OCR
RECOGNISING ACHIEVEMENT

F

GENERAL CERTIFICATE OF SECONDARY EDUCATION

TWENTY FIRST CENTURY SCIENCE
SCIENCE A

A212/01

Unit 2: Modules B2 C2 P2 (Foundation Tier)

Candidates answer on the Question Paper
A calculator may be used for this paper

OCR Supplied Materials:
None

Other Materials Required:
- Pencil
- Ruler (cm/mm)

Monday 18 January 2010
Morning

Duration: 40 minutes

Candidate Forename		Candidate Surname	

Centre Number						Candidate Number				

MODIFIED LANGUAGE

INSTRUCTIONS TO CANDIDATES

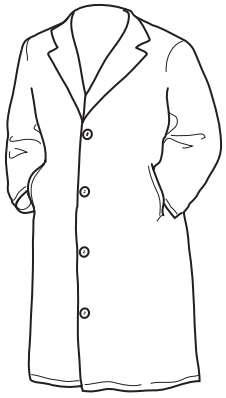
- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Answer **all** the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

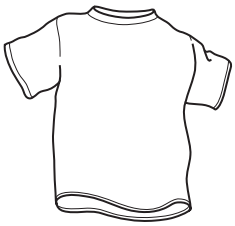
INFORMATION FOR CANDIDATES

- The number of marks is given in brackets **[ ]** at the end of each question or part question.
- The total number of marks for this paper is **42**.
- This document consists of **16** pages. Any blank pages are indicated.

Answer **all** the questions.

1 Different types of fibres can be made into clothes.
Some fibres are produced from living things, other fibres are synthetic.





(a) The table lists four different types of fibres.

Put ticks (✓) in the correct boxes to show what each fibre is made or obtained from.

fibre	from living plants	from living animals	synthetic materials
cotton			
nylon			
PVC			
wool			

[3]

(b) The table below shows some properties of these fibres.

	property				
	comfort	**heat insulation**	**strength**	**stretchiness**	**water absorbance**
cotton	high	good	medium	low	high
nylon	low	poor	high	high	very low
PVC	low	poor	high	low	very low
wool	low	very good	medium	medium	medium

Use the information in the table to answer the following questions.

(i) Which fibre would be the best choice for a coat for a very cold winter?

..... **[1]**

(ii) Why is cotton the best choice for a T shirt?

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

Cotton is comfortable and a good heat insulator.	☐
Cotton stretches a lot.	☐
Cotton is a weak fibre.	☐
Cotton is comfortable and absorbs sweat.	☐

[1]

(iii) Nylon is used to make swimwear.

Why is nylon used for swimwear?

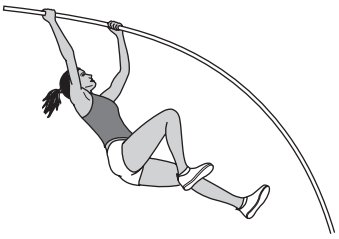
Put a tick (✓) in the box next to the **best** answer.

Nylon is very strong.	☐
Nylon is uncomfortable.	☐
Nylon will keep you cool.	☐
Nylon absorbs very little water.	☐

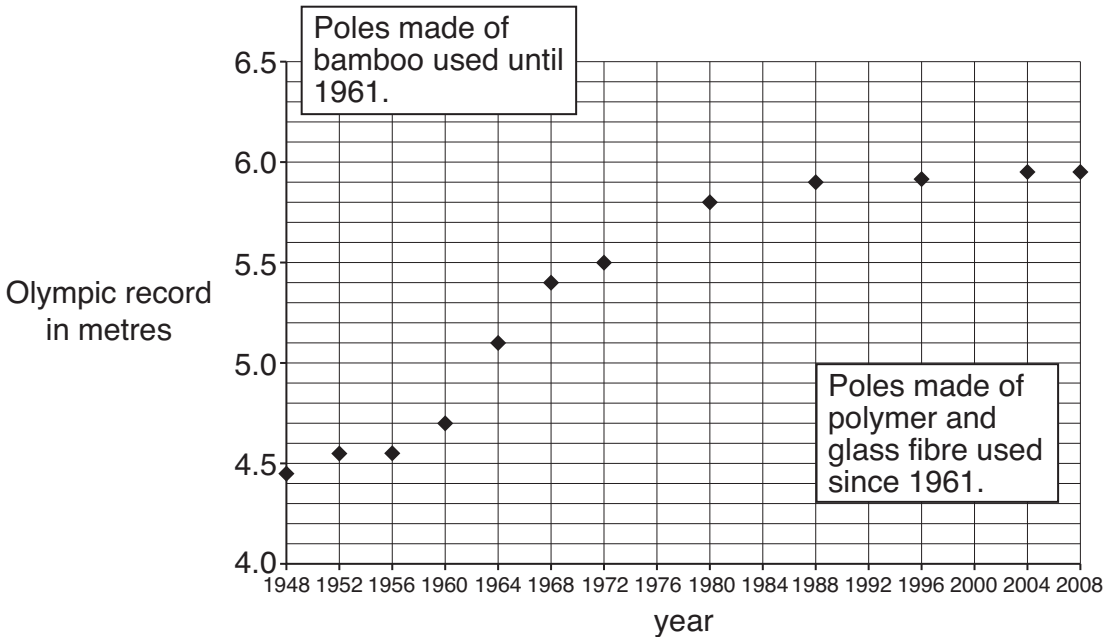
[1]

