OCR
RECOGNISING ACHIEVEMENT

F

GENERAL CERTIFICATE OF SECONDARY EDUCATION

TWENTY FIRST CENTURY SCIENCE BIOLOGY A

A221/01

Unit 1: Modules B1 B2 B3
(Foundation Tier)

OCE/V02876

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)

Thursday 14 May 2009
Afternoon

Duration: 40 minutes

A221101

Candidate Forename		Candidate Surname	

Centre Number						Candidate Number				

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 Neil and Ranjit are identical twins.

(a) Which of the statements explains how they were formed?

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

Two different sperm fertilised the egg. ☐

Two different eggs were fertilised. ☐

The cells of the embryo separated into two groups. ☐

The cells of the embryo all joined together. ☐ **[1]**

(b) Their teacher can tell them apart.

Which of the statements explains why?

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

Neil and Ranjit are different sexes. ☐

There are genetic differences between Neil and Ranjit. ☐

Neil and Ranjit are different ages. ☐

There are differences between Neil and Ranjit caused by their environments. ☐ **[1]**

(c) Before Neil and Ranjit were born, their mother had a genetic test during pregnancy to see if Neil and Ranjit had a genetic disorder.

Which of the statements gives a reason for having the test?

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

discussing whether or not the pregnancy should be terminated ☐

finding out if the twins would be good at sport ☐

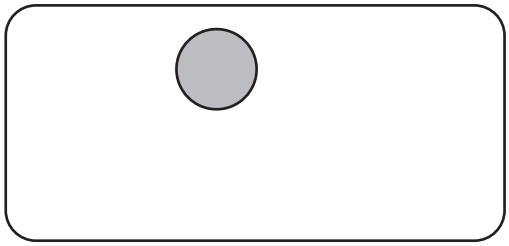
finding out if the twins would be friends ☐

deciding which school the twins should go to ☐

[1]

[Total: 3]

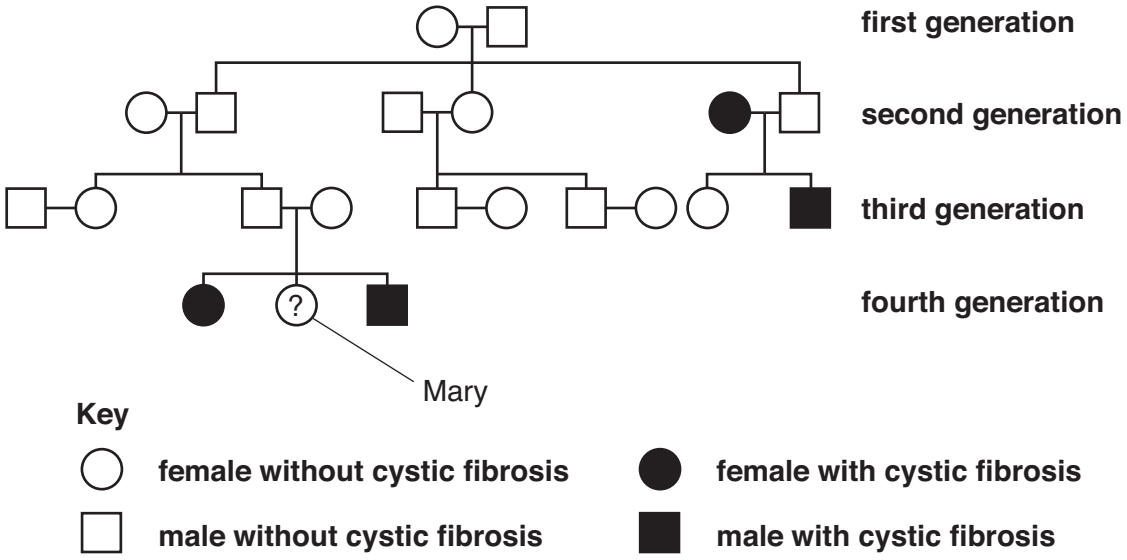
2 Look at the diagram of a cell.



instructions for how an organism develops are found here

(a) Draw a label line to connect the label with the correct part of the cell. **[1]**

(b) The instructions for how an organism develops are called alleles.
The family tree shows the inheritance of a faulty allele that causes cystic fibrosis.



(i) Which of the words best describes the allele that causes this disorder?

