

**Tuesday 15 May 2012 – Morning**

**GCSE TWENTY FIRST CENTURY SCIENCE  
BIOLOGY A**

**A221/01** Unit 1: Modules B1 B2 B3 (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 **12** pages. Any blank pages are indicated.

Answer **all** the questions.

1 Instructions for how an organism develops are found in the cell.

(a) Where in the cell are these instructions found?

Put a ring around the **correct** answer.

**cell wall**

**nucleus**

**cytoplasm**

**cell membrane**

**only the Y chromosome**

**only the X chromosome**

[1]

(b) What is the correct name for these sets of instructions?

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

nucleus

☐

paternal

☐

sperm

☐

genes

☐

hormones

☐

[1]

(c) Which statements best describe what these instructions are for?

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

making proteins

☐

storing information

☐

linking cells together

☐

transporting nutrients

☐

producing carbon dioxide

☐

[2]

(d) The instructions are found on chromosomes.

How many copies of **each** chromosome are in a human sperm?

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

- |    |                          |
|----|--------------------------|
| 1  | <input type="checkbox"/> |
| 2  | <input type="checkbox"/> |
| 4  | <input type="checkbox"/> |
| 23 | <input type="checkbox"/> |
| 46 | <input type="checkbox"/> |

[1]

[Total: 5]

2 Clones can occur naturally.

Which of the following statements about clones are true?

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

Clones can only contain unspecialised cells.

☐

Clones are genetically identical.

☐

Multicellular organisms cannot be clones.

☐

Stem cells from genetically different organisms can specialise to form the same clone.

☐

Asexual reproduction can produce clones.

☐

Differences between clones are due to environmental factors.

☐

Clones occur when cells of an embryo separate.

☐

Clones are always male.

☐

Any variation found between clones is due to their genes.

☐

[3]

[Total: 3]

Turn over

**3** Sunita discovers she is pregnant.

She is worried because she and her partner carry the allele for cystic fibrosis.

**(a)** State **two** symptoms of cystic fibrosis.

symptom 1 .....

symptom 2 ..... **[1]**

**(b)** Sunita is thinking about having a genetic test to see if her unborn baby has cystic fibrosis.

Sunita could have an **amniocentesis test** or **chorionic villus sampling**.

Look at the statements numbered **1** to **6** about testing for cystic fibrosis.

<b>1</b>	Chorionic villus sampling can be performed earlier in pregnancy than amniocentesis.
<b>2</b>	Some people think genetic testing is wrong but others think it is good because it prevents suffering.
<b>3</b>	Cystic fibrosis is a genetic disorder.
<b>4</b>	Parents should discuss whether or not to have a test with as many different people as possible to get their different views.
<b>5</b>	There is a greater risk of miscarriage with chorionic villus sampling than with amniocentesis.
<b>6</b>	Sunita has to decide whether or not to have one of the tests and which test to have.

To answer the following questions you can use each statement once, more than once, or not at all.

**(i)** Which statement, **1**, **2**, **3**, **4**, **5** or **6**, states clearly what the issue is?

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

**(ii)** Which statement, **1**, **2**, **3**, **4**, **5** or **6**, summarises different views that might be held?

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

**(iii)** Sunita decides to have a test.

Which two statements from **1**, **2**, **3**, **4**, **5** and **6**, will Sunita need to consider when she decides which test to have?

statements..... and ..... **[1]**

**(iv)** Which statement, **1**, **2**, **3**, **4**, **5** or **6**, implies that some actions are difficult to justify?

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

- (c) Some people think that the right decision is the one that leads to the best outcome for the majority of people involved.

Use the example of Sunita to explain what this means.

.....

.....

.....

.....

..... [2]

[Total: 7]

4 Antibiotics and vaccinations are used to treat and prevent some illnesses.

(a) Which type of condition **can** be treated with antibiotics?

Put a ring around the correct answer.

**bacterial infections**

**broken bones**

**viral infections**

**inherited disorders**

[1]

(b) Read the statements about developing and using antibiotics.

