

**GENERAL CERTIFICATE OF SECONDARY EDUCATION  
TWENTY FIRST CENTURY SCIENCE  
SCIENCE A**

Unit 2 Modules B2 C2 P2  
FOUNDATION TIER  
**MONDAY 18 JUNE 2007**

**F A212/01**

Morning

Time: 40 minutes

Calculators may be used.  
Additional materials: Pencil  
Ruler (cm/mm)



\* C U P / T 4 3 3 3 6 \*

Candidate  
Name

Centre  
Number

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Candidate  
Number

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**INSTRUCTIONS TO CANDIDATES**

- Write your name, Centre Number and Candidate Number in the boxes above.
- Answer **all** the questions.
- Use blue or black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure you know what you have to do before starting your answer.
- Do **not** write in the bar code.
- Do **not** write outside the box bordering each page.
- WRITE YOUR ANSWER TO EACH QUESTION IN THE SPACE PROVIDED. ANSWERS WRITTEN ELSEWHERE WILL NOT BE MARKED.

**INFORMATION FOR CANDIDATES**

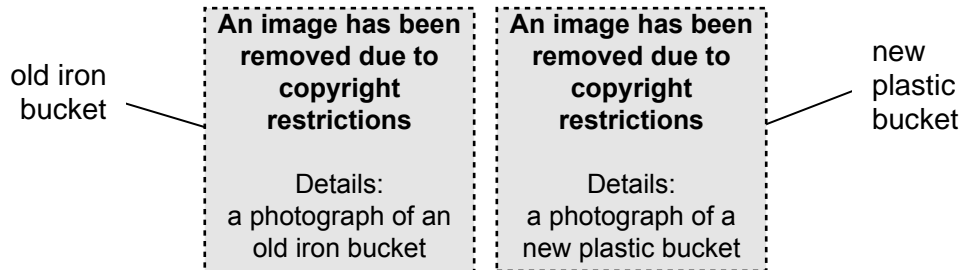
- The number of marks for each question is given in brackets [ ] at the end of each question or part question.

FOR EXAMINER'S USE		
Qu.	Max.	Mark
1	6	
2	4	
3	4	
4	2	
5	7	
6	5	
7	5	
8	5	
9	4	
<b>TOTAL</b>	<b>42</b>	

This document consists of **16** printed pages.

Answer **all** the questions.

- 1 Over the last 50 years, plastics have replaced many other materials in the home. Buckets used to be made out of iron. They are now made out of plastic.



- (a) Finish the sentences by putting a **ring** around the correct word in the list.

- (i) Buckets are now made out of plastic because plastic is

**heavier**

**lighter**

**stiffer**

- (ii) Iron buckets are not as good as plastic buckets because iron buckets

**melt**

**rust**

**shine**

[1]

[1]

- (b) When scientists make a new product, they consider the **full effect** of the product on the **environment**. This is called **Life Cycle Assessment**.

Which **two** of the following would scientists consider when making the **Life Cycle Assessment** of a new plastic?

Put ticks (✓) in the **two** correct boxes.

the energy used in making the plastic

the strength of the plastic

the weight of the plastic

the disposal of the plastic after it is used

[2]

- (c) Scientists want to conserve natural resources and protect the environment. This is called **sustainable development**.

Which of the following would make our use of plastics more sustainable?

Put ticks (✓) in the boxes next to the **two** best statements.

make plastic fibres from plants

use plastic film to keep food fresh

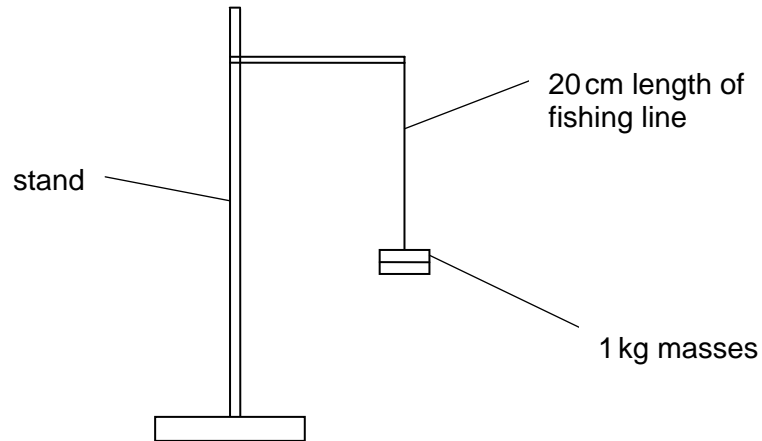
only use plastics that can be easily recycled

use landfill sites for household waste

[2]

[Total: 6]

- 2 A company makes fishing lines. The fishing lines are tested to find out how strong they are. Masses are added to the lines until they break. Six samples from each line are tested.



