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/15910

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 January 2010
Morning

Duration: 40 minutes

A221010

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 Ranjit has tuberculosis.

(a) Put (rings) around the correct words to explain how Ranjit's body reacts to the tuberculosis bacteria.

Ranjit's body has | a nervous / a reproductive / an immune | system to protect him from the bacteria.

Some white blood cells | infect / engulf / vaccinate | the invading bacteria.

Other white blood cells produce | antibodies / antigens / antiseptics | in response to the bacteria.

[3]

(b) Ranjit recovers. He is unlikely to get the disease again.

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

His body reacts more quickly to a second infection. ☐

Ranjit still has the disease. ☐

You only ever get a disease once. ☐

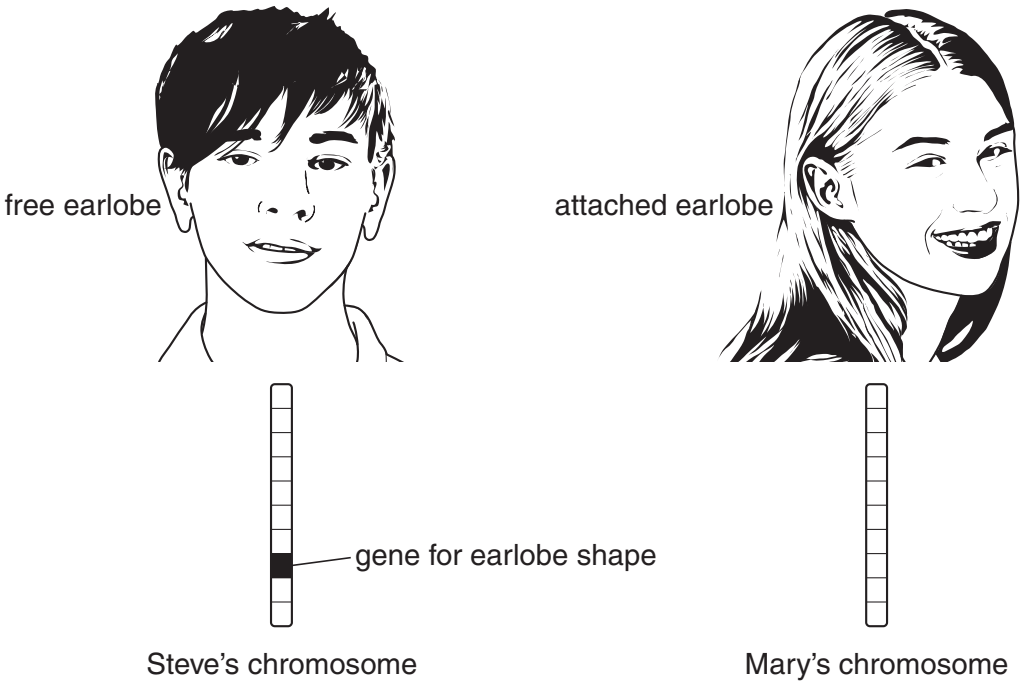
[1]

[Total: 4]

2 Steve and Mary are brother and sister.

One pair of their chromosomes contains the gene for earlobe shape.

One of this pair of chromosomes is inherited from their mother.



(a) Shade in the gene for earlobe shape on Mary's chromosome. **[1]**

(b) The second chromosome of the pair comes from their father.

Free earlobes are **dominant** and attached earlobes are **recessive**.

Steve has free earlobes but Mary does not.

Complete these sentences.

Put a (ring) around the correct word in each case.

Different forms of the gene are called

alleles.
DNA.
chromosomes.

Both Mary's alleles for earlobe shape are

dominant.
different.
recessive.

[2]

(c) Mary looks a bit like her mother and a bit like her father.

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

Mary has lived with her parents for so long she has grown to look like them.	☐
Mary has inherited a combination of alleles from both parents.	☐
Children always look like their parents.	☐
Mary inherited more alleles from her mother than she did from her father.	☐

[1]

[Total: 4]

3 A science class has students of many different heights.

Which two factors **best** explain why?

