

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

**A212/01**

Unit 2 Modules B2 C2 P2 (Foundation Tier)

**THURSDAY 5 JUNE 2008**

Morning  
 Time: 40 minutes

Candidates answer on the question paper.

**Additional materials (enclosed):**  
 None

Calculators may be used.

**Additional materials:** Pencil  
 Ruler (cm/mm)



\* G U P / T 4 3 9 9 0 \*

Candidate Forename

Candidate Surname

Centre Number

Candidate Number

**INSTRUCTIONS TO CANDIDATES**

- Write your name in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use blue or black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Answer **all** the questions.
- Do **not** write in the bar codes.
- Write your answer to each question in the space provided.

**INFORMATION FOR CANDIDATES**

- The number of marks for each question is given in brackets [ ] at the end of each question or part question.
- The total number of marks for this paper is 42.

**FOR EXAMINER'S USE**

Qu.	Max	Mark
1	6	
2	8	
3	2	
4	6	
5	6	
6	3	
7	6	
8	5	
<b>TOTAL</b>	<b>42</b>	

This document consists of **12** printed pages.

Answer **all** the questions.

- 1 This question is about the materials used to make sails for boats.



- (a) (i) Which **one** material is made from a living thing?

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

**cotton**

**nylon**

**PVC**

[1]

- (ii) Materials made from living things are better for the environment than man-made materials.

What is the reason for this?

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

They can be used for many things.

They can be melted and used again.

They are made from renewable resources.

They are stronger.

[1]

(b) The following table shows properties of some of the materials used to make sails.

material	resistance to stretch	strength	water absorption
cotton	medium	medium	high
kevlar	very good	strong	low
nylon	poor	very strong	low
PVC	good	strong	low

Use the table to answer the following questions.

(i) Resistance to stretch is an important property of sails.

Which material would you choose if you were **only** looking at this property?

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

**cotton**

**kevlar**

**nylon**

**PVC**

[1]

(ii) The amount of water absorbed (water absorption) is also an important property of sails.

Here are three statements about this property.

Write **T** in the box next to each **true** statement and **F** in the box next to each **false** one.

**T** (true)

or

**F** (false)

Nylon sails absorb the most water.

A sail that absorbs water will be heavier.

Sails that are strong absorb less water.

[2]

(iii) Nylon is not the best material to use for sails.

Which property in the table shows this?

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

resistance to stretch

strength

water absorption

[1]

[Total: 6]

- 2 (a) Some students investigate how PVC stretches. They each describe what they will do in the investigation.

**Andy**  
If we find an outlier we will have to do the test again.

**Peter**  
We will do the same test six times and find the mean.

**Kate**  
We must make sure that the samples of PVC are all the same length, thickness and width.

**Clare**  
We will add weights to the samples and measure their length.

**Jane**  
We must stretch the samples using the same force and measure their length.

- (i) Which student has said how to find the best estimate of the true value for PVC?

answer ..... [1]

- (ii) Which **two** students plan to control factors in this investigation?

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

- (b) The students carry out the investigation on six samples of PVC. They hang a 500g mass on each sample and measure how much it has stretched. Their results are shown in the table.

sample number	1	2	3	4	5	6
stretch in cm	2.1	2.5	3.5	1.8	2.2	1.9

- (i) One of these results is an outlier.

Put a **ring** around the sample number that is an outlier.

1                      2                      3                      4                      5                      6

[1]

(ii) The students use the other five results to calculate the mean value.

What is the mean of the other five results?

Put a **ring** around the number **closest** to the mean value.

1.8

2.1

2.3

2.4

2.8

[1]

(iii) Why are the results not all the same?

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

The samples may vary.

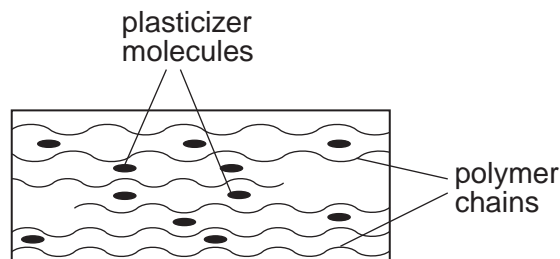
It was a fair test.

You cannot rely on data.

There may be errors reading the lengths.

[2]

(c) The PVC they use has a plasticizer in it.



How does this plasticizer change the properties of the PVC?

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

**The PVC becomes ...**

... darker in colour.

... more flexible.

... warmer.

... liquefied.

[1]

[Total: 8]

- 3 White blood cells are part of our immune system.

What do white blood cells do?

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

They digest starch.

They make antibodies.

They carry oxygen.

They digest microorganisms.

[2]

[Total: 2]

- 4 Rubella is a disease caused by a virus.  
Most babies are vaccinated to prevent them getting rubella.