- (a) Which of the statements **A**, **B**, **C** or **D** is the **best** reason for repeating the test six times?

<b>A</b>	to make sure it is a fair test
<b>B</b>	six is the right number of times to test anything
<b>C</b>	to make sure that the results are reliable
<b>D</b>	fish have different masses

answer ..... [1]

(b) The results for one fishing line are shown below.

mass needed to break line (kg)
12
5
12
11
9
11

The second result, 5kg, is an outlier.

Here are **four** suggestions why this outlier happened.

<b>A</b>	The line could have been thinner than usual.
<b>B</b>	The line could have been thicker than usual.
<b>C</b>	Too few masses had been put onto the line.
<b>D</b>	There was a mistake in counting the number of masses.

Write down the letters of the **two** best suggestions.

1 .....

2 .....

[2]

(c) Take out the outlier and calculate the mean value of the other five readings.

Put a **ring** around the correct answer.

**9 kg**

**10 kg**

**11 kg**

**12 kg**

[1]

[Total: 4]

- 3 This question is about the fibres used to make clothes.

Mark has a new shirt. He reads the label.  
The shirt is made from:

67%	cotton
30%	polyester
3%	elastane



- (a) Which of these fibres is made from living things?

..... [1]

- (b) The synthetic fibres in Mark's shirt are made from the chemicals in crude oil. Here are five sentences about using crude oil to make fibres. They are in the wrong order.

<b>A</b>	Crude oil is distilled to separate molecules by size.
<b>B</b>	Crude oil is taken from the ground by drilling.
<b>C</b>	The polymer is made into fibres.
<b>D</b>	Crude oil is taken to an oil refinery.
<b>E</b>	Small molecules are polymerised.

Fill in the boxes to show the right order. The first one has been done for you.

<b>B</b>				
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[3]

[Total: 4]

- 4 Emma has a new microwave oven.



Microwaves are part of a larger family of waves called the electromagnetic spectrum.

The diagram below shows the order of waves in the electromagnetic spectrum. Some waves have been left out.

radio waves	microwaves		visible light	ultraviolet		gamma rays
-------------	------------	--	---------------	-------------	--	------------

- (a) From the waves given in the diagram, choose **one** which has photons of higher energy than microwaves.

answer ..... [1]

- (b) Name **one** of the missing waves from the diagram above.

answer ..... [1]

[Total: 2]

- 5 Read the following extract based on an article by the U.S.A. Environmental Protection Agency.

Although sunbathing is enjoyable, too much can be dangerous. This can cause immediate effects like sunburn and longer-term problems like skin cancer.

Too much sunbathing also causes wrinkling and aging of the skin.

**Advice**

- Apply sunscreen liberally and reapply every two hours when working, playing, or exercising outdoors.
- Children under six months of age should never have sunscreen applied to their skin, but should be protected by avoiding too much time outdoors.

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Details:  
a clipart-style illustration  
of a man lying in a  
hammock

- (a) Which **two** methods of protecting people from the Sun's rays are described in the above article?

Put ticks (✓) in the boxes next to the **two** best answers.

wear a hat

stay out of the sun

put sunscreen on regularly

wear sunglasses

cover up skin with loose fitting clothing

[2]

- (b) Which type of radiation is responsible for causing sunburn and skin cancer?

Put a tick (✓) in the box next to the correct answer.

microwaves

ultraviolet

gamma rays

radio waves

[1]



(c) Which part of the Earth's atmosphere absorbs the radiation that causes skin cancer?

..... [1]

(d) Sun beds give off the type of radiation that causes skin cancer.