[Total: 6]

2



This graph shows the Olympic record height of the pole vault over the last sixty years.



(a) (i) What was the pole vault Olympic record height in 1980?

answer ..... m **[1]**

(ii) Here are four statements about the pole vault Olympic record height.

Use the graph to find out if they are **true** or **false**.

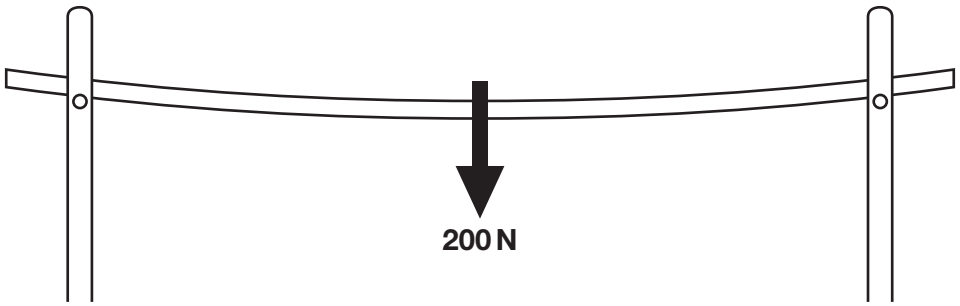
Put a tick (✓) in the correct box to show whether they are **true** or **false**.

	true	**false**
The record doubled between 1948 and 2008.	☐	☐
The record increased by more than 1m between 1948 and 2008.	☐	☐
The biggest increase over a 4-year period was between 1960 and 1964.	☐	☐
The record improved when polymer and glass fibre poles were introduced.	☐	☐

[2]

(b) Anna and Nick are investigating the properties of vaulting poles.
They know flexibility is an important property.

They support the pole at both ends as shown in the diagram.
They hang a 200 N weight from the centre of the pole and measure how far the pole bends.



(i) They repeat this measurement five times.

Suggest reasons why.

.....

.....

.....

..... **[3]**

(ii) Here are their results.

test number	**1**	**2**	**3**	**4**	**5**
how far the pole bends in cm	11.4	10.9	11.5	11.0	11.2

Suggest **two** reasons why the results of these tests are different.

1 .....

.....

2 .....

..... **[2]**

[Total: 8]

3 Arc welding is used to join metals together.

The arc is a very bright electrical spark between the welding tool and the metals being joined. This spark produces light, infrared (IR) and ultraviolet (UV) radiation.

UV can damage the cells in the outer layer of the eye. This causes intense pain and is called 'arc eye'.
The diagram shows that arc welders need to wear special masks to protect their eyes.

(a) Infrared, light and ultraviolet are three regions of the electromagnetic spectrum.

The diagram shows the electromagnetic spectrum. The names of some of the regions have been replaced with letters.

radio waves	**A**	**B**	light	**C**	X-rays	gamma rays

Write down the letter **A**, **B** or **C** for each of the following parts of the electromagnetic spectrum.

infrared ☐

ultraviolet ☐

[2]

(b) Here are some statements about ultraviolet radiation.

Which statements explain why ultraviolet radiation is more damaging to cells than light?

Put a tick (✓) in the box next to each of the **two** correct answers.

Ultraviolet is an ionising radiation. ☐

Ultraviolet is an invisible radiation. ☐

Sun-screen can absorb ultraviolet radiation. ☐

Ultraviolet photons have more energy than light photons. ☐

[2]

(c) Firms which employ arc welders must obey laws which protect workers.