(a) Which of these statements describes what a vaccine contains?

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

a chemical that stops the virus from multiplying

a safe form of the virus

a medicine that kills the virus

[1]

(b) Some parents choose not to vaccinate their children.  
Read the following opinions about vaccination and use them to answer the questions.

**Saleema**  
A small number of children have severe side effects due to vaccination.

**Jasmine**  
If all children were vaccinated we could get rid of these childhood diseases.

**Jo**  
Parents who don't vaccinate their children are putting other children at risk.

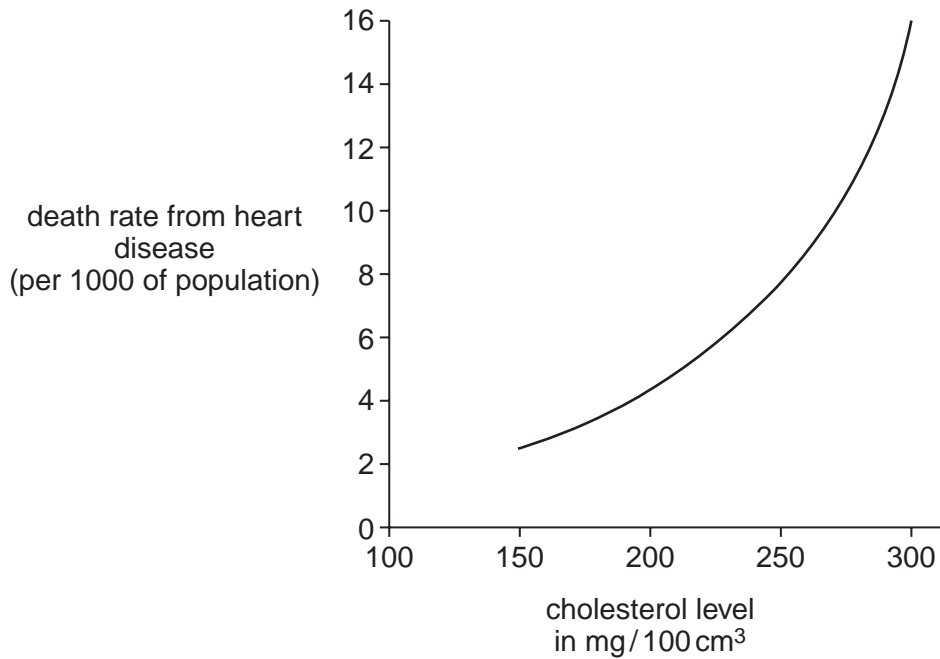
**Mary**  
A parent should have the right to choose whether to vaccinate their child.

**Sam**  
Research clearly shows that vaccination works.

- (i) Which **two** parents say that vaccination is a good thing for society as a whole?  
..... and ..... [2]
- (ii) Which **two** parents are considering risk when deciding about vaccination for their children?  
..... and ..... [2]
- (iii) Which parent is using evidence in their argument?  
..... [1]

[Total: 6]

- 5 Robert has a medical check-up for his job. The doctor tells him that his cholesterol level is high. He shows him this graph.



- (a) Finish the sentences. Choose words from this list. Each word may be used once, more than once or not at all.

**decreases                      increases                      negative                      positive                      stays the same**

As blood cholesterol increases, the risk of death from heart disease

.....

The correlation between cholesterol level and risk of death is

.....

[2]

- (b) The doctor gives Robert advice on how to reduce his risk of heart disease. It covers these areas of lifestyle.

Sort the areas of lifestyle into those that will increase the risk and those that will decrease the risk of heart disease.

Put a tick (✓) in the correct box for each lifestyle area.

<b>lifestyle area</b>	<b>increase the risk</b>	<b>decrease the risk</b>
poor diet		
stress		
drinking too much alcohol		
regular exercise		
smoking		
taking drugs to reduce cholesterol		

[4]

[Total: 6]



6 This is a question about radiation.

After a hard day at work, Mike watches TV at home.

Mike uses a remote control to change channel on his TV.

He is eating a ready meal which he cooked in a plastic container.



Which type of radiation is most often used for each of the following jobs?

Draw a straight line from each **job** to the correct **type of radiation used**.

job	type of radiation used
sending the signal from the TV station to the TV aerial	light
cooking food quickly without melting the plastic container	infrared
sending a signal from the remote control to the TV	microwaves
Mike watching his TV	radio waves

[3]

[Total: 3]

## 7 Read this article about wireless networks.

### Health risks could lead schools to remove wireless networks

Some parents want their schools to remove wireless computer networks. They fear that their children's health might be damaged.

