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. MONDAY, 14 January 2013

1 hour

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

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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

A Periodic Table is printed on page 20.

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***(b)*.

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Answer **all** *questions.*

1. The table below shows the names of some of the **elements** of the Periodic Table, a copy of which is found on page 20.

Name	carbon	gold	iron	aluminium	copper	sodium
Symbol	C	Au	.....	.....	Cu	Na

(a) (i) Complete the table above by writing the symbols for iron and aluminium. [2]

(ii) Name **one** metal that is not found as an ore. ..... [1]

(b) Use the Periodic Table on page 20 to help answer the following questions.

(i) Give the symbol or name of an element in the Periodic Table that is in the same **group** as potassium, K. [1]

.....

(ii) Give the symbol or name of an element in the Periodic Table that is in the same **period** as lithium, Li. [1]

.....

(c) What is the name given to the elements in **group 7**? ..... [1]

6

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2. Peter is studying food labels on snack foods.

(a) (i) Name **one** health risk associated with obesity. [1]

.....

(ii) Salt is often added to processed snack foods. Describe **one harmful** effect of eating too much salt. [1]

.....

.....

(b) Peter is obese and wants to lose weight. Use the information in the table to answer the following questions.

	Snack foods (per 100 g)		
	Cheesy snacks	Space snacks	Fruity bars
Energy (kJ)	1650	1750	1200
Salt (g)	3.0	0.8	0.2
Fibre (g)	4.0	3.1	16.0

Which snack in the table would be the best choice for him to eat? Give **one** reason for your choice. [2]

Snack .....

Reason .....

(c) Peter eats two fruity bars that contain 1 200 kJ of energy in each bar. Later in the day he goes cycling. Cycling uses 800 kJ of energy per hour.

(i) Calculate the energy in two bars. [1]

Energy = ... kJ

(ii) For how **long must he cycle** to use the energy in **both** bars? [1]

Answer .....

6

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3. The table below shows the colours of universal indicator at different pH ranges.

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

(a) Hydrochloric acid has a pH of 1.
State the **colour** of universal indicator in hydrochloric acid. [1]

.....

(b) The equation below shows the reaction between potassium hydroxide solution and hydrochloric acid.

$HCl + KOH \longrightarrow KCl + H_2O$

Name the **salt** formed in this reaction [1]

.....

(c) In an experiment, sulfuric acid reacted with sodium hydroxide forming a neutral solution of a salt and water.

(i) State the colour that would be seen if universal indicator is added to the solution [1]

.....

(ii) Complete the word equation below for this reaction.

sulfuric acid + sodium hydroxide ⟶ ..... + ... [2]

(iii) What is the term used to describe this type of reaction? [1]

.....

6

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4. Iron is extracted from its ore in a blast furnace. Steel production has been a traditional manufacturing industry in South Wales.

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(a) The table below shows information about the raw materials used in a blast furnace. Complete the table using the terms in the box. [2]

aluminium oxide	compound	iron oxide	element	bauxite

Raw material	Chemical name	Type of material
haematite	.....	compound
coke	carbon	element
limestone	calcium carbonate	.....

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(b) The table below describes the properties of different metal alloys.

Alloy	Composition	Properties
mild steel	99.8% iron 0.2% carbon	Easily pressed into shape
high carbon steel	98.0% iron 1.7% carbon 0.3% manganese	Hard but brittle
manganese steel	85.0% iron 1.2% carbon ..... % manganese	Very hard
stainless steel	74.0% iron 0.3% carbon 18.0% chromium 7.7% nickel	Rust resistant

Use the information in the table to answer the questions that follow.

(i) **Complete** the table by calculating the percentage (%) manganese in manganese steel. [1]

(ii) State **one** way of changing the composition to make a harder alloy of steel. [1]

.....

.....

(iii) Which **two** metals have been added to make stainless steel rust resistant? [2]

.....

.....