Put a (ring) around the correct answer.

dominant **mixed** **recessive** **[1]**

(ii) The second generation of the family tree consists of six people.

How many people in the second generation have cystic fibrosis?

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

(iii) When Mary is born it is not known whether or not she has cystic fibrosis.

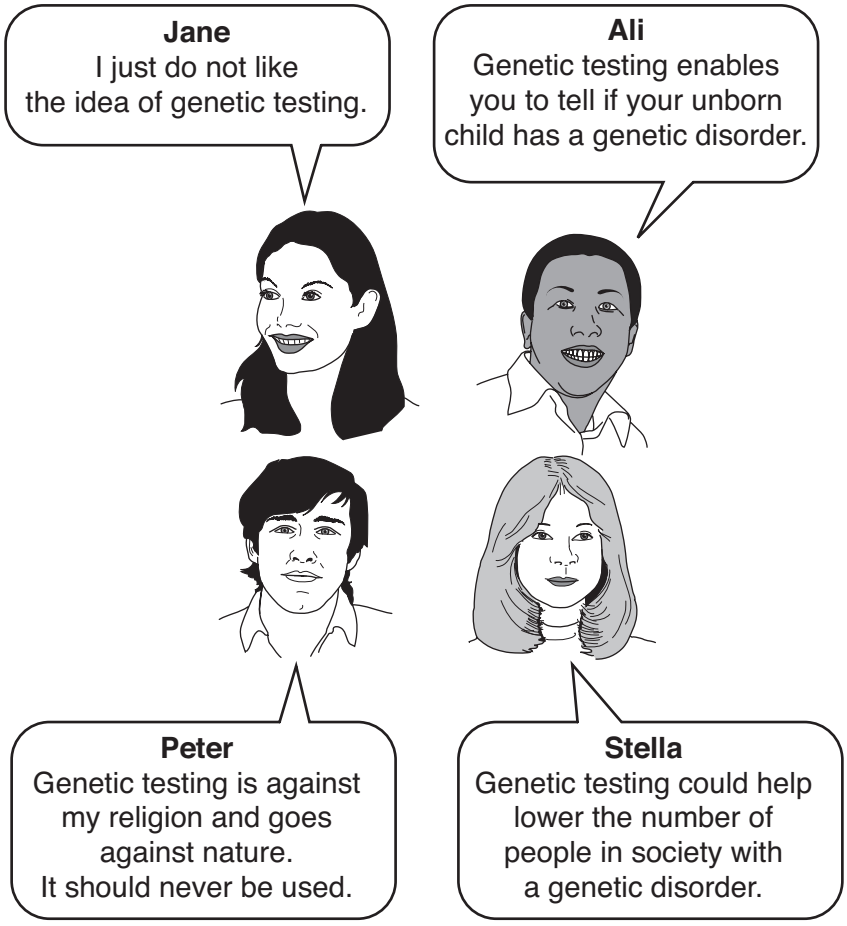
What is the chance that Mary is a carrier?

Put a (ring) around the correct answer.

100% **50%** **30%** **25%** **0%** **[1]**

[Total: 4]

3 Embryos can be tested to find out if they have any genetic defects.
Different people have different views about genetic testing.



(a) Which **two** people are making a statement that could **not** be tested using a scientific approach?

answer ..... and ..... **[2]**

(b) Which person argues that genetic testing is never justified because it is unnatural and wrong?

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

(c) Which person argues that the incidence of a genetic disorder could be reduced?

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

[Total: 4]

4 Humans are different from each other.
These differences may have genetic causes.
Sometimes they are caused by the environment.
Often differences are caused by both genes and the environment.

Put **one** tick in each row to show whether the feature or condition is caused by **genes**, the **environment** or **both**.

	genes	**environment**	**both**
Huntington's disorder			
the sex of a person			
heart disease			

[3]

[Total: 3]

5 Dave has a heart attack.

(a) Which **two** of the following are most likely to have contributed to Dave's heart attack?