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Details:  
a clipart-style illustration of a sun bed

Below are some opinions about using sun beds.

**Sara**  
I know I shouldn't really use them, but I'm going on holiday soon and I don't want to be the only one on the beach without a tan.

**Tony**  
I look good with a tan. That makes me feel more confident.

**Aran**  
In this country it's so gloomy all the time. Sun beds make it so much easier to get a tan.

**Julie**  
Looking good is not worth the possibility of getting skin cancer.

(i) Which **two** people are not aware that using a sun bed has a risk associated with it?

answer ..... and ..... [2]

(ii) Which person believes that the benefit of using sun beds outweighs the risk?

answer ..... [1]

[Total: 7]  
[Turn over

6 A group of pupils are discussing their views on global warming.

**Andrew**  
The amount of carbon dioxide in the atmosphere has decreased in the past 200 years.

**Gemma**  
There will be more flooding in the future.

**Kate**  
The climate is changing as a result of global warming.

**Tom**  
Burning down forests increases the amount of carbon dioxide in the atmosphere.

**Mike**  
How can there be global warming? My dad told me that 1976 was the hottest summer he remembers.

(a) Which **one** person has **definitely** got their facts wrong?

answer ..... [1]

(b) Which **two** people are talking about possible consequences of global warming?

answer ..... and ..... [2]

(c) Which **one** person has identified a **correlation**?

answer ..... [1]

(d) Why should **Mike** get more evidence before making up his mind?

Put a tick (✓) in the box next to the **best** answer.

His dad is wrong.

There may have been hotter summers before his dad was born.

You cannot make accurate assumptions based on a single case.

Some scientists say that global warming is definitely happening.

[1]

[Total: 5]

- 7 Many diseases are caused by bacteria. If bacteria get into the body then they can reproduce rapidly.



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- (a) Put a ring around each of the **three** factors that allow bacteria to reproduce rapidly inside bodies.

food

moisture

no predators

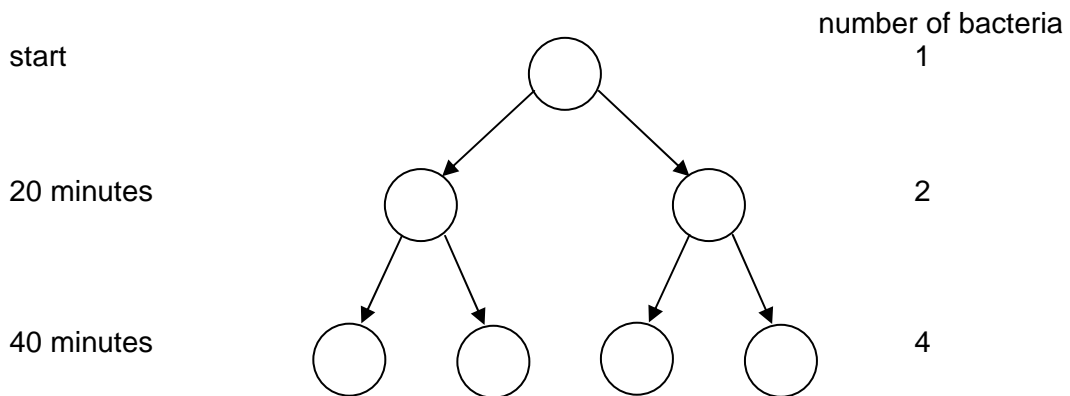
other bacteria

shelter

warmth

[3]

- (b) The number of bacteria can double every 20 minutes. This is illustrated in the diagram below.



- (i) How many bacteria would there be after one hour?

answer ..... [1]

- (ii) How many bacteria would there be after two hours?

answer ..... [1]

[Total: 5]  
[Turn over

8 This is a question about heart disease.

- (a) Tom is having a health check.  
He has to answer many questions.

Which questions are about **lifestyle factors**?

Put ticks (✓) in the **two** correct boxes.

Are your parents still alive?

Do you smoke?

Do you exercise regularly?

Are you on any medication?