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(iv) Which alloy would be most suitable for making kitchen sinks? Give **one** reason. [2]

Alloy used for kitchen sinks .....

Reason .....

.....

(v) Which alloy would be most suitable for making car doors? Give **one** reason. [2]

Alloy used for car doors .....

Reason .....

.....

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Turn over.

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5. Polyvinyl chloride (PVC) is an example of a plastic.

(a) Name **two** *other* plastics. [2]

.....

The list below states some of the properties of PVC.

1 Strong

2 Light

3 Weather resistant

4 Non-toxic

5 Does not conduct electricity

6 Good thermal insulator.

(b) The following items are made out of PVC. For each item, identify the property **2**, **3**, **4**, **5** or **6** that makes it suitable for this use. Each number can only be used once.
One has been completed for you. [3]

Use		**Property**
	Toy blocks	**1**
	Blood storage bags	.....
	Window frames	.....
	Covering electrical cables	.....

5

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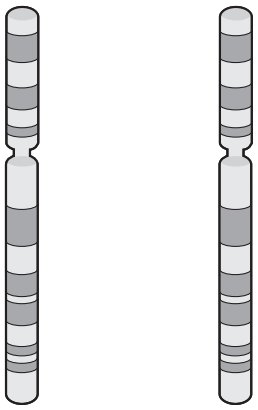
6. David and Ffion are both heterozygous for the cystic fibrosis allele.

It has been found that chromosome 7 contains the cystic fibrosis gene. The pair of chromosome 7 is shown below.



chromosome 7

(a) (i) Using **N** for a healthy allele, state the genotype of a person who is heterozygous for the cystic fibrosis allele. [1]

.....

(ii) David and Ffion are married. Complete the Punnett Square below to show which alleles David and Ffion's children may inherit. [3]

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

(iii) What is the chance of their child being born with cystic fibrosis? [1]

Answer ..... %

(b) When a patient suffers from cystic fibrosis, the code of their DNA has changed. What term describes this change? [1]

.....

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(c) Cystic fibrosis patients are monitored with X-rays.

(i) Which part of their bodies would be routinely X-rayed? [1]

.....

(ii) Explain why patients should have a limited number of X-rays in one year. [2]

.....

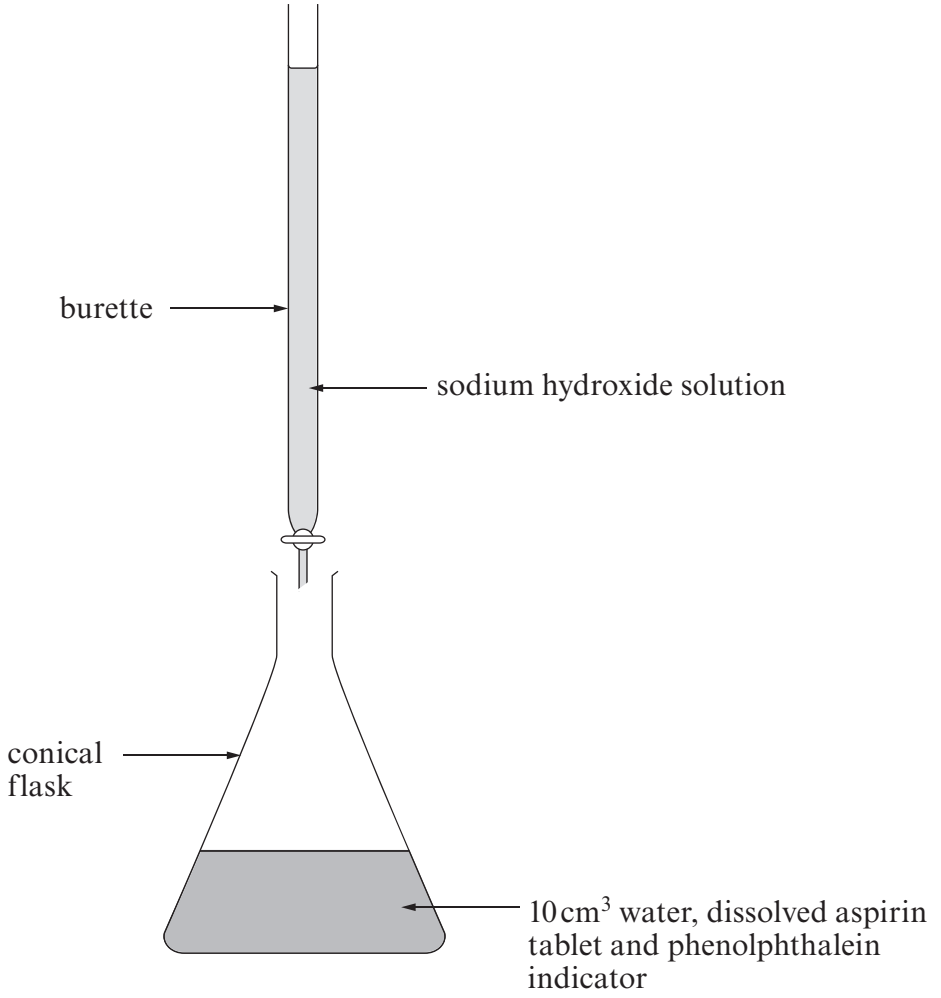
.....

