THIS IS A LEGACY SPECIFICATION

OCR
RECOGNISING ACHIEVEMENT

F

Tuesday 24 January 2012 – Morning

GCSE TWENTY FIRST CENTURY SCIENCE SCIENCE A

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

A213410112

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

A211101

Candidate forename		Candidate surname	

Centre number						Candidate number				

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 Hugh has a DNA test.

This tests for genes that may increase his risk of developing certain diseases.

(a) Complete the sentence to describe a gene.

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

A gene is …

… a pair of chromosomes. ☐

… a code for making DNA. ☐

… a short section of protein. ☐

… an instruction for making a protein. ☐

[1]

(b) Hugh is given counselling before his test.

This prepares him for any bad news.

His results show he has a high risk of developing heart disease but a low risk of developing Alzheimer's disease.

Suggest reasons why some people choose to have their DNA tested but others do not.

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.....

.....

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

[Total: 4]

2 Some disorders such as Huntington's disorder are caused by alleles of a single gene.

(a) Embryos produced by IVF can be tested for the allele that causes Huntington's disorder. Fetuses and adults can also be tested.

A positive test result shows the presence of the allele for Huntington's disorder.

Someone with the allele for Huntington's disorder will always develop the disease.

Draw a single straight line from each **individual with the allele** for Huntington's disorder to a **possible decision** that might be taken.

individual with the allele	**possible decision**
adult	do not have children
fetus in womb	do not implant the embryo
embryo produced by IVF	have an abortion

[2]

(b) If one parent has one copy of the allele for Huntington's disorder and the other parent has no copies of this allele, the probability of any of their children inheriting the disorder is 50%.

(i) Complete the genetic diagram to show that the probability is 50%.

		sex cells from parent **with** the allele for Huntington's disorder	
		H	**h**
sex cells from parent **without** the allele for Huntington's disorder	**h**		hh
	h		

[1]

(ii) On the genetic diagram put a (ring) around the allele combinations that cause Huntington's disorder.

[1]

(c) It is estimated that there are 12.4 cases of Huntington's disorder per 100 000 people.

If the population of the UK is 60 000 000, how many cases of Huntington's disorder does this estimate suggest?

Put a (ring) around the correct answer.

12.4 **49.6** **7 440** **4 838 000** **1 240 000** **[1]**

[Total: 5]

3 **(a)** Adam and Lionel are 15-year-old identical twins.

Identical twins are an example of a naturally occurring clone.

Put a tick (✓) in the box next to the statement that correctly describes why Adam and Lionel are identical twins.

They have the same number of chromosomes.	☐
They have the same mother and father.	☐
They developed from a single fertilised egg.	☐
They developed from two identical eggs.	☐

[1]

(b) By the age of 15 there may be differences between Adam and Lionel.

Put ticks (✓) in the boxes next to the **two** characteristics that could be different.

eye colour	☐
blood group	☐
weight	☐
scars	☐

[1]

[Total: 2]

4 **(a)** Embryonic stem cells are unspecialised cells.

Explain what is meant by **unspecialised cells**.