Write down **two** ways of reducing the risk to workers' eyes.

.....

.....

.....

..... **[2]**

[Total: 6]

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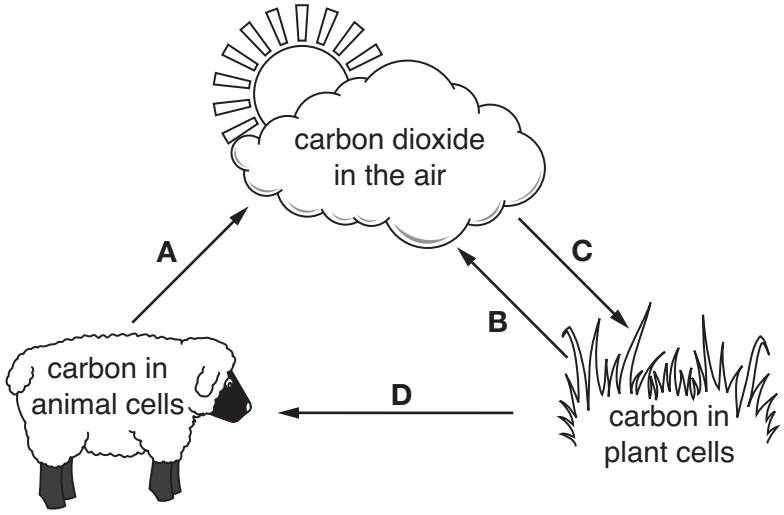
4 **(a)** The diagram shows part of the carbon cycle.



(i) Which **one** arrow, **A**, **B**, **C** or **D**, shows photosynthesis?

arrow ..... **[1]**

(ii) Which **two** of the arrows, **A**, **B**, **C** or **D**, show respiration?

arrows ..... and ..... **[1]**

(iii) Which **one** arrow, **A**, **B**, **C** or **D**, has the opposite effect to respiration?

arrow ..... **[1]**

(b) The amount of carbon dioxide in the atmosphere has increased during the past two hundred years.

Which of the following changes would slow down the increase of carbon dioxide in the atmosphere?

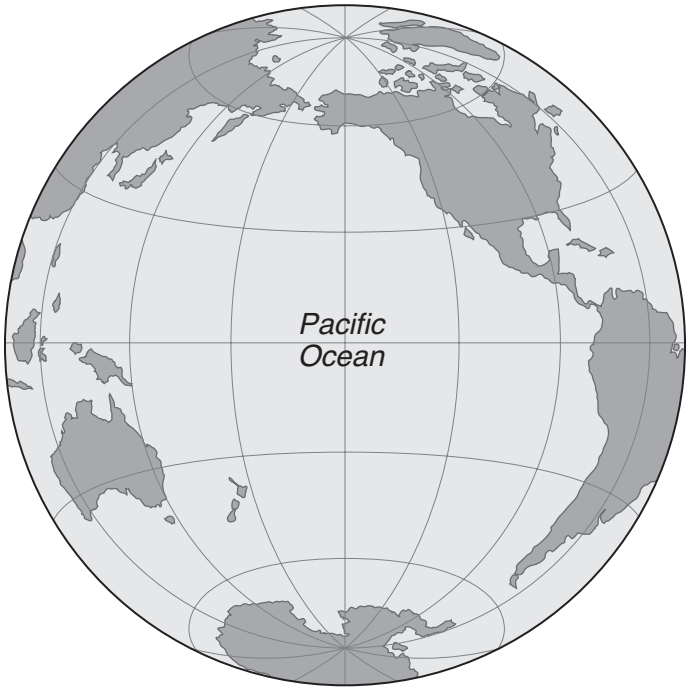
Put a tick (✓) in the box next to each of the **two** correct answers.

Stop burning forests to clear the land.	☐
Plant more grassland for cattle and sheep.	☐
Cut back on the use of fossil fuels as a source of energy.	☐
Use wind power instead of nuclear power to generate electricity.	☐
Find new sources of oil and gas to replace the ones which are running out.	☐

[2]

[Total: 5]

5 Read this article about the rise of the sea level in the Pacific Ocean.



Most people in the countries of the Pacific Ocean live near the coast.

Any rise in the sea level will be very serious for them.

Global warming is causing a rise in sea level as the sea warms up and the Earth's ice caps melt.

Satellite data show the sea levels in the Pacific Ocean are rising at an average rate of 2 centimetres each year.