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

The students are all in the same age group.	☐
Height is controlled by several different genes.	☐
Height is affected by environmental factors such as lifestyle.	☐
Height is affected by the number of children in the class.	☐
All children grow at the same rate.	☐
The students are all the same sex.	☐

[2]

[Total: 2]

4 Fetuses can be tested to see if they have the alleles that cause genetic disorders.

(a) Which two decisions may parents have to make after the results of a genetic test on the fetus?

Put ticks (✓) in the boxes next to the **two** most important decisions.

They may have to decide whether or not to …

… have a vaccination. ☐

… have the pregnancy terminated. ☐

… name the baby after a grandparent. ☐

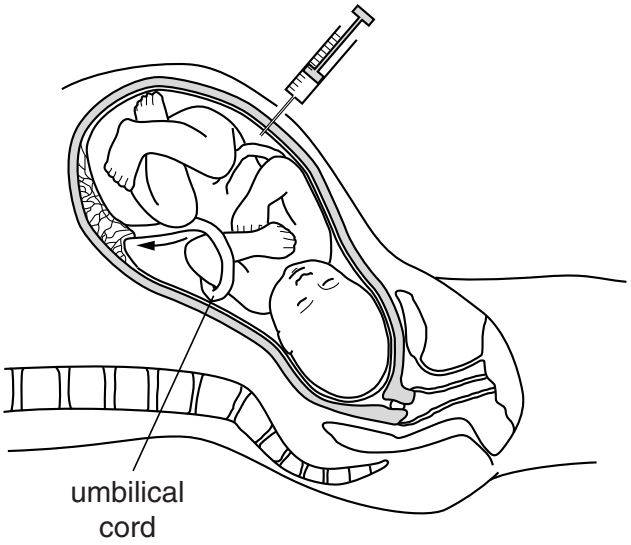
… have an anaesthetic during the baby's birth. ☐

… have any more children. ☐

… tell the grandparents the sex of the fetus before it is born. ☐

[2]

(b) Fetuses are tested by removing a sample of amniotic fluid.



The fluid contains cells from the fetus that can then be tested.

There is a 1% risk that doing the test could result in the mother having a miscarriage.

Using this information, explain clearly **two** things that the parents need to think about **before** they decide whether to have the test.

.....

.....

.....

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

[Total: 4]

5 Embryonic stem cells may be useful in treating some diseases.

(a) Which two statements best describe embryonic stem cells?

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

Embryonic stem cells …

… are taken from the stems of plants. ☐

… are unspecialised cells. ☐

… can be taken from any part of the body. ☐

… are the only cells not to divide. ☐

… can develop into any other kind of cell. ☐

[2]

(b) Human embryos can be cloned to make large numbers of stem cells.

The stem cells can then be used to treat illnesses that were previously incurable.

Some people think using embryos in this way is wrong.

Other people do not.

Tom says: *"The right decision is the one which leads to the best outcome for the majority of people involved"*.

Explain how this idea applies to the cloning of human embryos.

.....

.....

.....

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

[Total: 4]