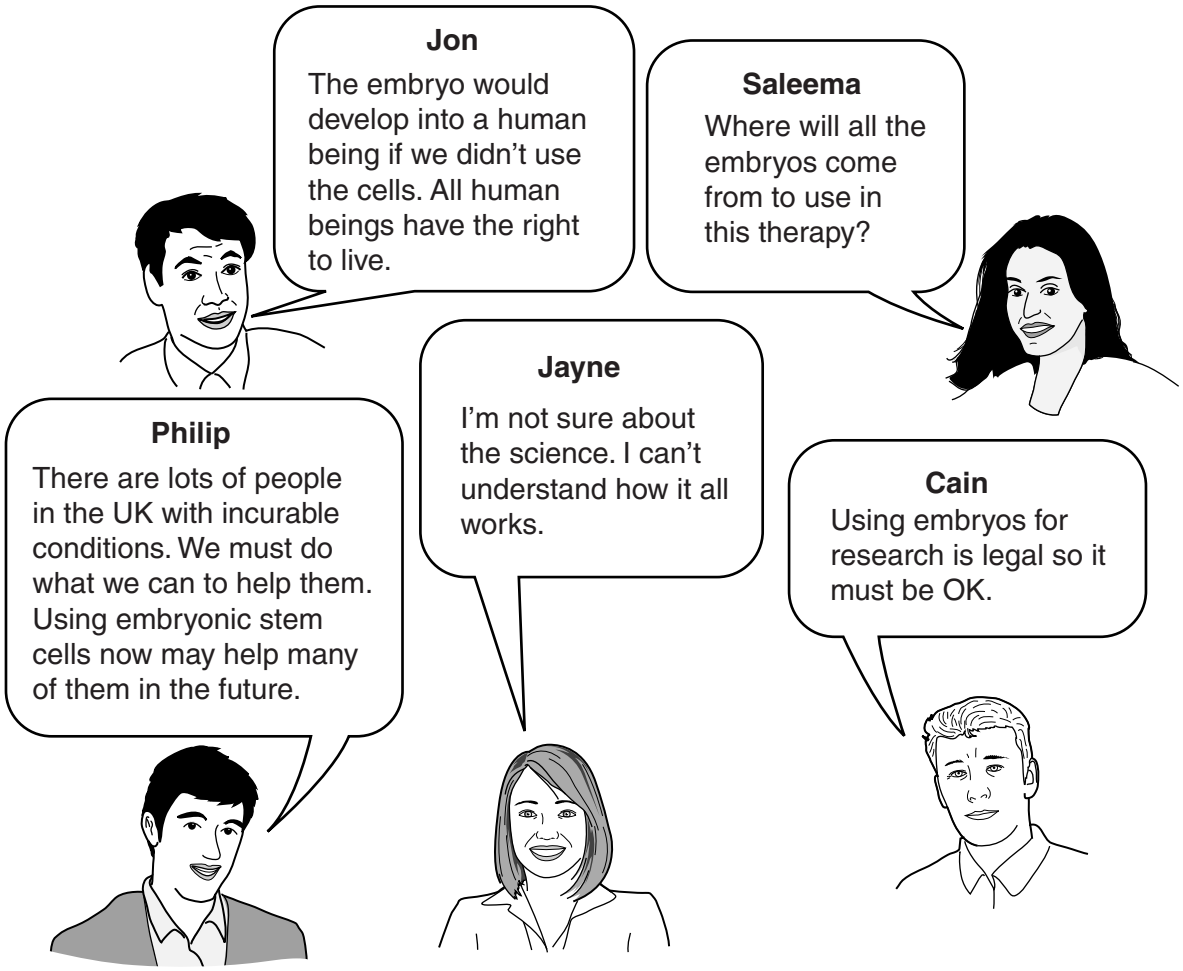
.....

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

(b) Embryonic stem cells could be cloned and used to treat some illnesses.

People have different views about the use of embryonic stem cells.

Here is what some people say.



(i) Which person thinks that the use of embryos to obtain stem cells is wrong in itself?

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

(ii) Which person thinks that the right thing to do is the action which will benefit the greatest number of people?

