

Surname						Other Names					
Centre Number						Candidate Number					
Candidate Signature											

For Examiner's Use
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General Certificate of Secondary Education  
January 2007

**SCIENCE B**  
**Unit Biology B1**

**BIOLOGY**  
**Unit Biology B1**

**Higher Tier**

Tuesday 16 January 2007 1.30 pm to 2.15 pm

<p><b>You will need no other materials.</b> You may use a calculator.</p>
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Time allowed: 45 minutes

**Instructions**

- Use blue or black ink or ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- Answer the questions in the spaces provided.
- Do all rough work in this book. Cross through any work you do not want to be marked.

**Information**

- The maximum mark for this paper is 45.
- The marks for questions are shown in brackets.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.

**Advice**

- In all calculations, show clearly how you work out your answer.

**BLY1H**  
**H**



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Question	Mark	Question	Mark
1		3	
2		4	
		5	
		6	
		7	
		8	
Total (Column 1) →			
Total (Column 2) →			
TOTAL			
Examiner's Initials			

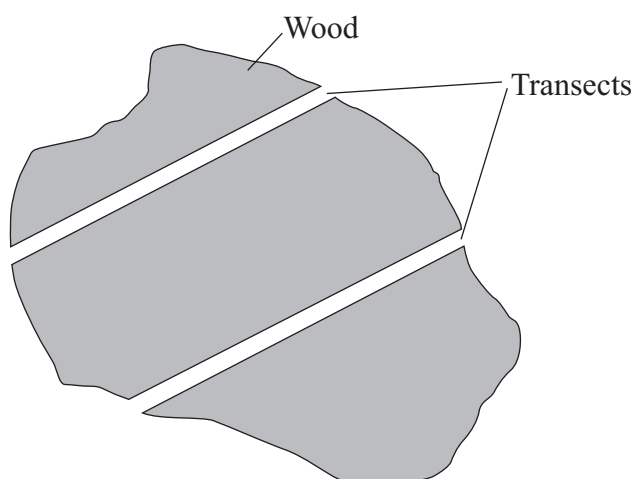
Answer **all** questions in the spaces provided.

- 1 Red squirrels live in trees. They eat seeds from the cones of conifer trees. Squirrels store cones in 'larders' on the ground. These larders provide food through the winter. Each red squirrel makes and defends one larder.

Scientists monitor squirrel numbers to find the best habitats for the squirrel's survival. In one investigation, scientists estimated the numbers of squirrels in different types of woodland. Each woodland contains a different species of conifer tree.

Here is their method.

- Ten woods of each type of woodland were surveyed.
- In each wood scientists measured out two transects (strips), each 600 m long and 10 m wide.
- A scientist walked slowly down the centre of each transect, recording the number of squirrel larders he could see.



- (a) (i) How many transects altogether did the scientists survey in each **type** of woodland?

Number of transects .....  
(1 mark)

- (ii) What was the total area surveyed in **one** wood?

.....  
Area ..... m<sup>2</sup>  
(1 mark)

- (b) Name **one** variable that was controlled in this investigation.

.....  
(1 mark)

- (c) (i) The scientists recorded the number of ladders instead of the number of squirrels they saw.

Explain how this could have increased the accuracy of the investigation.

.....  
.....  
(1 mark)

- (ii) This method of counting the number of ladders could have led to an inaccurate estimate of the number of squirrels.