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

temperature ☐

fatty diet ☐

viruses ☐

bacteria ☐

smoking ☐

[1]

(b) Dave survives the heart attack.
He wants to know what caused it.
Draw **one** straight line linking a possible **cause** of the heart attack to its correct **effect**.

cause	**effect**
Dave took regular exercise.	Dave's heart muscle did not get enough carbon dioxide.
Dave ate less sweet foods.	Dave's heart muscle got too much nitrogen.
Dave's blood vessels built up fatty deposits.	Dave's heart muscle got too much glucose.
Dave reduced the number of cigarettes he smoked.	Dave's heart muscle did not get enough oxygen.

[2]

(c) Heart disease is more common in countries like the UK than in non-industrialised countries.

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

The UK has more …

… countryside. ☐

… sports centres. ☐

… food. ☐

…doctors. ☐

[1]

[Total: 4]

6 Gina has a sore throat.
Her doctor says it may be caused by bacteria or viruses.
Gina wants some antibiotics.
Her doctor says they may not work.

(a) Which two statements explain why the antibiotics may not work?

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

Gina will get another sore throat in the future.	☐
Antibiotics do not work against viruses.	☐
Antibiotics do not work against bacteria.	☐
The viruses may have become resistant to the antibiotics.	☐
The bacteria are resistant to the antibiotics.	☐
Gina will get better anyway.	☐

[2]

(b) The doctor tells Gina that a new drug is being developed to treat sore throats.

These steps describe the development of the new drug.

They are in the wrong order.

A The new drug is tested on ill people for its effectiveness.

B The new drug is tested on healthy volunteers for safety.

C The new drug is passed for use on the general public.

D The new drug is tested on human cells.

E The new drug is tested on animals.

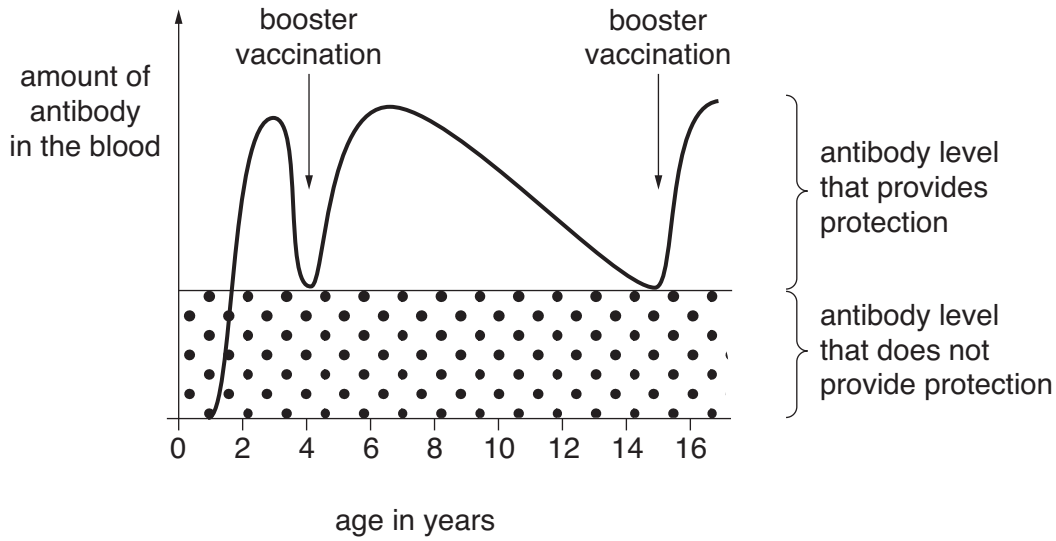
Fill in the boxes to show the right order.
Two have been done for you.

	E		**A**	

[2]

[Total: 4]

7 Steve has been vaccinated three times against polio.
Two of the vaccinations were boosters.
The graph shows what effect the vaccinations have on the amount of antibodies in Steve's blood.



(a) At what age (in years) was Steve most likely to get polio?

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

(b) At what age (in years) did Steve have his first vaccination?

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

(c) At what ages (in years) did Steve have booster vaccinations?

Put a (ring) around the correct answer.

2 and 6 **0 and 4** **4 and 15** **3 and 6** **[1]**

(d) The scientist Louis Pasteur developed a vaccine against rabies.
It was injected into people after they had been bitten by a dog carrying the rabies virus.
The vaccine was not completely successful in saving lives.

Which statement explains why?

