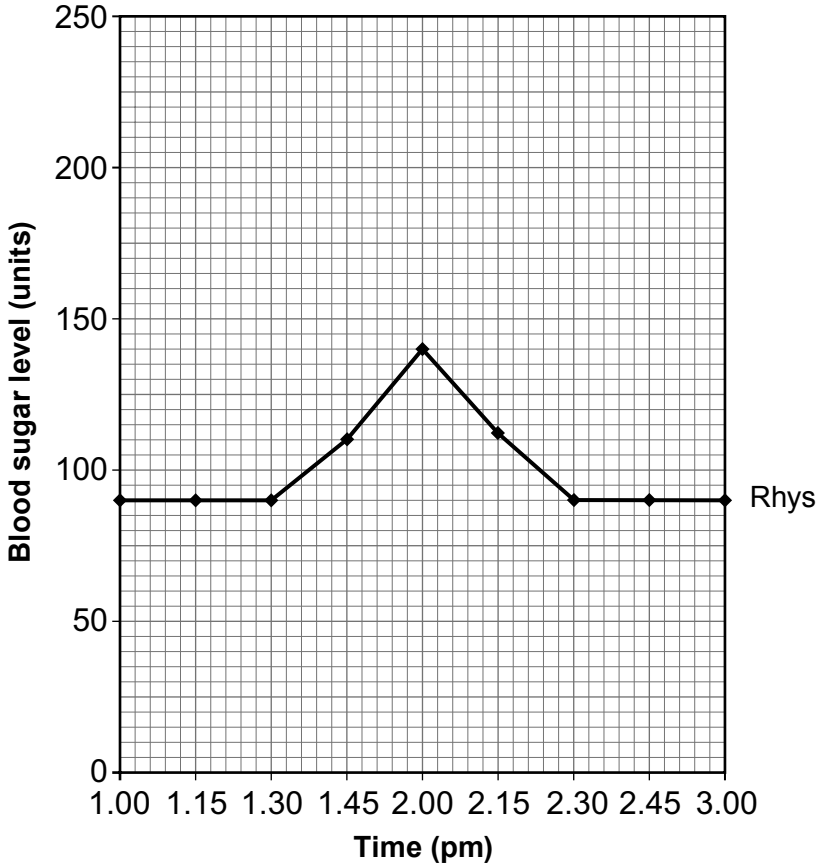
5. The table below shows the blood sugar levels of Rhys and Kevin over a two hour period.

Time (pm)		1.00	1.15	1.30	1.45	2.00	2.15	2.30	2.45	3.00
Blood sugar levels (units)	Rhys	90	90	90	110	140	112	90	90	90
	Kevin	90	90	90	130	170	190	200	210	210

(a) Rhys' blood sugar has been plotted. Plot the blood sugar levels for Kevin. Join the points with a ruler. [3]



(b) (i) At 1.30pm both Rhys and Kevin ate food that contained some carbohydrate. Describe how the blood sugar levels of Rhys and Kevin changed between 1.30pm and 3.00pm. [4]

Rhys

.....

.....

Kevin

.....

.....

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(ii) At what time did Rhys' blood sugar level return to normal? [1]

.....

(iii) What is Kevin's blood sugar level at the time when Rhys' blood sugar level returned to normal? [1]

.....

(c) The blood sugar level in the body is usually controlled by a hormone. Name the organ that produces this hormone. [1]

.....

(d) Kevin suffers from diabetes. State **two** ways in which diabetics control their blood sugar level. [2]

1. .....

2. .....

12

Turn over.

Examiner only

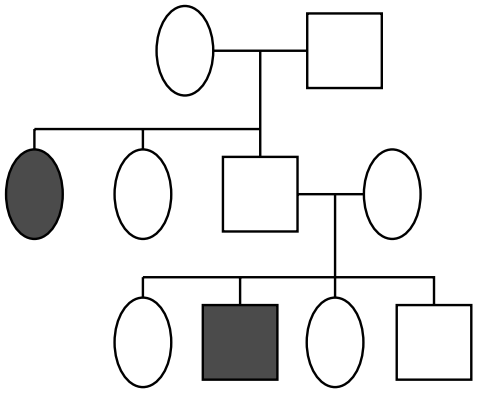
6. Cystic fibrosis is an inherited disease.

