

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

**A211/01**

Unit 1 Modules B1 C1 P1 (Foundation Tier)

**MONDAY 23 JUNE 2008**

Morning  
 Time: 40 minutes

Candidates answer on the question paper.

**Additional materials (enclosed):** None

Calculators may be used.

**Additional materials (required):**

Pencil

Ruler (cm/mm)



\* G U P / T 6 1 3 0 4 \*

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**.

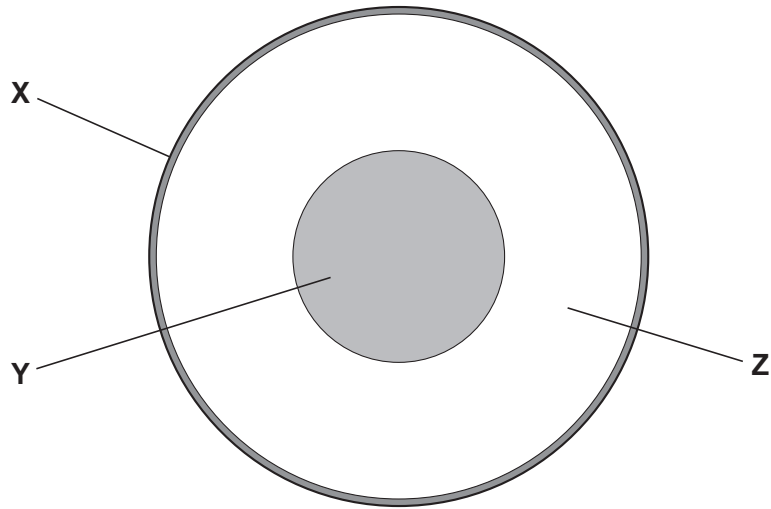
**FOR EXAMINER'S USE**

Qu.	Max.	Mark
1	6	
2	9	
3	10	
4	4	
5	4	
6	9	
<b>TOTAL</b>	<b>42</b>	

This document consists of **18** printed pages and **2** blank pages.

Answer **all** the questions.

1 (a) The diagram shows a section through the Earth.



(i) Draw a straight line to join each part of the Earth, **X**, **Y** and **Z**, to its correct **name**.

**X**

core

**Y**

crust

**Z**

mantle

[2]

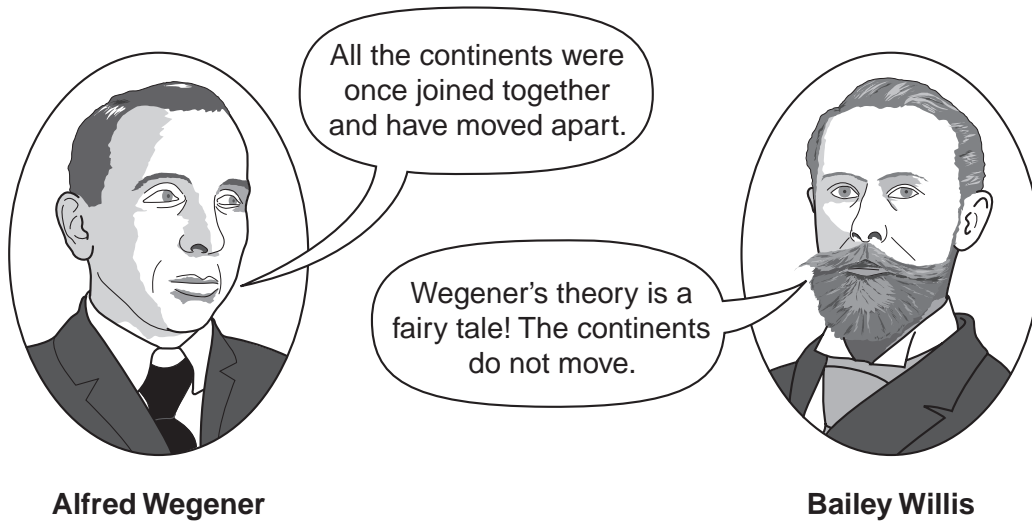
(ii) Write the correct letter, **X**, **Y** or **Z**, in the correct space in the sentence below.

The spreading of the seafloor and the movement of continents

is caused by movement in the .....