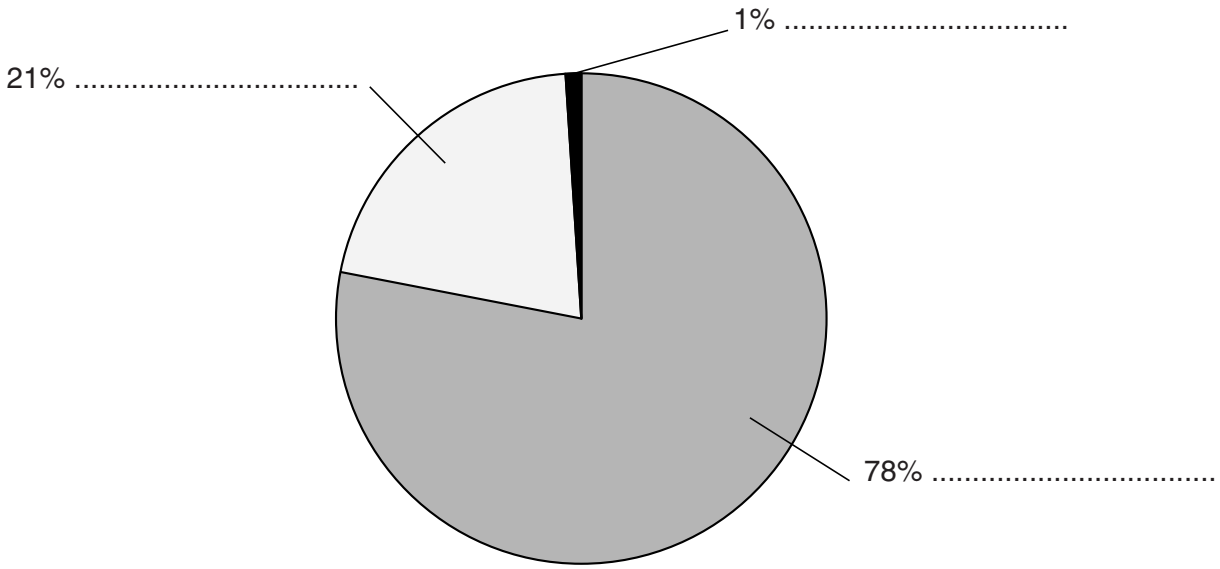
answer ..... **[1]**

[Total: 3]

5 This is a question about gases found in the air.

The pie chart shows the approximate percentages of three gases in the air.

(a) Label the pie chart to name these three gases.



[2]

(b) Other gases are released into the air when fuels burn.

Some of these gases are shown in the table below.

(i) Draw a straight line from the **name** of each gas to its **formula** and from each **formula** to the **diagram** of its molecule.

Key: carbon ● nitrogen ▨ oxygen ○ sulfur ●

name	formula	diagram
carbon monoxide	NO	●○
nitrogen monoxide	CO	○▨○
nitrogen dioxide	SO_2	▨○
sulfur dioxide	NO_2	○●○

[3]

(ii) Burning fuels makes sulfur dioxide.

Sulfur dioxide is a gas.

Sulfur dioxide does not stay in the air.

Describe what happens to the sulfur dioxide in the air.

Explain why this is harmful to the environment.

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.....

.....

.....

.....

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

[Total: 8]

6 In April 2010 an Icelandic volcano erupted.

A cloud of ash and sulfur dioxide was made.

Where this cloud travelled and where the ash landed depended on the weather conditions.

Measurements of particulates in the air were taken near an airport **during** the eruption.

Particulates include carbon and other solids.

Here are measurements at **three** different times in one day.

sample	**particulates in the air in μg/m^3**		
	morning	**afternoon**	**evening**
1	10	58	17
2	12	63	15
3	15	71	11
4	8	66	4
5	10	62	13
best estimate		**64**	**14**

(a) (i) One of the readings in the table is an outlier.

Put a (ring) around the outlier. **[1]**

(ii) What is the best estimate of the true value of particulates in the air in the **morning**?

Show your working.

best estimate = ... μg/m^3 **[2]**

(iii) What is the range of values of the particulates in the air in the **afternoon** samples?

..... to ..... $\mu g/m^3$ **[1]**

(b) It is not safe for aircraft to fly when there are high levels of particulates in the air.

The airport was open in the morning but closed in the afternoon.

Using data from the table suggest reasons why this happened.

.....

.....