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

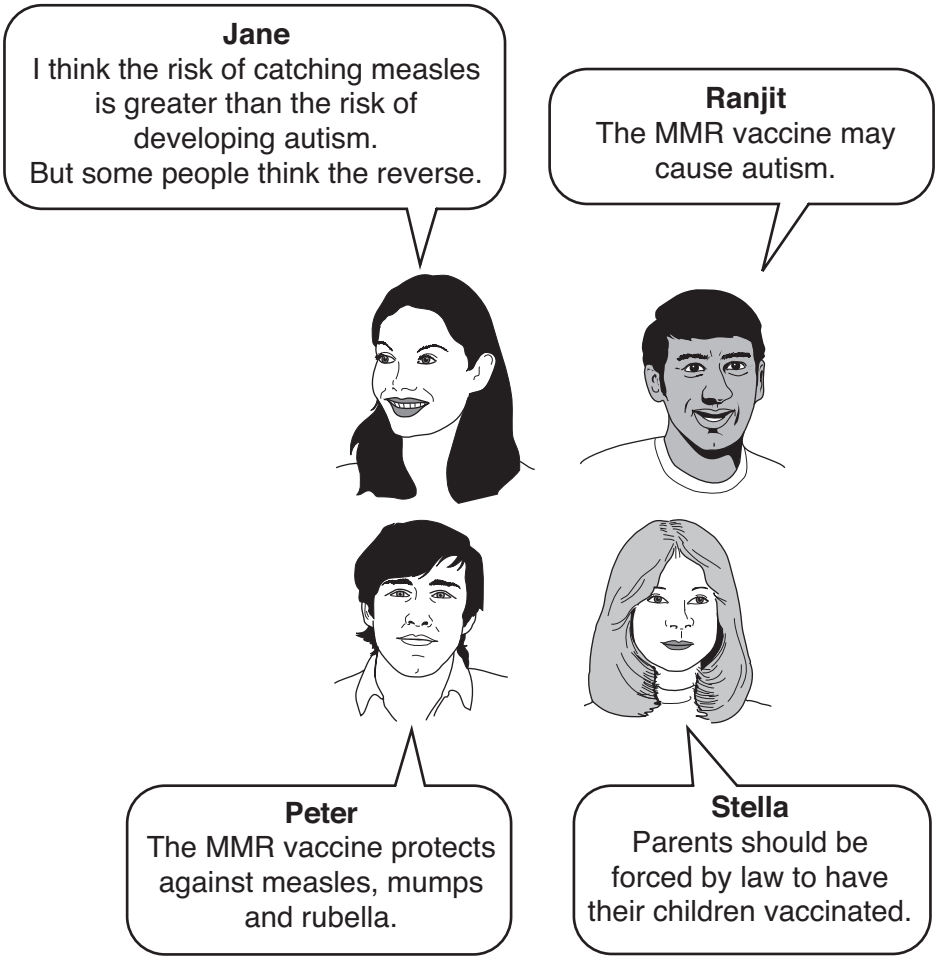
several injections were needed ☐

vaccinations work best if given after getting an infection ☐

the side effects of the vaccine lasted too long ☐

people's bodies did not have time to make enough antibodies ☐ **[1]**

(e) The government has a measles, mumps and rubella (MMR) vaccination policy.
It wants all children to be vaccinated with the MMR vaccine.
Different people have different views about this policy.



(i) Which person is summarising two different views?

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

(ii) Which person is describing an action which is hard to justify?

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

[Total: 6]

8 Life on Earth developed by the process of evolution.

(a) How long ago did life begin on Earth?

Put a (ring) around the correct answer.

3500 years **35 000 years** **3500 million years** **3500 billion years** **[1]**

(b) Which statement about how life began is true?

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

Living things developed from molecules that …

… could copy themselves. ☐

… got bigger and bigger. ☐

… dissolved in water. ☐

… got smaller and smaller. ☐

[1]

(c) Which process describes how evolution happens?

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

cloning ☐

gene therapy ☐

homeostasis ☐

natural selection ☐

[1]

(d) Conditions on other planets can be very different from conditions on Earth.

Which statement about evolution is true if conditions on Earth had been very different?