.....

9

Turn over.

7. Heulwen performed an experiment to find the strength of different aspirin tablets. The active ingredient in aspirin is an acid. By adding just enough alkali it is possible to determine the strength of a particular tablet.



- A flask containing aspirin and the indicator phenolphthalein was prepared.
- Heulwen added sodium hydroxide from a burette.
- She stopped her experiment when the indicator changed colour.
- Her results are shown below.

Aspirin tablet	Mass of tablet (g)	Volume of water added to dissolve the aspirin (cm^3)	Volume of sodium hydroxide used (cm^3)	Cost per packet containing 10 tablets (p)
A	0.50	10	16.0	40
B	0.75	10	15.0	40
C	0.25	10	5.0	50
D	0.50	10	2.5	50

Examiner only

(a) Use the information in the table on the opposite page to answer the following questions.

(i) State which aspirin tablet is the strongest giving **one** reason for your choice. [2]

Strongest tablet .....

Reason for choice. .....

.....

(ii) Calculate the cost **per gram** for tablet **D**. [2]

Answer ..... p/g

(b) How could Heulwen improve her confidence in her results? [1]

.....

(c) (i) Aspirin is often used to treat patients suffering from cardiovascular disease. Explain how aspirin helps these patients. [2]

.....

.....

(ii) State **two** possible side effects from taking aspirin tablets. [2]

.....

.....