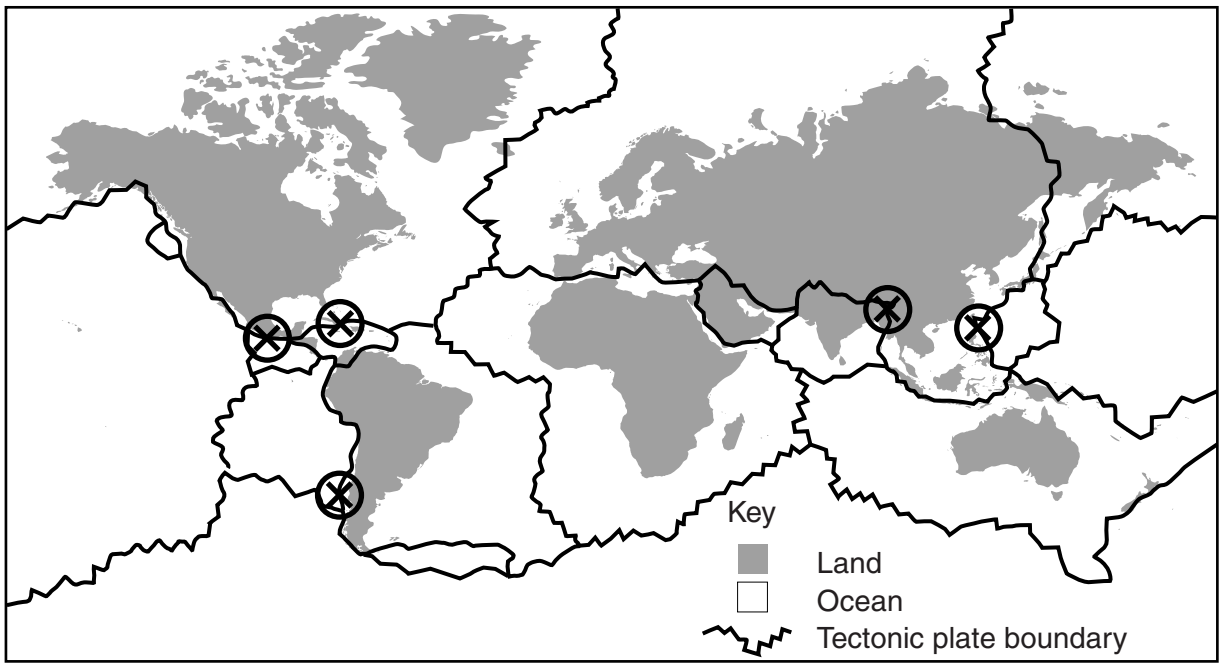
.....

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

[Total: 6]

7 There were five large earthquakes around the world in one year.

The earthquakes took place at the points marked (X) on this map.



Read what these people say about the earthquakes.

Anna
All these earthquakes were above strength 7. They caused much destruction and many deaths.

Brian
These earthquakes must have been linked in some way. To see if this is true, scientists need to study earthquakes more.

Chandra
People need to be trained to know what to do during an earthquake.

Daniel
These five earthquakes were all on the edges of tectonic plates.

(a) Earthquakes happen when tectonic plates move against each other.

Who gives data that support this statement?

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

- Anna ☐
- Brian ☐
- Chandra ☐
- Daniel ☐

[1]

(b) Who refers to an action that could be taken to reduce the effect of earthquakes on people?

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

- Anna ☐
- Brian ☐
- Chandra ☐
- Daniel ☐

[1]

(c) Who mentions a serious consequence of an earthquake?

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

- Anna ☐
- Brian ☐
- Chandra ☐
- Daniel ☐

[1]

(d) Which **two** people use data in their statements?

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

- Anna ☐
- Brian ☐
- Chandra ☐
- Daniel ☐

[1]

[Total: 4]

8 This question is about objects in the Universe.

(a) Here are five objects with different diameters.

A the Earth

B the Milky Way galaxy

C the Moon

D the Solar System

E the Sun

Arrange the objects in order of increasing size.

Fill in the boxes to show the correct order.

One has been done for you.

smallest					**B**	**biggest**

[2]

(b) The Earth, the Sun and the Universe are different ages.

What is the correct order of age?

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

oldest		**youngest**	
Earth	Universe	Sun	☐
Sun	Universe	Earth	☐
Universe	Sun	Earth	☐
Universe	Earth	Sun	☐

[1]

[Total: 3]

9 Evidence from rocks shows that the Earth has changed a lot since it was formed.

Give **one** example of the evidence found in rocks, and state what change it shows.

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.....

.....

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

[Total: 2]

10 Life exists on Earth. Many scientists think it is likely that life exists elsewhere in the Universe as well.

Explain why.

.....

.....

.....

.....

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

[Total: 3]

11 (a) Many telescopes on the Earth's surface have difficulty in making clear observations of stars at night.

Which of the following is the **best** reason for this?

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

earthquakes	☐
light pollution	☐
sunlight	☐
tides	☐

[1]

(b) Which of the following methods are used to measure the distance to a star?

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

bouncing laser beams off the star	☐
comparing the brightness of stars	☐
sending a rocket to the star	☐
using parallax	☐

[1]

[Total: 2]

END OF QUESTION PAPER

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