

Tuesday 15 May 2012 – Morning

**GCSE TWENTY FIRST CENTURY SCIENCE
SCIENCE A**

A211/01 Unit 1: Modules B1 C1 P1 (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)

Duration: 40 minutes



Candidate
forename

Candidate
surname

Centre number

Candidate number

MODIFIED LANGUAGE

INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).
- Do **not** write in the bar codes.

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 (a) Complete the sentences about genes.

Use words from this list.

cytoplasm

DNA

fats

nucleus

proteins

Genes are instructions for a cell that describe how to make

Genes are found in the of a cell.

Genes are sections of that make up chromosomes. [2]

- (b) Hamish and Fred are brothers.

They both have two sex chromosomes in every body cell.

Put a ring around their sex chromosomes.

XX

XY

XZ

YZ

[1]

- (c) There are different versions of each gene.

What are the different versions of a gene called?

..... [1]

[Total: 4]

2 (a) Cuttings are grown from a plant.

They are all **clones** of the original plant.

They all have white flowers.

Some have small unhealthy leaves.

Others have large healthy leaves.

Why are some of the leaves small and unhealthy?

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

They have different genes.

☐

They have different parents.

☐

They were produced by sexual reproduction.

☐

Their environmental conditions were different.

☐

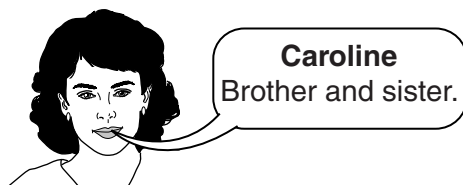
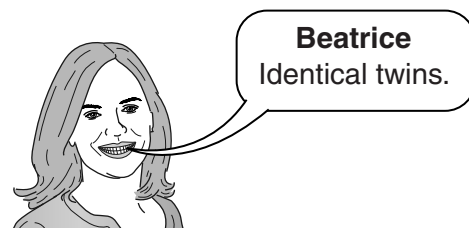
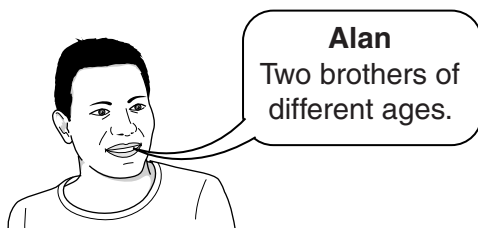
[1]

(b) Animals can also be cloned.

Natural clones of humans occur.

Four people were asked to give an example of human clones.

Who gives the correct answer?



answer [1]

(c) Parkinson's disease affects nerve cells in the brain.

Scientists are trying to grow new brain cells to replace damaged cells.

Which cells could be used to grow the new brain cells?

Put a ring around the correct answer.

blood

nerve

root

skin

stem

[1]

[Total: 3]

3 Jack and Jill are both carriers for cystic fibrosis.

Jack and Jill are expecting a baby.

They are worried that it may have cystic fibrosis.

They have the fetus genetically tested.

The results of the test are positive.

Write about the decisions that Jack and Jill have to make.

In your answer include

- what factors they have to consider
- what action they might take.

.....

.....

.....

.....

..... [3]

[Total: 3]

- 4 Huntington's disorder is a genetic disorder.

George is 58 years old and shows symptoms of Huntington's disorder.

He has only one allele for the disorder.

His daughter Mary is 20 years old and shows no symptoms of the disorder.

Mary's mother does not have the allele for this genetic disorder.

- (a) (i) Draw a genetic diagram to show how Mary might have inherited the alleles from her parents.

Use the symbols **H** for the dominant allele and **h** for the recessive allele.

[2]

- (ii) What is the probability that Mary has the disorder?

..... [1]

- (b) Mary may have Huntington's disorder but not show symptoms.

Why is this?

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

Mary's grandmother does not have the disorder.

☐

The symptoms do not show until later in life.

☐

The allele for Huntington's disorder is recessive.

☐

Environmental factors might prevent the disorder from developing.

☐

[1]

[Total: 4]

Turn over

- 5 (a) (i) Many town councils are asking people to use buses instead of driving their cars. The councils want to lower carbon dioxide pollution from motor vehicles.

A bus makes **more** carbon dioxide than a car.

Choosing to travel by bus can lower carbon dioxide pollution.
Explain how.

.....

.....

.....

.....

.....

..... [3]

- (ii) Look at the diagrams.

Which one shows a carbon dioxide molecule?

Put a ring around the correct diagram.