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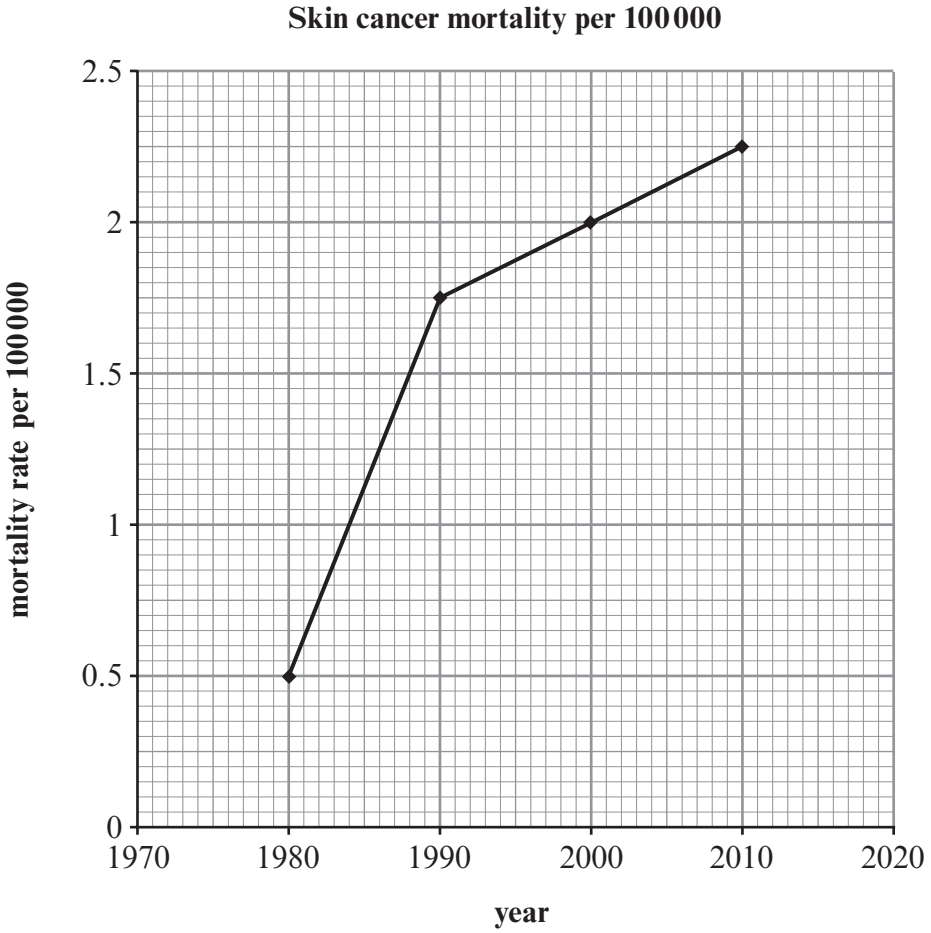
8. The information below from Cancer Research UK shows how the mortality rate for skin cancer has changed over the last 30 years.
The mortality rate measures the number of deaths caused by a particular disease per 100 000 people per year.