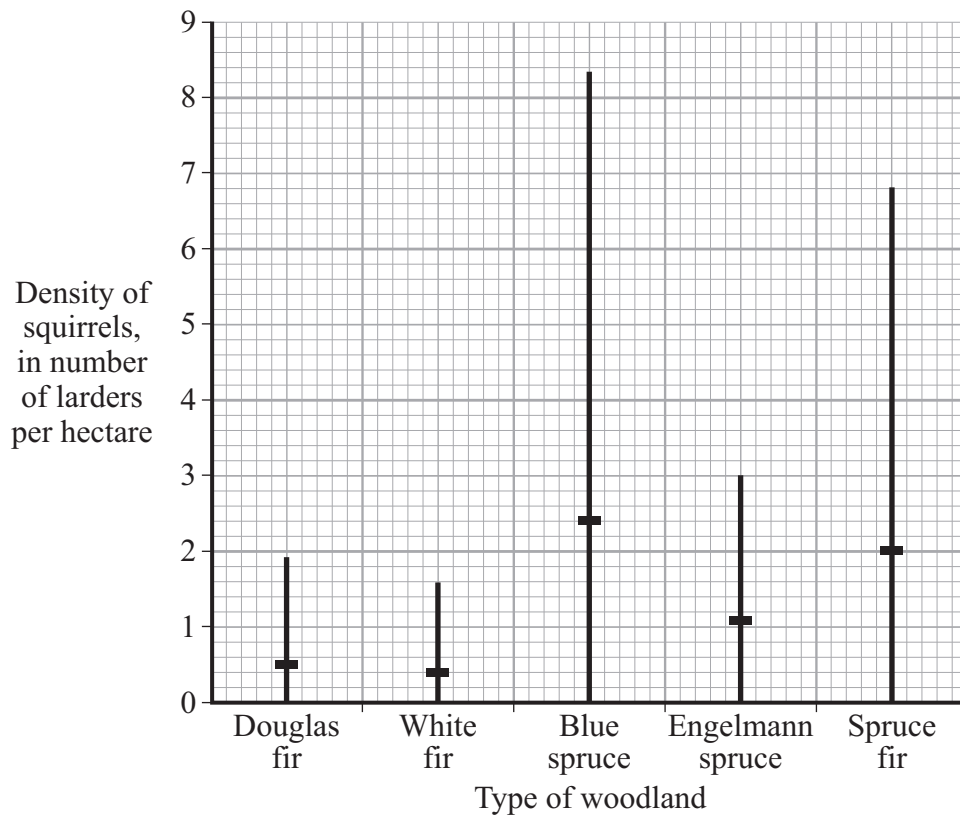
Explain how.

.....  
.....  
.....  
.....  
(2 marks)

**Question 1 continues on the next page**

**Turn over ►**

(d) The results of the investigation are shown in the graph.



The horizontal mark on each bar represents the mean number of ladders per hectare of woodland.

The range of the number of ladders observed for Douglas fir woodland was 0 to 1.9 per hectare.

- (i) What was the range of the number of ladders per hectare in the Spruce fir woodland?

.....  
(1 mark)

- (ii) The highest mean number of ladders per hectare was found in Blue spruce woodland.

Suggest **one** explanation for this.

.....  
.....  
(1 mark)

2 Deforestation affects the environment in many ways.

(a) Deforestation increases the amount of carbon dioxide in the atmosphere.

Give **two** reasons why.

1 .....

.....

2 .....

.....

(2 marks)

(b) Deforestation also results in a loss of *biodiversity*.

(i) What is meant by *biodiversity*?

.....

.....

(1 mark)

(ii) Give **one** reason why it is important to prevent organisms from becoming extinct.

.....

.....

(1 mark)

4
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**Turn over for the next question**

**Turn over ►**

3 It is legal in the UK to use certain recreational drugs but illegal to use others.

- (a) Tobacco is a legal drug. Pregnant women are strongly advised not to smoke.

Explain how a fetus may be affected if the mother smokes tobacco.

.....

.....

.....

.....

(2 marks)

- (b) Illegal drugs are classified as Class **A**, **B** or **C**. Class **A** drugs are the most dangerous. The use of Class **A** drugs attracts the most serious punishments and fines.

Cannabis is a Class **C** drug.

These are some facts about cannabis.

- It is less addictive than amphetamines, tobacco or alcohol.
- It may cause mental illness.
- It does not seem to cause major social problems.
- It may be a 'gateway' drug to more harmful substances.
- It has a higher tar content than tobacco.
- It has an effect on the heart, similar to the effects of exercise.
- It can upset the control of blood pressure.

Use the above information to answer these questions.

- (i) Give **two** reasons why many people think that cannabis should be classified as a Class **A** or Class **B** drug.

1 .....

.....

2 .....

.....

(2 marks)

- (ii) Give **two** reasons why many people think that cannabis should **not** be classified as an illegal drug.

1 .....

.....

2 .....

.....