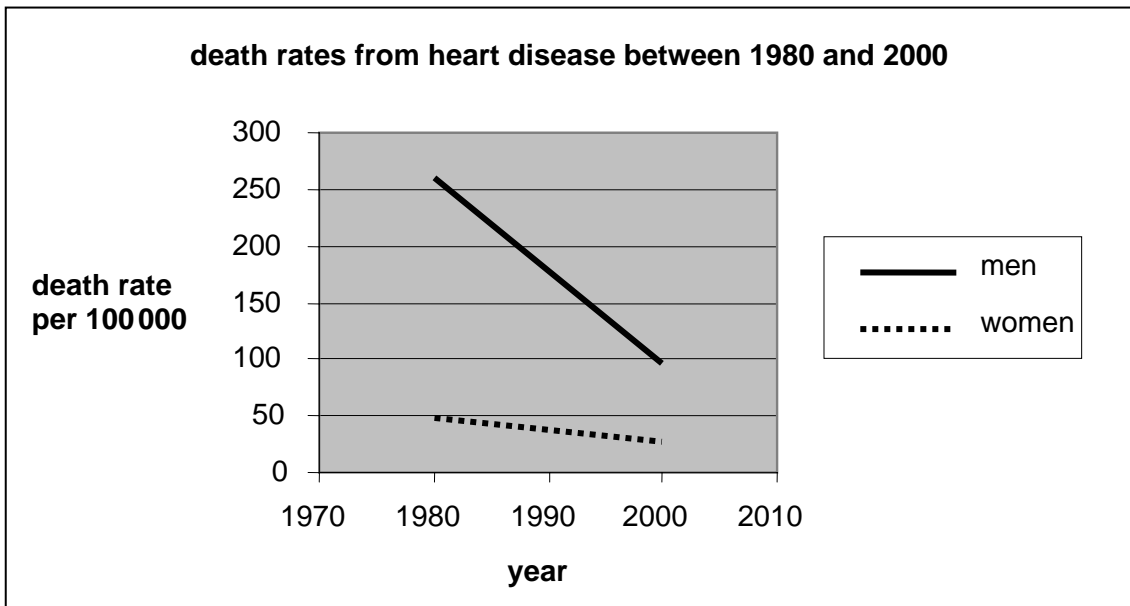
Have you ever been admitted to hospital?

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Details:  
a clipart-style illustration  
of a man visiting his  
doctor

[2]

(b) The graph below shows death rates due to heart disease between 1980 and 2000.



Read the suggestions about why there has been **a fall in the death rates of men** between 1980 and 2000.

Put a tick (✓) in the box next to **each** suggestion which could explain why the death rate has fallen.

There is more genetic testing.

Fewer men are smoking.

Better drugs are used after heart attacks.

The average body mass of men has increased.

[2]

- (c) In non-industrialised countries, the death rates from heart disease are lower than they are in the United Kingdom.

Here are four statements about people who live in non-industrialised countries.

Put a tick (✓) in the box next to the **best** reason for their lower death rate from heart disease.

They mainly live outdoors.

They earn less money.

They have less fat in their diet.

They do not have as many medicines.

[1]

[Total: 5]

- 9 This is a question about vaccination.  
Vaccines can protect us against many diseases we have not had.



- (a) Finish the sentences to explain how vaccination works. Choose words from this list.

**antibodies**  
**immune system**  
**microorganisms**  
**symptoms**

Vaccines contain safe forms of .....

Vaccinations trigger the body's .....

White blood cells produce .....

[2]

- (b) Read this newspaper article.

**Vaccine for cervical cancer**  
Cervical cancer kills more than 1500 women a year in the UK.  
Doctors are conducting a trial of a new vaccine to prevent cervical cancer.

Vaccines must be properly trialled before they can be used by doctors.

Put ticks (✓) in the boxes next to the **two** statements below which **best** explain why.

- |   |                          |
|---|--------------------------|
| Vaccines are expensive to produce.                      | <input type="checkbox"/> |
| Doctors need to work out the best dose.                 | <input type="checkbox"/> |
| Vaccines may have serious side effects.                 | <input type="checkbox"/> |
| New vaccines may be used to treat other diseases.       | <input type="checkbox"/> |
| New vaccines may be no better than existing treatments. | <input type="checkbox"/> |

[2]

[Total: 4]

**END OF QUESTION PAPER**

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