[1]

- (b) Motor vehicles give out carbon dioxide and other air pollutants. These pollutants do not just disappear. They have to go somewhere. Draw a straight line from each **pollutant** to **where it goes**.

pollutant

particulate carbon

carbon dioxide

sulfur dioxide

where it goes

makes acid rain

used by plants in photosynthesis

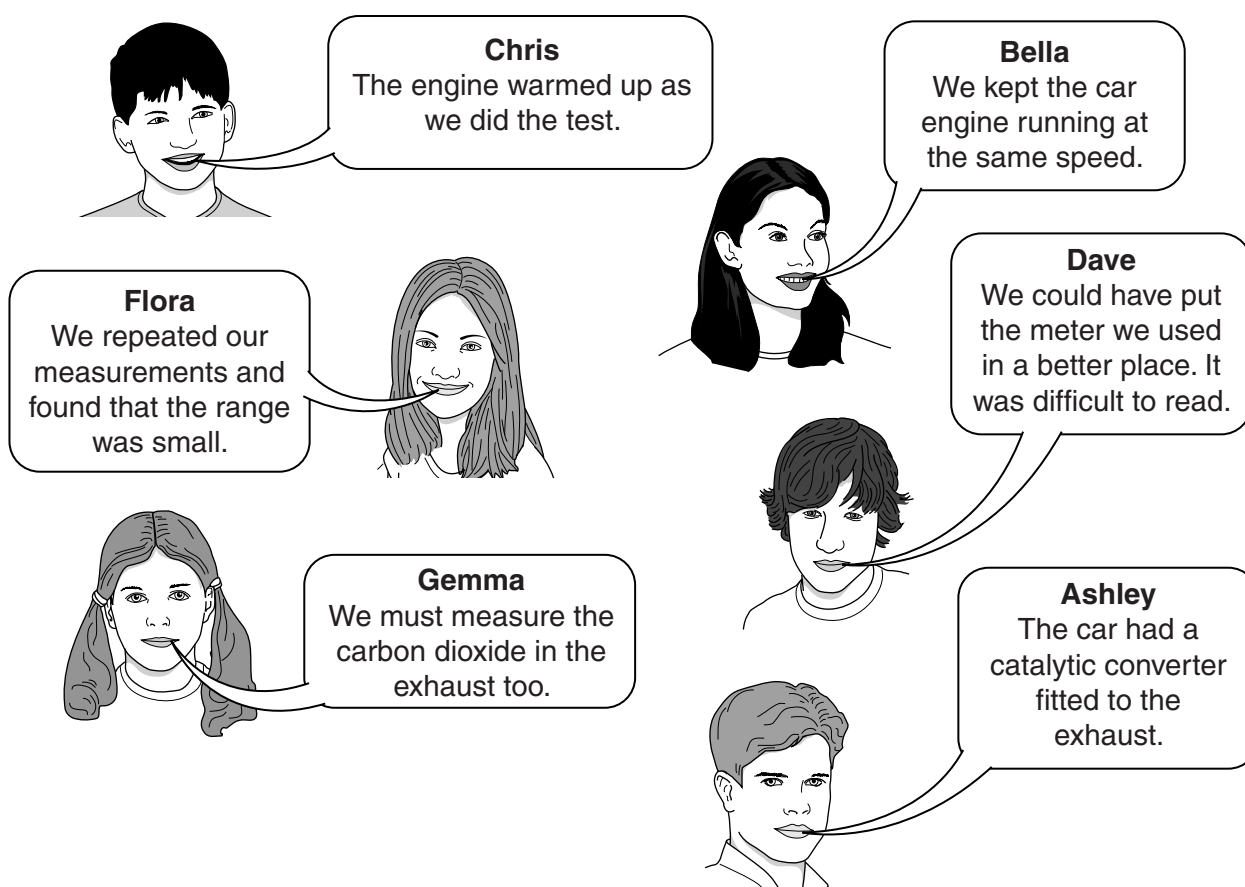
makes surfaces dirty

[2]

- (c) Nitrogen oxides are also pollutants from cars. Some students measure the amount of nitrogen oxides in the exhaust gases of a car. They repeat the test on the same car five times. Look at their results.

Test number	1	2	3	4	5
Percentage of nitrogen oxides in the exhaust	0.25	0.25	0.23	0.23	0.21

Here are the students talking about the tests.



Chris
The engine warmed up as we did the test.

Bella
We kept the car engine running at the same speed.

Dave
We could have put the meter we used in a better place. It was difficult to read.

Ashley
The car had a catalytic converter fitted to the exhaust.