[1]

- (b) In 1915, Alfred Wegener suggested his theory of continental drift. The American geologist Bailey Willis did not agree with him.



Here are some statements.

Each statement either supports Wegener or supports Willis.

Put a tick (✓) in the **one** correct box after each statement.

	<b>supports Wegener</b>	<b>supports Willis</b>
There are similar fossils in America and Africa.		
The shapes of the continents look as if they fit together.		
The accepted geological theories in 1915 stated that continents cannot move.		
The rock layers have a similar pattern on each side of the Atlantic Ocean.		

[3]

[Total: 6]

- 2 (a) A new Earth satellite called Gaia has been planned. It will use a telescope to measure the distances from Earth to many stars.



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- (i) Gaia will find this distance by measuring how much the stars appear to move as the Earth goes around the Sun.

Complete the following sentence. Choose from this list

**a light-year**      **parallax**      **twinkling**

The apparent movement of stars is called ..... [1]

- (ii) Gaia will also use another method of measuring the distance to stars.

It will measure how bright they are.

The statements below describe two stars A and B.

From the Earth, star A and star B look equally bright.

Star A is really giving out much **more** energy than star B.

The statements are not all correct.

Put a tick (✓) in the box next to the **one** correct statement.

Stars A and B are the same distance from Earth.

Star A is further from Earth than star B.

Star A is closer to Earth than star B.

[1]

(b) Complete the following sentences about satellite telescopes like Gaia. Use words from this list.

**alien life**

**light pollution**

**galaxies**

**meteor showers**

**planets**

**radiation**

Telescopes detect the ..... that comes from distant stars.

Telescopes are put into space to stop interference from .....

Powerful telescopes have detected ..... around some nearby stars.

[3]

(c) Four scientists discuss the Gaia satellite.

They have different opinions.



**Bev**

This new satellite will be able to find the distance to over a billion stars. That's amazing!

**Matt**  
It's not due for launch until the end of 2011. I expect it'll be cancelled, because there are more important things to spend the money on. What about global warming?



**Tracy**

Gaia will help us understand how our galaxy has developed.

**Sahid**

I don't believe Gaia will be able to measure the position of stars to the accuracy they say. The technology today is not advanced enough.



(i) Which **two** scientists are discussing data that the satellite may produce?

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

Bev

Matt

Sahid

Tracy

[2]

(ii) Which **two** scientists are making statements which include an **explanation**?

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

Bev

Matt

Sahid

Tracy

[2]

[Total: 9]

## 3 Read this newspaper story about traffic pollution.

**Clean air targets missed as traffic hotspot pollution soars**

Nitrogen dioxide levels on some of the city's busiest roads are now more than double the EU's air quality targets.

Nitrogen dioxide causes breathing difficulties and affects people with asthma.

In 2010, targets on air quality become law.

The city council faces huge fines if it misses these targets.

The council is thinking about these ways to reduce the pollution.

- using electric trams
- charging motorists for entering the city
- closing roads
- banning vehicles that don't meet strict emission limits.

- (a) (i) Which of the following can reduce atmospheric pollution in the city centre caused by cars?

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

close roads in the city centre

have more shops in the city centre

use electric trams instead of cars

build more car parks in the city centre

[2]



(ii) Which statements give the best reasons for reducing pollution?

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

People want to ride on trams.

People like driving their cars to collect shopping.

Pollution causes breathing problems and affects people with asthma.

Pollution damages the environment.

[2]

(iii) Why are trams expected to make a difference to air pollution in the city centre?

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

People on trams are not driving their cars into town.

Trams are very heavy.

Trams run on electricity.

Trams go along rails.

[2]

(b) The article only mentions nitrogen dioxide as a polluting gas.

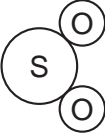


There are other pollutants from car engines.

The left hand box gives the **chemical structure** of the pollutant.

The centre box shows the **name** of the pollutant.

The right hand box shows the **main pollution problem**.