(2 marks)

6

**Turn over for the next question**

**Turn over ►**

4 Cholesterol is a substance which affects our health.

(a) (i) Which organ in the body produces cholesterol?

.....  
(1 mark)

(ii) Which organ in the body may be damaged by high levels of cholesterol in the blood?

.....  
(1 mark)

(iii) Name **one** factor, other than diet, which affects the level of cholesterol in the blood.

.....  
(1 mark)

(b) Other than increasing fitness, give **two** reasons why regular exercise is important in maintaining a healthy body.

1 .....

.....

2 .....

.....

(2 marks)



5 Controlling infections in hospitals has become much more difficult in recent years.

(a) Explain why MRSA is causing problems in many hospitals.

.....

.....

.....

.....

(2 marks)

(b) The pioneer in methods of treating infections in hospitals was Ignaz Semmelweiss. He observed that women whose babies were delivered by doctors in hospital had a death rate of 18% from infections caught in the hospital. Women whose babies were delivered by midwives in the hospital had a death rate of 2%. He observed that doctors often came straight from examining dead bodies to the delivery ward.

(i) In a controlled experiment, Semmelweiss made doctors wash their hands in chloride of lime solution before delivering the babies. The death rate fell to about 2% – down to the same level as the death rate in mothers whose babies were delivered by midwives.

Explain why the death rate fell.

.....

.....

(1 mark)

(ii) Explain how Semmelweiss's results could be used to reduce the spread of MRSA in a modern hospital.

.....

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(2 marks)

5
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Turn over ►

6 The drawings show two different species of butterfly.



*Amauris*



*Hypolimnna*

- Both species can be eaten by most birds.
- *Amauris* has a foul taste which birds do not like, so birds have learned not to prey on it.
- *Hypolimnna* does **not** have a foul taste but most birds do not prey on it.

(a) Suggest why most birds do **not** prey on *Hypolimnna*.

.....

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(2 marks)

(b) Suggest an explanation, in terms of natural selection, for the markings on the wings of *Hypolimnna*.

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(3 marks)

7 Read the passage about IVF (in-vitro fertilisation) and embryo-splitting.

“IVF is not as successful as we would like it,” says scientist Michael Tucker. “On average, only one in five or one in six of all the embryos that we generate in the IVF lab will develop as far as full-term delivery as a baby.”

“There is a way to perhaps double those odds. A new, identical embryo is split off from the original embryo made in the IVF lab.”

“What we are really doing is creating an identical twin,” says scientist Dr Hilton Kort.

“And that’s what happens in nature every day. Cloning is creating a replica of a person or an animal.”

- (a) Explain why the two embryos will develop into identical twins.

.....

.....

.....

.....

(2 marks)

- (b) Explain why the embryos are **not** clones of their parents.

.....

.....

.....

.....

(2 marks)

- (c) The scientists want to develop this technique, but are afraid to do so because public opinion might be against the technique.

Suggest an explanation for this.

.....

.....

(1 mark)

**8** Hormones are used in contraceptive pills.

(a) Explain how a contraceptive pill works.

.....

.....

.....

.....

(2 marks)

(b) Read the information about the trialling of the first contraceptive pill.

The Pill was developed by a team of scientists led by Gregory Pincus. The team needed to carry out large scale trials on humans.

In the summer of 1955, Pincus visited the island of Puerto Rico. Puerto Rico is one of the most densely populated areas in the world. Officials supported birth control as a form of population control. Pincus knew that if he could demonstrate that the poor, uneducated women of Puerto Rico could use the pill correctly then so could women anywhere in the world.

The scientists selected a pill with a high dose of hormones to ensure that no pregnancies would occur while test subjects were taking the drug. The Pill was found to be 100% effective when taken properly. But 17% of the women in the study complained of side effects. Pincus ignored these side effects.

The women in the trial had been told only that they were taking a drug that prevented pregnancy. They had not been told that the Pill was experimental or that there was a chance of dangerous side effects.

This image shows a full page of a handwriting practice worksheet. It consists of ten sets of horizontal dashed lines spaced evenly down the page, providing a guide for letter height and placement. The background is plain white, and there are no other markings or text present.

7

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