Gemma
We must measure the carbon dioxide in the exhaust too.

Flora
We repeated our measurements and found that the range was small.

- (i) Which two students are giving reasons why the measurements vary?

students and [1]

- (ii) Which student is talking about checking the reliability of the data?

student [1]

[Total: 8]

- 6 (a) (i) Fuel for motor vehicles contains mainly hydrocarbons.
Hydrocarbons are made of two elements.
What are these elements?

Put (rings) around the **two** correct answers.

argon

carbon

hydrogen

oxygen

nitrogen

[1]

- (ii) When hydrocarbons burn **incompletely** in air, the carbon makes particulates and a poisonous gas.
What is the name of the poisonous gas?

..... [1]

- (b) Mark is a scientist.
He measures air pollution next to a motorway.
He measures the concentration of carbon particulates in the air at different distances from the motorway.

Here are his results.

Distance from the motorway in m	10	30	50	70	90
Concentration of carbon particulates in $\mu\text{g}/\text{m}^3$	10.0	8.0	6.5	5.0	4.0

- (i) What is the **correlation** shown by these measurements?

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

As the distance from the motorway increases, the concentration of carbon particulates increases.

☐

The nearer the motorway, the fewer the carbon particulates.

☐

The concentration of carbon particulates decreases by $2\mu\text{g}/\text{m}^3$ every 20 m from the motorway.

☐

The further away from the motorway, the smaller the concentration of carbon particulates.

☐

[1]

- (ii) Mark says that these results do **not** prove that motorway traffic causes the carbon particulate pollution.

What reason might Mark have for saying this?

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

There is no data on the number of vehicles on the motorway.

☐

Mark has taken the wrong measurements.

☐

Mark has not calculated the true value of the carbon particulate concentration.

☐

The carbon particulates may not have come from the motorway traffic.

☐

Other air pollutants were not measured.

☐

[1]

- (iii) Mark says that the weather will affect his results.
Explain how **one** weather condition could change his results.

.....

.....

.....

..... [2]

[Total: 6]

- 7 Two scientists are discussing the extinction of the dinosaurs 65 million years ago.

Dr Adams

A huge asteroid landed in Mexico 65 million years ago. It sent up huge dust clouds that would have blocked out the Sun, killing most of the life on Earth.



Dr Baker

Massive volcanic eruptions in India happened much closer in time to the dinosaur extinction. These eruptions would also block out the Sun.



Dr Adams

A study of the crater in Mexico was published in the journal 'Science' recently. It showed that the asteroid collision was such an enormous impact that it would have had world-wide effects.



Dr Baker

I went to a conference about a mass extinction that happened 250 million years ago. This happened at the same time as an enormous volcanic eruption in Russia.



- (a) Who refers to a scientific journal?

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

only Dr Adams

☐

only Dr Baker

☐

both scientists

☐

neither scientist

☐

[1]

(b) Who talks about a mass extinction?

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

only Dr Adams

☐

only Dr Baker

☐

both scientists

☐

neither scientist

☐**[1]****(c)** Who has an explanation for the extinction of the dinosaurs?

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

only Dr Adams

☐

only Dr Baker

☐

both scientists

☐

neither scientist

☐**[1]****(d)** Which statement best describes this discussion between the two scientists?

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

The explanations are probably wrong.

☐

Dr Adams has proved that Dr Baker is wrong.

☐

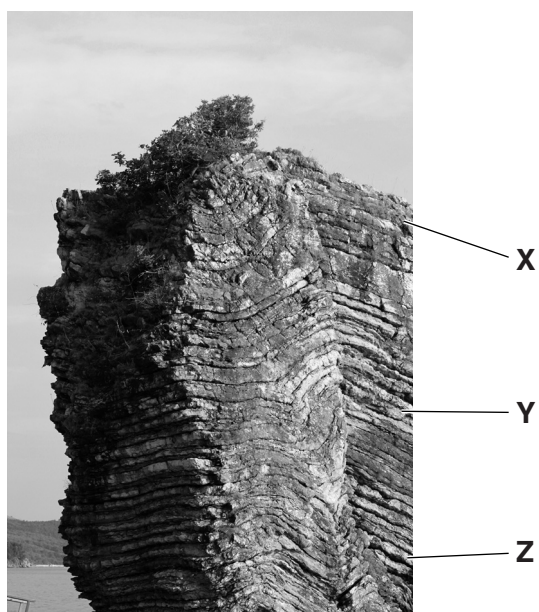
Dr Baker has proved that Dr Adams is wrong.

