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**A221/01**

**GENERAL CERTIFICATE OF SECONDARY EDUCATION**  
**TWENTY FIRST CENTURY SCIENCE**  
**BIOLOGY A**

Unit 1 Modules B1 B2 B3 (Foundation Tier)

**TUESDAY 15 JANUARY 2008**

Afternoon

Time: 40 minutes



Candidates answer on the question paper.

**Additional materials (enclosed):**

None

Calculators may be used.

**Additional materials:** Pencil  
 Ruler (cm/mm)



Candidate  
 Forename

Candidate  
 Surname

Centre  
 Number

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Candidate  
 Number

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**INSTRUCTIONS TO CANDIDATES**

- Write your name in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use blue or 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.
- Do **not** write outside the box bordering each page.
- Write your answer to each question in the space provided.

**INFORMATION FOR CANDIDATES**

- The number of marks for each question is given in brackets [ ] at the end of each question or part question.
- The total number of marks for this paper is 42.

FOR EXAMINER'S USE		
Qu.	Max.	Mark
1	6	
2	4	
3	4	
4	13	
5	7	
6	8	
<b>TOTAL</b>	<b>42</b>	

This document consists of **12** printed pages.

Answer **all** the questions.

1 (a) Jo sees that her son Sammi has spots on his chest and back.

She takes Sammi to the doctor.

The doctor suspects that Sammi has meningitis.

Meningitis is caused by a microorganism.

(i) The microorganism has made Sammi ill.

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

Microorganisms are very large.

Some microorganisms can make poisons.

Cells can be damaged by microorganisms.

Microorganisms are only found in dirty water.

[2]

(ii) The statements **A**, **B**, **C** and **D** describe how Sammi's body reacts to the microorganisms.

They are in the wrong order.

- A** White blood cells digest the microorganisms.
- B** Microorganisms enter the body.
- C** White blood cells engulf the microorganisms.
- D** White blood cells recognise the microorganisms.

Put the statements in the correct order by writing **A**, **B**, **C** or **D** in each box.

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[3]

(b) The doctor finds that Sammi has chicken pox, **not** meningitis.

Sammi's friend Jason had chicken pox last year.

Why will Jason **not** catch chicken pox from Sammi?

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

Chicken pox is not a serious disease.

Jason already has antibodies for chicken pox.

Chicken pox is caused by a virus.

[1]

[Total: 6]

2 Saleema has a three month old daughter called Nadia.

Nadia is due for a vaccination to protect her from certain diseases.

Saleema is worried that there may be side effects.

She asks some of her friends what they think.



(a) Which **one** of Saleema's friends thinks that Nadia should **not** have the vaccination?

answer ..... [1]

(b) Which friend can see a benefit to **Nadia** in having the vaccination?

answer ..... [1]

(c) Which **two** friends can see a benefit for **society** if Nadia has the vaccination?

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

[Total: 4]

3 Alex works for a company trying to make new antibiotics.

Antibiotics are used to treat infections caused by some microorganisms.

(a) Which of these microorganisms **cannot** be controlled with antibiotics?

Put a (ring) around the correct answer.

bacteria

fungi

viruses

[1]

(b) Why do scientists need to find new types of antibiotics?

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

Antibiotics can be killed.

Not all microorganisms can be controlled with antibiotics.

Microorganisms can become resistant to antibiotics.

[1]

(c) When Alex makes a new antibiotic it must be tested.

These are some of the tests which must be done.

They are in the wrong order.

- A The new antibiotic is tested on healthy volunteers.
- B The new antibiotic is tested on human cells grown in a laboratory.
- C The new antibiotic is tested on animals.
- D The new antibiotic is tested on people with the illness.

Fill in the boxes to show the right order. The first one has been done for you.

B			
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[2]

[Total: 4]

4 Theresa and Matthew have identical twin boys.

(a) (i) Put ticks (✓) in the **two** boxes next to the statements that explain why the boys are identical.

They have the same genes.

They have the same parents.

They were both born on the same day.

They both developed from the same fertilised egg.

[2]

(ii) By the time the twins are adults there could be differences between them.

Put a **ring** around **two** possible differences.

**blood group**

**eye colour**

**fingerprints**

**hair style**

**scars**

[2]

(b) The twins have an older brother called Steven. There are differences between him and the twins.

Put ticks (✓) in the **two** boxes that explain why Steven is different from his brothers.

Steven's parents have different genes.

Steven has twice as many genes as his brothers.

Steven has inherited different forms of some genes.