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

Evolution …

… would not have taken place. ☐

… would have produced the same result. ☐

… could have produced a different result. ☐

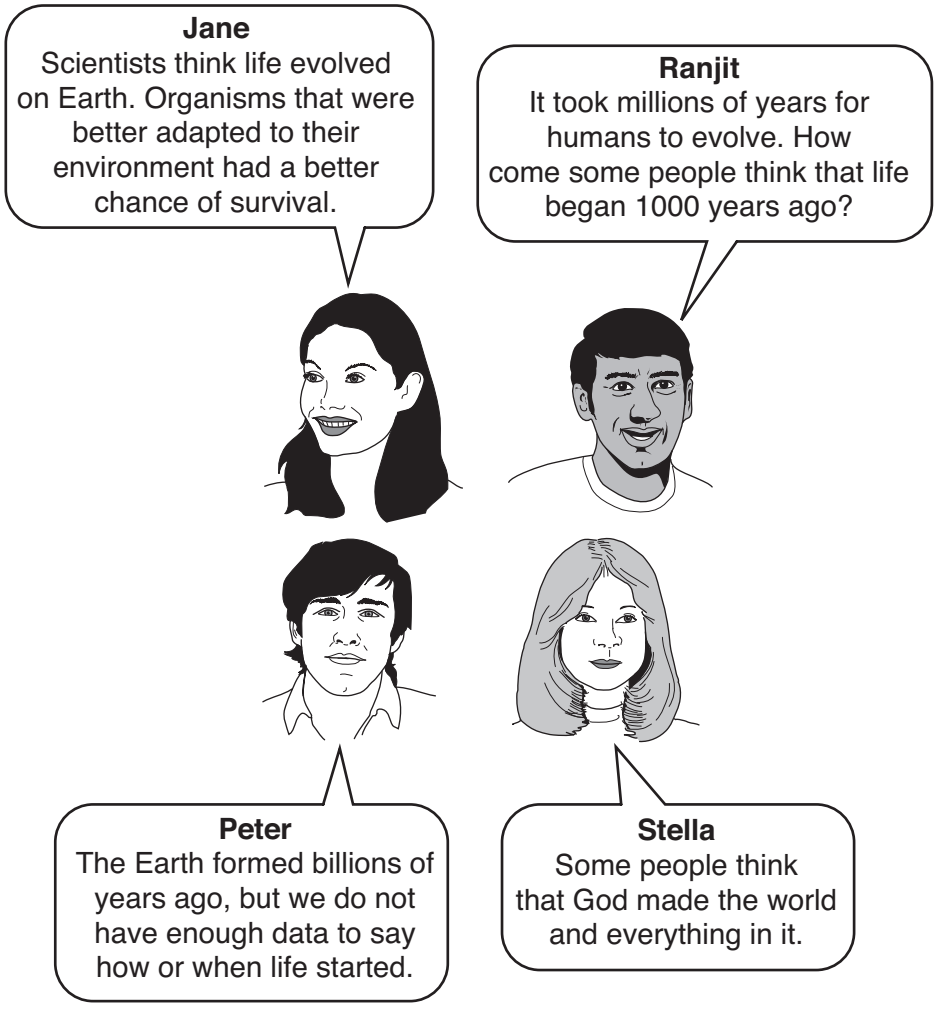
… always happens more quickly. ☐

… always happens more slowly. ☐

[1]

[Total: 4]

9 People have different ideas about how life evolved on Earth.



(a) Which **two** people make statements which include data?

answer ..... and ..... **[2]**

(b) Which person is making a statement which includes an agreed scientific explanation?

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

(c) Which person is suggesting a reason why scientists disagree?

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

[Total: 4]

10 The nervous system is made up of neurons linking receptor cells to effector cells.

(a) Look at the examples of types of cell.

Put ticks (✓) in the boxes next to **two** examples of effector cells.

cells that sense pressure in the skin ☐

cells that react to light in the retina ☐

cells that contract in muscles ☐

cells in glands found in the body ☐

cells that detect sound in the ear ☐

[2]

(b) Which two parts of the nervous system are responsible for coordination?

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

motor neuron ☐

brain ☐

receptor ☐

effector ☐

spinal cord ☐

sensory neuron ☐

[2]

(c) A student produced this table to describe the differences between the nervous system and the hormonal system.

Complete the table by putting these words into the correct column.

chemical **electrical** **fast** **long-lasting** **short-lasting** **slow**

hormonal system	nervous system

[2]

[Total: 6]

END OF QUESTION PAPER

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