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| For Examiner's Use |
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General Certificate of Secondary Education
June 2008

SCIENCE B
Unit Biology B1

BIOLOGY
Unit Biology B1

BLY1H
H



Higher Tier

Tuesday 17 June 2008 9.00 am to 9.45 am

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| <p>For this paper you must have:</p> <ul style="list-style-type: none"> a ruler. <p>You may use a calculator.</p> |
|---|

Time allowed: 45 minutes

Instructions

- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Answers written in margins or on blank pages will not be marked.
- 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.

| For Examiner's Use | | | |
|---------------------|------|----------|------|
| Question | Mark | Question | Mark |
| 1 | | 5 | |
| 2 | | 6 | |
| 3 | | 7 | |
| 4 | | | |
| Total (Column 1) | | → | |
| Total (Column 2) | | → | |
| TOTAL | | | |
| Examiner's Initials | | | |



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

1 Organisms have adaptations that enable them to survive in extreme conditions.

1 (a) The photograph shows an arctic fox.



This fox lives in the arctic, where it is very cold.

Suggest **two** ways in which the arctic fox is adapted for life in very cold conditions. Explain how each adaptation helps the arctic fox to survive in very cold conditions.

Adaptation 1

How this adaptation helps the arctic fox to survive in very cold conditions.
.....
.....
.....

Adaptation 2

How this adaptation helps the arctic fox to survive in very cold conditions.
.....
.....
.....

(4 marks)



1 (b) The photograph shows an antelope that lives in a sandy desert.



The antelope is prey to large cats such as cheetah.

Suggest **two** adaptations that help this antelope to avoid being killed by predators. Explain how each adaptation helps the antelope to avoid being killed by predators.

Adaptation 1

.....

How this adaptation helps the antelope to avoid being killed by predators.

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Adaptation 2

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How this adaptation helps the antelope to avoid being killed by predators.

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(4 marks)

8

Turn over ▶



2 Governments are encouraging businesses to reduce carbon dioxide emissions.

2 (a) (i) Explain the link between carbon dioxide emissions and the greenhouse effect.

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(2 marks)

2 (a) (ii) Give **one** possible outcome of the greenhouse effect on the environment.

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(1 mark)

2 (b) A large supermarket chain is advertising ‘our goal is to make our business carbon neutral in the next five years’.

2 (b) (i) Why does the supermarket management think that this will attract more customers?

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(1 mark)



2 (b) (ii) One step that the supermarket chain intends to take is to obtain as much food as possible from British sources.

Explain how this will help the environment.

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(2 marks)

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| 6 |

Turn over for the next question

Turn over ▶



- 3 A popular diet book claims that a low-carbohydrate diet results in quicker weight loss and a more healthy body than a low-fat diet.

Scientists carried out an investigation to see if this claim is true.

- They used 120 overweight volunteers divided into two equal groups.
- **Group 1** was given a diet containing less than 20 g of carbohydrate per day.
- **Group 2** was given a low fat diet. This contained less than 30% of energy from fat and less than 300 mg of cholesterol per day.
- Both groups were given the same exercise programmes and a weekly information meeting.
- Both groups were allowed only 2000 kilocalories per day.

The results after 24 weeks are shown in the table.

| | Group 1 Low-carbohydrate diet | Group 2 Low-fat diet |
|--|--|---------------------------------|
| Proportion of volunteers who completed the trial | 76% | 57% |
| Mean change in body mass | -12.9% | -6.7% |
| Mean change in body fat mass | -9.4 kg | -4.8 kg |
| Mean change in blood HDL concentration | +55 mg per litre | -16 mg per litre |
| Mean change in blood LDL concentration | +16 mg per litre | -74 mg per litre |

- 3 (a) What was the independent variable in this investigation?

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(1 mark)

- 3 (b) Give **one** variable that the scientists tried to control in this investigation.

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(1 mark)



3 (c) Give **two** ways in which the method used by the scientists could have led to unreliable data.

1

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2

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(2 marks)

3 (d) Does the data support the claim in the book?

Draw a ring around your answer. **Yes / No**

Give **two** reasons for your answer.

1

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2

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(2 marks)

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| 6 |

Turn over for the next question

Turn over ►



4 Pathogenic bacteria and viruses may make us feel ill if they enter our bodies.

4 (a) Why do bacteria and viruses make us feel ill?