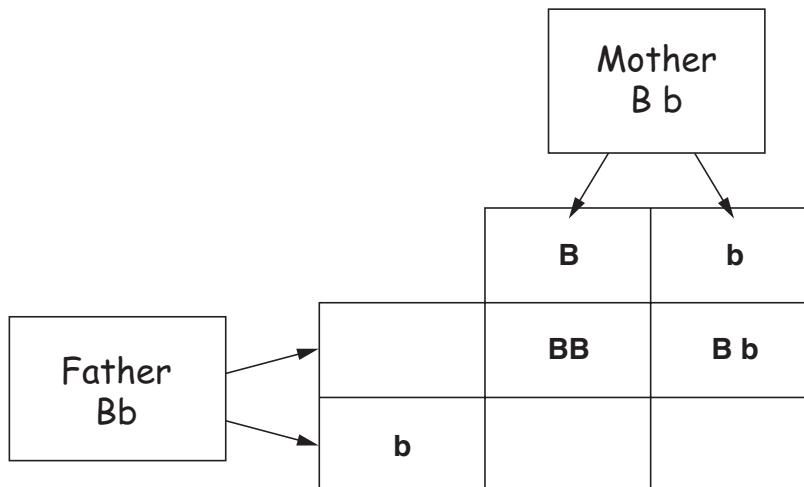
Steven has lost genes as he has grown.

[2]

(c) Steven has blue eyes. The twins and both of their parents have brown eyes.

**B** represents the allele for brown eyes, and **b** represents the allele for blue eyes.

(i) Complete the genetic diagram.



[2]

(ii) Put a (ring) around the combination that Steven inherited. [1]

(d) Theresa and Matthew want to have a daughter.

(i) What combination of sex chromosomes is needed to make a daughter?

Put a (ring) around the correct answer.

XX            YY            XY

[1]

(ii) It is possible to select the sex of an embryo before it is implanted.

Some people think that embryo selection should not be done.

Sort the following statements into arguments **for** embryo selection and arguments **against** embryo selection.

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

statement	argument for	argument against
We can make a more balanced family by selecting the sex of a child.		
Embryo selection could result in an imbalance of males and females in the population.		
Scientists should not be allowed to play God.		
Embryo selection could reduce the number of children with genetic disorders.		
Many embryos would be discarded if embryo selection were allowed.		

[3]

[Total: 13]

5 Read this passage about a discovery made by a conservation group.

### New rodent is 'living fossil'

1. A squirrel-like rodent was discovered in Laos. It is the only survivor of a group that scientists thought had died out 11 million years ago.
2. It is the only new family of living mammals to be found in 30 years.
3. Scientists believe it is a 'living fossil'. It is related to a group of prehistoric rodents that once lived in South East Asia.
4. They found that the rodent's skeleton is very similar to rodent fossils only found in 11 million year old rock.
5. The chief scientist said efforts to conserve this animal should be given the highest priority.

Extract from BBC News at <http://news.bbc.co.uk>, 09 March 2006

(a) What can scientists find out from an animal fossil?

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

the type of blood system it had

how long ago the animal lived

the colour of the animal

the size of the animal

whether the animal had colour vision

[2]

(b) Which statement, **3**, **4** or **5**, contains data?

answer ..... [1]

10

(c) Which statement **best** explains why scientists had thought that this rodent was extinct?

Put a tick (✓) in the correct box.

The rodent had never been observed in the wild.

Fossils of this rodent are only found in 11 million year old rock.

New species of animals are always being discovered.

[1]

(d) Conservationists are studying the living rodent and its habitat.

They want to make sure it does not become extinct.

Which changes could cause the rodent to become extinct?

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

The rodent's prey becomes extinct.

The climate becomes too cold.

More trees grow giving new shelter.

A new food source moves into the area.

A new predator moves into the area.

The environmental conditions stay the same.

[3]

[Total: 7]

6 Our bodies need communication systems to respond to changes in our surroundings.

Some of these responses are controlled by nerves.

Some are controlled by hormones.

(a) Here is a list of responses.

- A knee jerk reaction when the knee cap is tapped
- B controlling the glucose level in the blood after a meal
- C keeping the water level in the body correct
- D touching a hot surface and pulling away
- E jumping out of the way of a moving car
- F blinking when a bright light is shone in our eyes

Choose **two** responses that:

(i) are controlled by nerves.

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

(ii) are controlled by hormones.

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

12

(b) Jasmine plays rounders for her school team.

Complete the sentences to explain what happens when she catches the ball.

Choose words from this list.

communication      effector      neuron  
response      sensory      stimulus

Jasmine sees the ball coming towards her.

Her eyes contain ..... cells.

The cells react to a light .....

Muscles in her arm contain ..... cells.

Jasmine catches the ball.

Catching the ball is a .....

[4]

[Total: 8]

**END OF QUESTION PAPER**

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Q.5 text

Helen Briggs, *New Rodent is 'living fossil'*, 09 March 2006 © BBC News, <http://news.bbc.co.uk> Reproduced by kind permission of BBC News Online.

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