(a) There could be a number of serious effects if global warming continues.

Put a tick (✓) in the box next to each of the **two** possible serious effects of continued global warming.

Some low-lying lands will be flooded. ☐

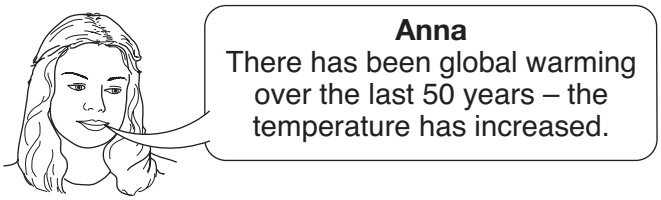
The amount of carbon dioxide in the atmosphere will go down. ☐

The ice caps at the North and South Poles will become thicker. ☐

Some crops will no longer grow in the places where they now grow. ☐

[1]

(b) Some scientists are discussing global warming.
This is what they say.



Anna
There has been global warming over the last 50 years – the temperature has increased.

Peter
The amount of carbon dioxide in the atmosphere has gone up in the last 50 years.

Sophie
The carbon dioxide may be the cause of global warming.

Explain the meaning of **correlation** using information from **two** of the scientists.

.....

.....

.....

..... **[2]**

[Total: 3]

6 **(a)** We have natural barriers to prevent microorganisms entering our bodies.

Put a (ring) around each of the **two** barriers in this list.

blood **hair** **skin** **stomach acid**

[2]

(b) What must microorganisms do to make us ill?

Put a tick (✓) in the box next to each of the **two** correct answers.

reproduce rapidly ☐

get bigger ☐

damage cells ☐

have immune systems ☐

recognise antibodies ☐

[2]

[Total: 4]

7 Read this report.

> **Do chemicals in chocolate reduce heart disease?**
>
> Cocoa is the main ingredient of chocolate.
> Cocoa is a good source of chemicals which reduce the risk of heart disease.
> Doctors are starting a study to see if eating chocolate will reduce the risk of heart disease for women with diabetes.

(a) Put a tick (✓) in the box next to a link described in the article.

eating chocolate will stop a person getting heart disease ☐

eating chocolate causes diabetes ☐

eating the chemicals in cocoa reduces the chance of heart disease ☐

[1]

(b) Information about chocolate and heart disease can be found in

- health magazines
- newspapers
- peer reviewed journals
- television programmes.

Explain which one of these sources of information is the most reliable.

source of information .....

explanation .....

..... **[2]**

[Total: 3]

8 Read the newspaper article.

> **Medical chief expects vaccine for MRSA**
>
> The government's chief medical advisor says that a new vaccine against the superbug MRSA will be available in 10 years.
>
> Other scientists think a vaccine will be difficult to produce because the MRSA bacterium is always evolving and changing.
>
> These scientists claim that clean hospitals are the key to preventing infection as antibiotics become less effective.

(a) This question is about how vaccines work.

Draw **one** straight line from the correct **content of a vaccine** to its **effect**.
Draw **one** straight line from this **effect** to the **reason for immunity**.
There should be only **two** straight lines in your answer.

content of a vaccine	effect	reason for immunity
small number of disease-causing microorganisms	more red blood cells produced	already had the disease
a dose of antibiotics	white blood cells destroy the antibiotics	antibodies present before real infection
dead disease-causing microorganisms	white blood cells make antibodies against microorganisms in vaccine	stops microorganisms infecting the body

[2]

(b) New drugs and vaccines have to be tested.
They are tested on humans.
Some tests are done on groups of healthy volunteers.
Some tests are done on groups of people with the illness that the drug will treat.

What are the reasons for using these groups of people?

Put a tick (✓) in the correct box for each group of people.
There should be one tick in each row.

	to test for safety only	to test for effectiveness only	to test for safety **and** effectiveness
healthy volunteers			
people with the illness			

[2]

(c) The article claims that antibiotics are becoming less effective.
This is because an increasing number of disease-causing microorganisms are becoming resistant to antibiotics.

(i) Put a tick (✓) in the box next to the **best** description of what resistance means.

Microorganisms are killed more easily by antibiotics. ☐

Microorganisms are not killed by antibiotics. ☐

Microorganisms are killed by cleaning. ☐

[1]

(ii) Describe **two** ways in which we can reduce the spread of antibiotic resistance.

1 .....

.....

2 .....

..... **[2]**

[Total: 7]

END OF QUESTION PAPER

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