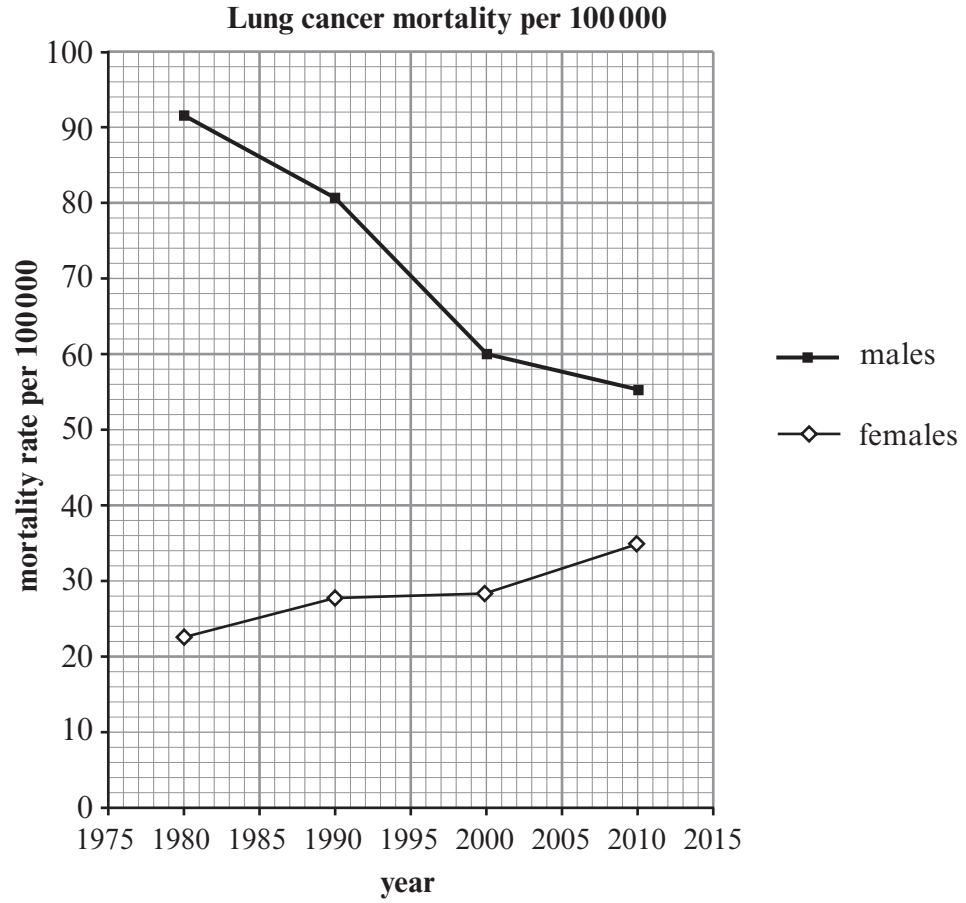


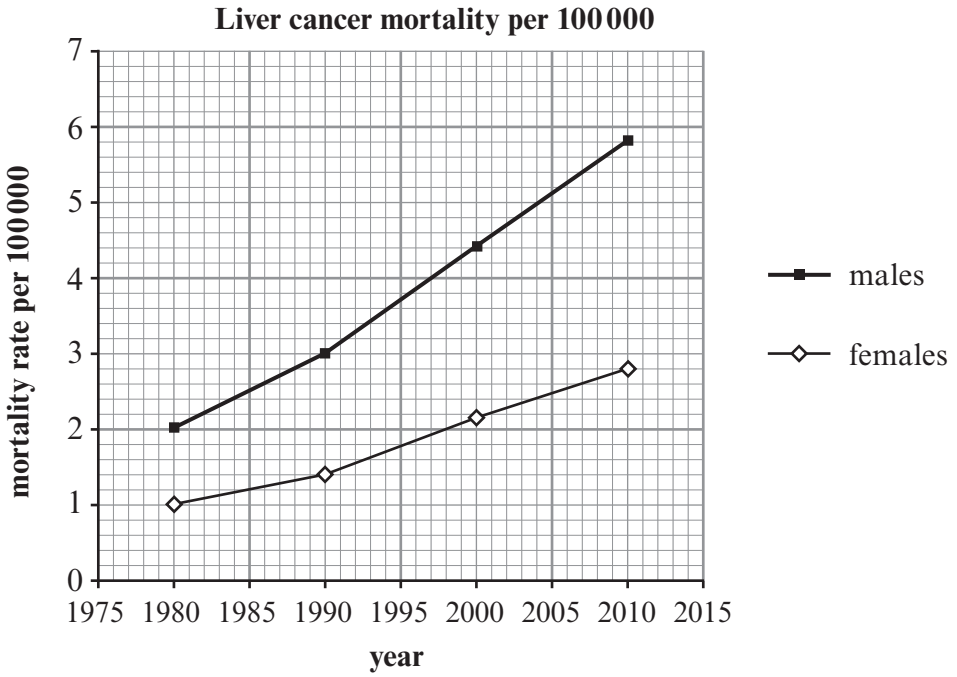
(a) Use the graph to calculate the percentage change in the mortality rate for skin cancer from 1980 to 2010. [3]

Percentage change: .....

Examiner only

(b) Use the information in the graphs below to describe the changes in mortality rates for lung and liver cancer explaining why these changes have occurred. [6]
[*QWC*]





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END OF PAPER

Turn over.

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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**	9 **F**	neon 10 **Ne**
3	sodium 11 **Na**	magnesium 12 **Mg**											13 **Al**	silicon 14 **Si**	phosphorus 15 **P**	sulfur 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**	26 **Fe**	cobalt 27 **Co**	nickel 28 **Ni**	copper 29 **Cu**	zinc 30 **Zn**	gallium 31 **Ga**	germanium 32 **Ge**	arsenic 33 **As**	selenium 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**	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**																