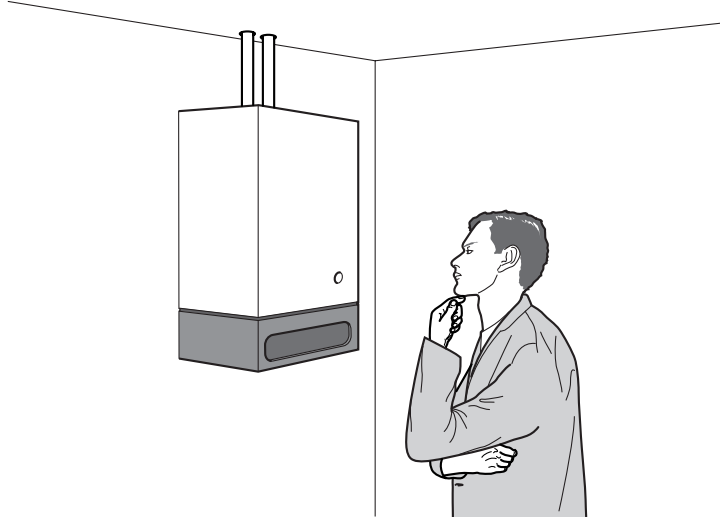
Draw a straight line from each **name** to the correct **structure**, and from each **name** to the **main pollution problem**.

chemical structure	name	main pollution problem
	carbon dioxide	It is poisonous and may kill you.
	carbon monoxide	It forms acid rain.
	sulfur dioxide	It causes global warming.

[4]

[Total: 10]

- 4 Andy is a gas engineer. He looks at a central heating boiler. It is not working properly. He notices soot coming out of the chimney. He tests the boiler to measure the amount of carbon in the soot.



- (a) Here are Andy's measurements.

test	1	2	3	4	5	6
amount of carbon (mg/m <sup>3</sup> )	47	48	45	51	64	49

Which measurement is an outlier?

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

45      47      48      49      51      64

[1]

(b) After the boiler is repaired he repeats the tests.

Here are his new measurements.

test	1	2	3	4	5
amount of carbon (mg/m <sup>3</sup> )	25	26	27	23	24

(i) Work out the best estimate of the true value.

..... [1]

(ii) Write down the range of these measurements.

from ..... to ..... [1]

(iii) There are differences in the second set of measurements.

Which of the statements below gives the **best** reason for these differences?

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

The measurements were only taken during the day.

Andy took all the measurements.

The temperature of the central heating boiler changed slightly.

The chimney was very tall.

[1]

[Total: 4]

5 Every cell contains genetic information.

(a) The lists show some names and descriptions about this information.

Draw a straight line from each **name** to its best **description**.

name	description
alleles	long threads of DNA found in the nucleus
chromosomes	instructions for making specific proteins
genes	DNA found outside the nucleus
	different versions of the same gene

[3]

(b) Why are there two sets of genetic instructions in each body cell?

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

The cell needs a spare set of instructions.

The cell can make twice as many proteins at once.

One set comes from each of the parents.

[1]

[Total: 4]

6 William has just been told he has Huntington's disorder.

Huntington's disorder is an inherited condition.

(a) (i) How did William get Huntington's disorder?

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

He had an unhealthy diet.

He caught it when he went abroad for his holidays.

It was passed on to him from one of his parents.

[1]

(ii) Which of these are symptoms of Huntington's disorder?

Put a (ring) around each of the **two** correct symptoms.

**being clumsy**

**headaches**

**sneezing**

**forgetting things**

**vomiting**

[2]

(iii) Huntington's disorder is caused by a **dominant** allele.

How many copies of the allele do you need to get the disorder?

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

none

one

three

four

[1]

(b) William is 58.

His son Duncan is 26.

Duncan is offered a test to see if he will develop Huntington's disorder.

Which of these arguments are good reasons **for** having the test.

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

The test will stop him getting the disorder.

It will help him decide whether or not to have children.

He can make plans that will help him in the future.

[1]

(c) Duncan finds out that he **has** the allele for Huntington's disorder.

Duncan's wife Sarah is pregnant.

A genetic counsellor says that Sarah's fetus can be tested.

They will know the results after 15 weeks of pregnancy.

If the fetus has the Huntingtons's allele then Sarah can have a termination.

Duncan and Sarah discuss their options with their family.





(i) Who is concerned about the safety of the test?

.....

(ii) Who is making an ethical point?

.....

(iii) Who is thinking about the economic effect on society?

.....

(iv) Which **two** people believe that Huntington's disorder is not a good reason to have a termination?

..... and .....

[4]

[Total: 9]

**END OF QUESTION PAPER**

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