Put a tick (✓) in **one** box in **each** row to show if each statement is true or false.

	true	false
Over time, some bacteria become resistant to antibiotics.		
New antibiotics are first tested on people with the disease.		
New antibiotics must be tested to see how much profit can be made.		
Antibiotics have to be effective or safe but not both.		
Patients should always complete the course of the tablets that are prescribed.		

[2]

(c) Vaccines can never be completely safe.

Which of the statements about vaccinations explains why?

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

Vaccines are made from powerful antibiotics that have side effects.

☐

Vaccines cause an increase in blood pressure and cholesterol.

☐

Different people experience different side effects from vaccines.

☐

Vaccines contain other people's white blood cells.

☐

[1]

(d) A conflict exists between

- the benefit of vaccination for society as a whole, and
- a person's right to decide whether or not to be vaccinated.

Suggest what this conflict is.

.....

.....

.....

..... [2]

[Total: 6]

5 This question is about the heart and heart disease.

(a) The heart muscle needs its own blood supply.

Which of these statements explains why?

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

Heart muscle needs to ...

... receive carbon dioxide.

☐

... rest between beats.

☐

... receive oxygen.

☐

... be attached to a bone.

☐

... receive glucose.

☐

... produce vitamins.

☐

[2]

(b) The structure of arteries and veins is related to their function.

(i) Write down one feature of an **artery** and explain how it is related to its function.

.....

..... [2]

(ii) Write down one feature of a **vein** and explain how it is related to its function.

.....

..... [2]

(c) When scientists study smoking habits and human health, they look for examples of correlations between factors and outcomes.

Write down **one** example concerning smoking of a correlation between a factor and an outcome.

.....

..... [2]

[Total: 8]



**6** Scientists have investigated how humans have evolved.

These are some of their findings.

<b>1</b>	Fossils were found of early hominid remains.
<b>2</b>	Fossils were found that closely resembled modern humans.
<b>3</b>	Scientists predicted that fossils would be found with some features in between early hominid species and modern man.
<b>4</b>	Fossils were found with some features in between early hominid species and modern man.
<b>5</b>	Fossils were found that showed that modern man existed earlier than previously thought.
<b>6</b>	Scientists concluded that an ancient ancestor gave rise to many different species.
<b>7</b>	Scientists concluded apes and modern man evolved from a common ancestor.

- (a)** Which statement, **1, 2, 3, 4, 5, 6** or **7**, best increases confidence in the theory that modern man evolved from an early hominid species?

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

- (b)** Which statement, **1, 2, 3, 4, 5, 6** or **7**, indicates that either a prediction or observation is wrong?

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

**[Total: 2]**

7 Life on Earth began about 3500 million years ago.

Complete these sentences about evolution.

Choose phrases from this list.

**not react with other molecules**

**biodiversity and sustainability**

**copy themselves**

**delete themselves**

**have produced identical results**

**have produced different results**

**natural selection**

**not have happened**

**environmental conditions being stable**

If the conditions on Earth had at any stage been slightly different from what they were,

evolution would .....

The first living things developed from molecules that could .....

Evolution happens due to ..... [3]

[Total: 3]

**8** Variation and biodiversity are important.

**(a)** Variation occurs between organisms of the same species.

Which of these statements about variation are true?

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

Variation can be caused by the environment.

☐

Variation only occurs between organisms of the same species.

☐

Variation is caused by natural selection.

☐

Genetic variation can be passed from parent to offspring.

☐

Environmental variation is passed from parent to offspring.

☐

Variation is only caused by selective breeding.

☐

Variation does not occur between clones.

☐

Variation can be caused by genes.

☐

**[3]**

**(b)** Which two of the following statements depend upon biodiversity?

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

The transfer of information between different organisms.

☐

Showing how artificial selection took place.

☐

Transferring energy from the Sun into food.

☐

The extinction of a species.

☐

The future development of food crops.

☐

The production of new medicines.

☐

**[2]**

- (c) Maintaining biodiversity is an important part of using the environment in a sustainable way.

Explain what is meant by sustainability.

.....

.....

.....

..... [2]

- (d) Human activity can reduce biodiversity and even lead to extinction of a species.

Name one example of an extinction caused by human activity.

..... [1]

[Total: 8]

## END OF QUESTION PAPER

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