☐

The scientists have different interpretations of the data.

☐**[1]****[Total: 4]**

- 8 Look at the photograph of rock layers in a cliff at the seaside.



- (a) Three layers of rock are labelled.

Which of the following shows the correct order of age of the rocks?

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

- | | | | |
|------------|--------------|----------|--------------------------|
| (youngest) | X Y Z | (oldest) | <input type="checkbox"/> |
| (youngest) | Y X Z | (oldest) | <input type="checkbox"/> |
| (youngest) | Y Z X | (oldest) | <input type="checkbox"/> |
| (youngest) | Z X Y | (oldest) | <input type="checkbox"/> |

[1]

- (b) People on the beach can see all these layers of rock.

The layers were once underground.

Which of the following statements best explains why these rock layers can now be seen?

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

The layers were formed by sedimentation.

☐

The layers were only formed during the past few years.

☐

The cliff contains very old rocks.

☐

The sea has eroded some of the land.

☐

[1]

- (c) The following statements explain why the cliff is made of twisted rock layers.

The statements are **not** in the correct order.

A Sediments are carried down rivers into the sea.

B Movements in the Earth's crust twist the layers of rock.

C The weight of material on top squashes the sediments into rock.

D The sediments form layers at the bottom of the sea.

Put the letters **A**, **B**, **C** and **D** into the boxes to show the correct order of the statements.

One has been done for you.

			B
--	--	--	----------

[2]

[Total: 4]

- 9 In 1912, Alfred Wegener published his theory of continental drift. It was not believed at the time.

State **two** reasons why geologists did not believe Wegener's theory when he published it.

.....

.....

.....

.....

..... [2]

[Total: 2]

- 10 Our Solar System was formed approximately 5 thousand million years ago.

Describe how it was formed.

.....

.....

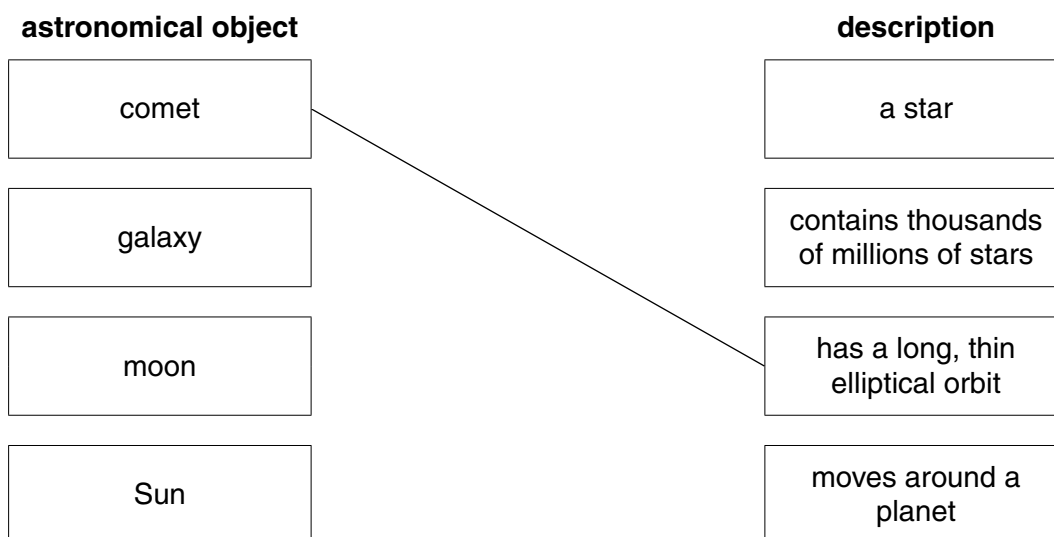
.....

..... [2]

[Total: 2]

11 Draw straight lines to link each **astronomical object** to its correct **description**.

One has been done for you.



[2]

[Total: 2]

END OF QUESTION PAPER

PLEASE DO NOT WRITE ON THIS PAGE



Copyright Information

OCR is committed to seeking permission to reproduce all third-party content that it uses in its assessment materials. OCR has attempted to identify and contact all copyright holders whose work is used in this paper. To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced in the OCR Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download from our public website (www.ocr.org.uk) after the live examination series.

If OCR has unwittingly failed to correctly acknowledge or clear any third-party content in this assessment material, OCR will be happy to correct its mistake at the earliest possible opportunity.

For queries or further information please contact the Copyright Team, First Floor, 9 Hills Road, Cambridge CB2 1GE.

OCR is part of the Cambridge Assessment Group; Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.