

Candidate forename						Candidate surname					
Centre number						Candidate number					

**OXFORD CAMBRIDGE AND RSA EXAMINATIONS**  
**GCSE**  
**A221/01**  
**TWENTY FIRST CENTURY SCIENCE**  
**BIOLOGY A**

**Unit 1: Modules B1 B2 B3 (Foundation Tier)**

**TUESDAY 15 MAY 2012: Morning**  
**DURATION: 40 minutes**  
**plus your additional time allowance**  
**MODIFIED ENLARGED**

**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)**

**READ INSTRUCTIONS OVERLEAF**

## **INSTRUCTIONS TO CANDIDATES**

- **Write your name, centre number and candidate number in the boxes on the first page. 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).**

## **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.**

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**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**

☐

**2**

☐

**4**

☐

**23**

☐

**46**

☐

**[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]**

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

**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.**

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**[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.**

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

**[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.**

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

- (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.**

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**[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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