Bacteria

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Viruses

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(2 marks)

4 (b) Most drugs that kill bacteria cannot be used to treat viral infections.

Explain why.

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(2 marks)



4 (c) Antibiotic-resistant strains of bacteria are causing problems in most hospitals.

Explain, as fully as you can, why there has been a large increase in the number of antibiotic-resistant strains of bacteria.

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(4 marks)

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Turn over for the next question

Turn over ▶



5 The photograph shows a Crossbill.



A Crossbill feeds by using its bill (beak) to force apart the scales on conifer cones. It then uses its tongue to extract the seeds. If the bill is clipped it grows back again.

Scientists were interested in the evolution of the bill of the Crossbill.

In an investigation, they clipped the bills of several Crossbills so that their bills no longer crossed.

They observed that Crossbills with clipped bills took much longer to get seeds.

Use information from the investigation to suggest an explanation for the evolution of the bill in the Crossbill.

In your explanation, use the ideas of *selection*, *competition* and *mutation*.

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(4 marks)

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| 4 |



Turn over for the next question

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ANSWER IN THE SPACES PROVIDED**

Turn over ▶



6 (a) Describe the roles of FSH, oestrogen and LH in the menstrual cycle.

FSH

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Oestrogen

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LH

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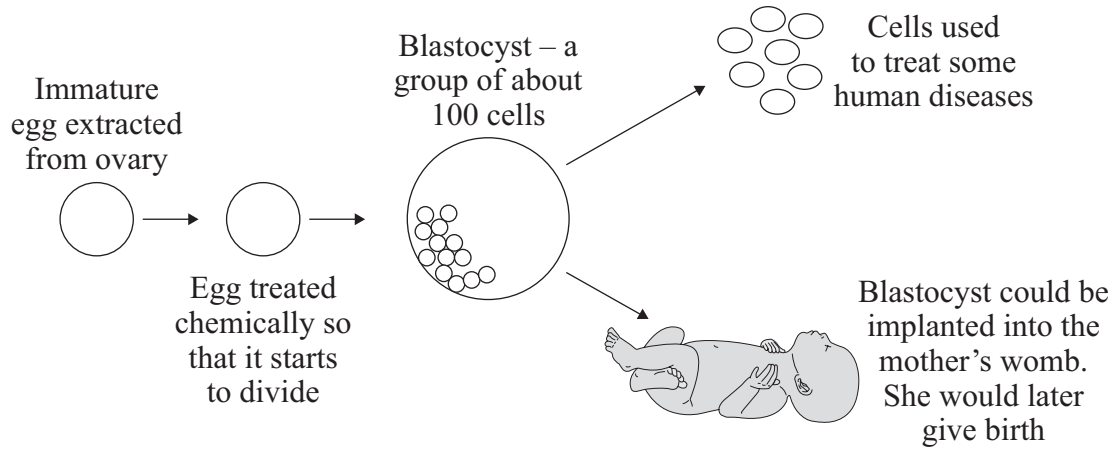
.....

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(4 marks)



6 (b) The diagram shows how an immature egg could be used either to produce cells to treat some human diseases or to produce a baby.



Scientists may be allowed to use this technique to produce cells to treat some human diseases, but not to produce babies.

Using information from the diagram, suggest an explanation for this.

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(4 marks)

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| 8 |
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Turn over ▶



7 Read the description of an investigation into the link between smoking cannabis and heroin addiction.

Six 'teenage' rats were given a small dose of THC – the active chemical in cannabis – every three days between the ages of 28 and 49 days. This is the equivalent of human ages 12 to 18.

The amount of THC given was roughly equivalent to a human smoking one cannabis 'joint' every three days.

A control group of six 'teenage' rats did not receive THC.

After 56 days catheters (narrow tubes) were inserted in all twelve of the now adult rats and they were able to self-administer heroin by pushing a lever.

All the rats began to self-administer heroin frequently. After a while, they stabilised their daily intake at a certain level.

The ones that had been on THC as 'teenagers' stabilised their heroin intake at a much higher level than the others. They appeared to be less sensitive to the effects of heroin. This pattern continued throughout their lives.

Reduced sensitivity to the heroin means that the rats take larger doses. This has been shown to increase the risk of addiction.



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