Many parents think that microwave radiation given off by transmitters could be harmful. It may cause loss of concentration, headaches and possibly cancer. Some scientists think that children are at risk because of their thinner skulls.

The scientific evidence is not conclusive.

The Health Protection Agency says there is no real evidence of damage to health. However, they say the approach should be precautionary.

(a) The headline of the above article refers to 'health risks'.

Which of these health risks are identified in the article?

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

headaches

thinner skulls

loss of concentration

damage to the ears

[2]

(b) Having read this article, why might a school still use a wireless network?

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

There is definitely no risk to anyone involved.

Students can benefit from using a wireless network in school.

Parents might complain about the risk to their children.

Schools have insurance to cover themselves against risk.

[1]

- (c) The article suggests that microwave radiation from a wireless transmitter could cause cancer.

Read the following statements.

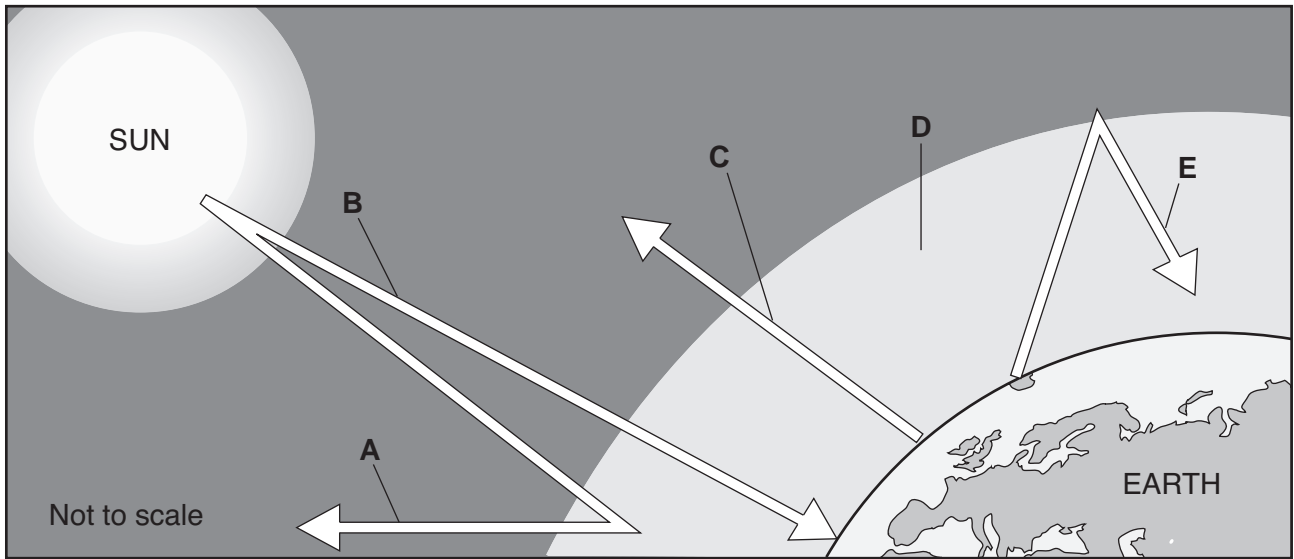
Write **T** in the box next to each **true** statement and **F** in the box next to each **false** one.

	<b>T</b> (true) or <b>F</b> (false)
Microwave photons have more energy than photons of visible light.	<input type="checkbox"/>
Microwave photons are ionising radiation.	<input type="checkbox"/>
Ionising radiation can cause cancer.	<input type="checkbox"/>
Microwave radiation is used by mobile phones.	<input type="checkbox"/>

[3]

[Total: 6]

8 Here is a diagram that shows what happens when light radiated from the Sun arrives at the Earth.



(a) Match the following descriptions to the labels in the diagram. Write the correct letter, **A, B, C, D** or **E**, in each box.

- |   |                          |     |
|---|--------------------------|-----|
| light radiated from the Sun   | <input type="checkbox"/> |     |
| radiation reflected from the Earth's atmosphere that does not reach the Earth's surface | <input type="checkbox"/> |     |
| the Earth's atmosphere  | <input type="checkbox"/> |     |
| radiation reflected from the Earth's atmosphere that warms the Earth                    | <input type="checkbox"/> | [4] |

(b) Which gas present in the Earth's atmosphere is a greenhouse gas? Put a tick (✓) in the box next to the best answer.

- |                |                          |  |
|----------------|--------------------------|--|
| nitrogen       | <input type="checkbox"/> |  |
| carbon dioxide | <input type="checkbox"/> |  |
| oxygen         | <input type="checkbox"/> |  |
| argon          | <input type="checkbox"/> |  |

[1]  
[Total: 5]

**END OF QUESTION PAPER**

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