6 Some diseases can be prevented by vaccination.

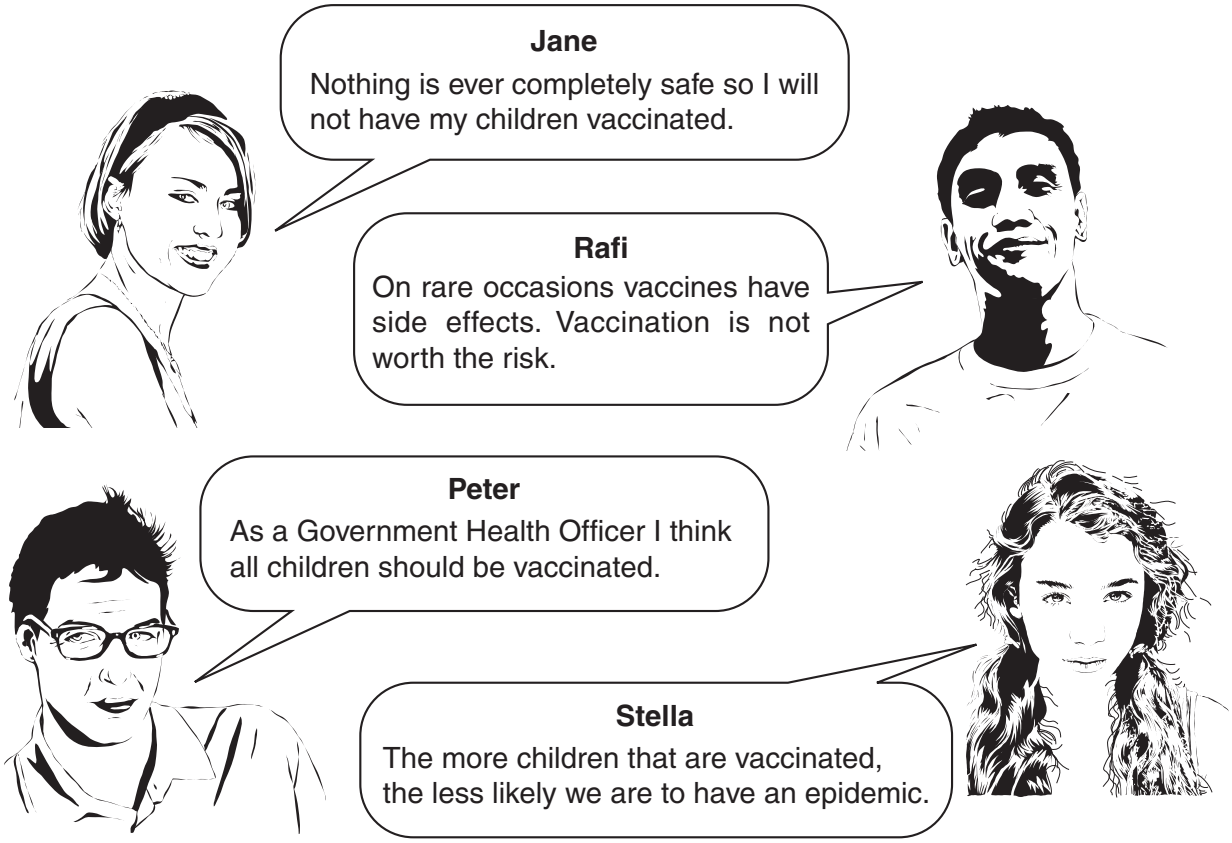
(a) Complete the sentence about vaccines.

Choose the best words from this list.

a different **an infectious** **a large** **a safe** **a toxic**

Vaccines are usually made from ..... form of the disease-causing microorganism. **[1]**

(b) People argue about vaccination.



(i) Which person is using a correlation in their argument?

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

(ii) Summarise in not more than 15 words both sides of the argument about vaccination.

.....

.....

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

[Total: 3]

7 Antibiotics can be used to cure some diseases.

(a) Which microorganisms **cannot** be killed by antibiotics?

Put a ring around the correct answer.

bacteria **fungi** **viruses**

[1]

(b) Which of these statements about the use of antibiotics are **true** and which are **false**?

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

	true	**false**
Over time bacteria may become resistant to antibiotics.	☐	☐
Antibiotics should not be used on mild infections.	☐	☐
When you feel better you should stop taking antibiotics so they are not wasted.	☐	☐

[2]

(c) Trials are carried out to test new drugs.

Explain **who** these trials are carried out on and **why** they are carried out.

Include these words in your answer.

healthy **ill** **safe** **effective**

.....

.....

.....

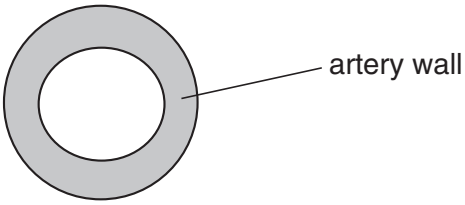
.....

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

[Total: 6]

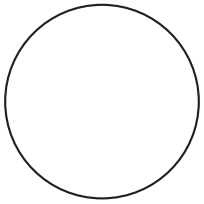
8 There are many factors that increase the risk of heart disease.

(a) When Fred was a young boy a section through an artery supplying his heart muscle with blood looked like this.