(a) Name the section of DNA that causes cystic fibrosis. [1]

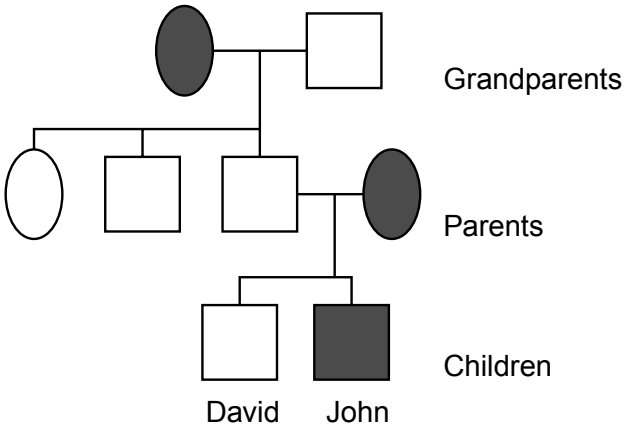
.....

(b) The family trees below show how cystic fibrosis has been inherited.

Lucy's family tree



David and John's family tree



Key

non-suffering female

non-suffering male

female suffering from cystic fibrosis

male suffering from cystic fibrosis

Use the letters:
N = normal allele
n = cystic fibrosis allele

(i) Use the information above to state the genotype of: [2]

John .....

David .....

(ii) Lucy is heterozygous. Write down Lucy's genotype. [1]

.....

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(c) (i) Complete the Punnett square below and use it to calculate the chance of **Lucy** and **David** having a child with cystic fibrosis. [3]

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

Chance = ... %

(ii) Construct a Punnett square and use it to calculate the chance of **Lucy** and **John** having a child with cystic fibrosis. [3]

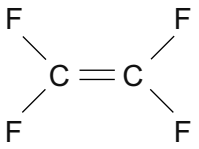
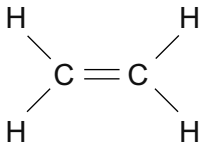
Chance = ... %

10

Turn over.

Examiner only

7. *(a)* Complete the following table. [2]

Monomer name	tetrafluoroethene	ethene	vinyl chloride
Polymer	PTFE	polyethene	PVC
Formula	.....	C_2H_4	C_2H_3Cl
Structural Formula			.....

(b) (i) **Name** the process by which polyethene is made. [1]

.....

(ii) What is the main **structural** difference between a molecule of ethene and a molecule of polyethene? [1]

.....

.....

(c) State **two** reasons why recycling of plastics, such as polyethene, is important for the environment. [2]

.....

.....

.....

6

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8. A student was given three different types of antacid tablets.

Design an experiment he would need to carry out to determine the most effective tablet in treating acid indigestion.

- Identify the key steps in the investigation.
- Describe how the results could be used to reach a conclusion.

(6 QWC)

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6

END OF PAPER

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Acknowledgements:

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Periodic Table of the Elements

element name
atomic number
symbol

	1	2											3	4	5	6	7	0
1									hydrogen 1 **H**									helium 2 **He**
2	lithium 3 **Li**	beryllium 4 **Be**											boron 5 **B**	carbon 6 **C**	nitrogen 7 **N**	oxygen 8 **O**	fluorine 9 **F**	neon 10 **Ne**
3	sodium 11 **Na**	magnesium 12 **Mg**											aluminium 13 **Al**	14 **Si**	phosphorus 15 **P**	16 **S**	chlorine 17 **Cl**	argon 18 **Ar**
4	potassium 19 K	calcium 20 **Ca**	scandium 21 **Sc**	titanium 22 **Ti**	vanadium 23 **V**	chromium 24 **Cr**	manganese 25 **Mn**	iron 26 **Fe**	cobolt 27 **Co**	nickel 28 **Ni**	copper 29 **Cu**	zinc 30 **Zn**	gallium 31 **Ga**	germanium 32 **Ge**	arsenic 33 **As**	34 **Se**	bromine 35 **Br**	krypton 36 **Kr**
5	rubidium 37 **Rb**	strontium 38 **Sr**	yttrium 39 **Y**	zirconium 40 **Zr**	niobium 41 **Nb**	molybdenum 42 **Mo**	technetium 43 **Tc**	ruthenium 44 **Ru**	rhodium 45 **Rh**	palladium 46 **Pd**	silver 47 **Ag**	Cadmium 48 **Cd**	Indium 49 **In**	tin 50 **Sn**	antimony 51 **Sb**	tellurium 52 **Te**	iodine 53 **I**	xenon 54 **Xe**
6	caesium 55 **Cs**	barium 56 **Ba**	lutetium 71 **Lu**	hafnium 72 **Hf**	tantalum 73 **Ta**	tungsten 74 **W**	rhenium 75 **Re**	osmium 76 **Os**	iridium 77 **Ir**	platinum 78 **Pt**	gold 79 **Au**	mercury 80 **Hg**	thallium 81 **Tl**	lead 82 **Pb**	bismuth 83 **Bi**	polonium 84 **Po**	astatine 85 **At**	radon 86 **Rn**
7	francium 87 **Fr**	radium 88 **Ra**																