Fred has eaten a high fat diet for many years.

Complete the section diagram below to show what Fred's artery is likely to look like now.



[2]

(b) Fred now has heart disease.

Some lifestyle factors decrease the risk of heart disease.

Others do not.

Put a tick (✓) in each box next to a factor that **reduces** the risk of heart disease.

poor diet	☐
stress	☐
cigarette smoking	☐
exercise	☐
excess alcohol	☐
low fat diet	☐

[2]

[Total: 4]

9 Scientists study how life began on Earth and how it evolved.

(a) Put a (ring) around the correct word to complete each sentence.

Life began on Earth about 3500 | million / billion / trillion | years ago.

There are | millions / hundreds / tens | of different species living on Earth today.

| Many / Few / None | of the early species are now extinct. |

[3]

(b) Three different students were asked to name a process involved in the appearance of different species.

These are their answers.

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

Petra says **natural selection**. ☐

Julie says **selective breeding**. ☐

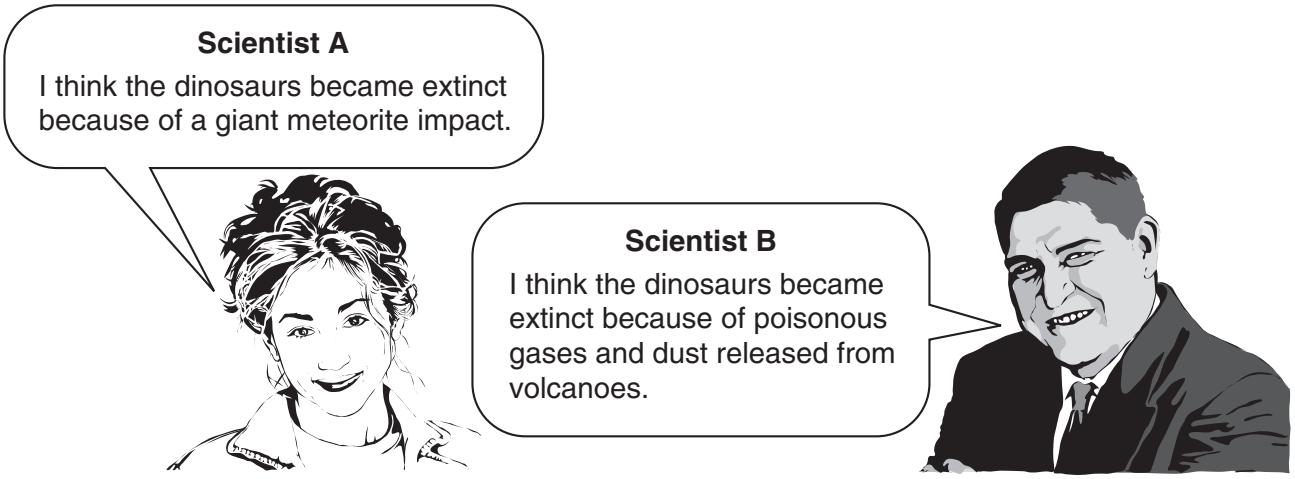
Robert says **artificial selection**. ☐

[1]

[Total: 4]

10 Scientists sometimes have different views.

Read the views of two different scientists.



(a) What scientific question are the two scientists debating?

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

(b) Suggest **two** reasons why the two scientists disagree.

reason 1 .....

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

reason 2 .....

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

[Total: 3]

11 One way the human body is coordinated is by the nervous system.

(a) Which of these statements about the nervous system are true?

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

The nervous system uses …

… effectors that detect stimuli. ☐

… short-lived electrical impulses. ☐

… receptors to link nerve cells with effectors. ☐

… effectors to link receptors with nerve cells. ☐

… nerve cells to link receptors with effectors. ☐

… long-lived impulses. ☐

… slow electrical impulses. ☐

[2]

(b) The body is also coordinated by the hormonal system.

The hormonal system is **different** from the nervous system.

Write down **two** ways that the hormonal system is different.

1 .....

.....

2 .....

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

[Total: 4]

END OF QUESTION PAPER

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