General Certificate of Secondary Education
June 2009

SCIENCE
Unit Biology B1

BLY1H

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BIOLOGY
Unit Biology B1

Higher Tier

Friday 12 June 2009   9.00 am to 9.45 am

For this paper you must have:
- a ruler.
You may use a calculator.

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.

BLY1H

*Areas outside
the box will
not be scanned
for marking*

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

1 Swallows and swifts migrate between Britain and South Africa every year.

1 (a) **Photograph 1** shows a swallow.

Photograph 1

Swallows can fly very quickly.

Use information from the photograph to give **one** way in which the swallow is adapted for flying very quickly.

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(1 mark)

1 (b) **Photograph 2** shows swifts.

Photograph 2

Swallows and swifts both feed on flying insects.
They both spend the summer in Britain and then migrate to South Africa in the autumn.

Suggest **one** reason why swallows and swifts do not stay in Britain in the winter.

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(1 mark)

1 (c) The table gives data about swallows and swifts.

	Swallows	**Swifts**
Arrival date in Britain	April	Early May
Leaving date from Britain	October	Early August
Food	Flying insects	Flying insects
Height at which the birds feed	Near ground level	Up to 350 m above ground level
Times at which birds feed	Mainly when it is light	Almost 24 hours per day

1 (c) (i) There is very little competition between swallows and swifts for food.

Use information from the table to suggest **two** reasons for this.

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(2 marks)

(Extra space) ....

1 (c) (ii) Swallows and swifts do compete for some factors.

Suggest **one** of these factors.

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(1 mark)

Turn over ▶

5

2 Many people who are overweight try slimming programmes.

A research study evaluated four different slimming programmes over 6 months.

Scientists selected a group of 40 people for each slimming programme and a control group. Each of the five groups was matched for age, gender and mass.

The graph shows the results of the study.

The graph showing results cannot be reproduced here due to third party copyright constraints.
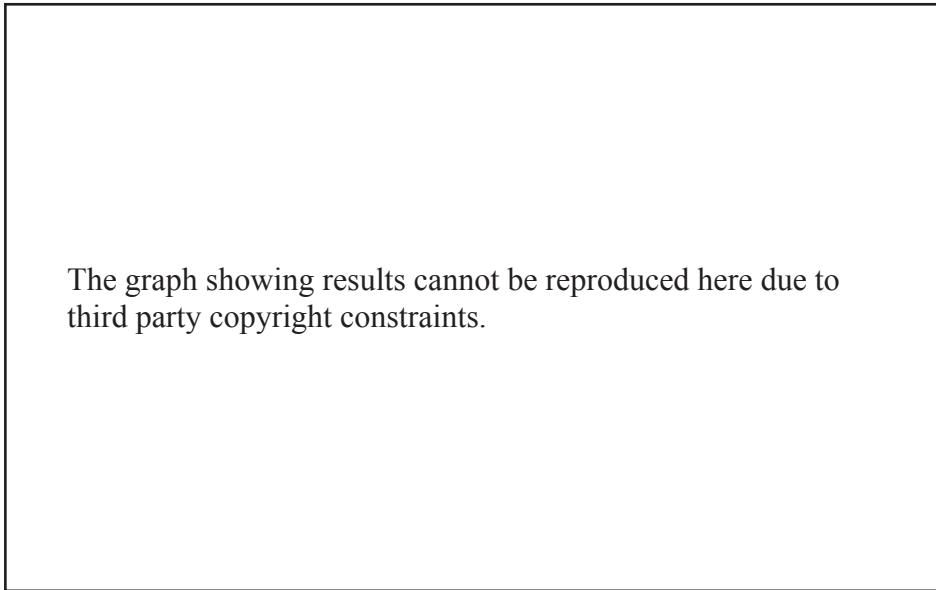
2 (a) Give **two** control variables that were used in this study.

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(2 marks)

2 (b) Give **two** conclusions that can be drawn from the results of this study.

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(2 marks)

5

*Areas outside
the box will
not be scanned
for marking*

2 (c) The costs of the four programmes were:

- Atkins book cost £3
- Rosemary Conley classes cost £140 for 6 months
- Weight Watchers classes cost £170 for 6 months
- Twice-daily Slim-Fast meal replacements cost £240 for 6 months.

Use this information and the graph to answer this question.

Which is the most cost effective of the four programmes?

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Explain the reason for your answer.

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(2 marks)

(Extra space) ....

2 (d) Some slimming programmes include daily exercise.

Explain how daily exercise helps a person to lose mass.

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(2 marks)

(Extra space) ....

8

Turn over for the next question

Turn over ▶

3 Many people use recreational drugs.

3 (a) Give **one** example of:

3 (a) (i) a legal recreational drug

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(1 mark)

3 (a) (ii) an illegal recreational drug.

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(1 mark)

3 (b) Some recreational drugs are addictive.

3 (b) (i) Give **one** example of a recreational drug that is very addictive.

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(1 mark)

3 (b) (ii) Explain how the action of a drug makes a person become addicted to it.

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(1 mark)

3 (c) Some doctors think that smoking cannabis causes depression.

Doctors investigated the cannabis smoking habits of 1500 young adults.

The table shows the percentage of cannabis smokers in the investigation who became depressed.

How many times the men or women had smoked cannabis in the last 12 months	Percentage of men who became depressed	Percentage of women who became depressed
Less than 5 times	9	16
More than 5 times, but less than once per week	10	17
1–4 times per week	12	31
Every day	15	68

From the data, give **two** conclusions that can be drawn about the relationship between cannabis and depression.

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(2 marks)

(Extra space) ....

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6

Turn over for the next question

Turn over ▶

4 Influenza is a disease caused by a virus.

4 (a) Explain why it is difficult to treat diseases caused by viruses.

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(2 marks)

4 (b) In some years there are influenza epidemics.

The graph shows the death rate in Liverpool during three influenza epidemics.

Weekly death rate from influenza in deaths per 100 000 of population

Time in weeks from start of epidemic

Key
- 1918 epidemic
- · — · 1951 epidemic
- ----- 1957 epidemic
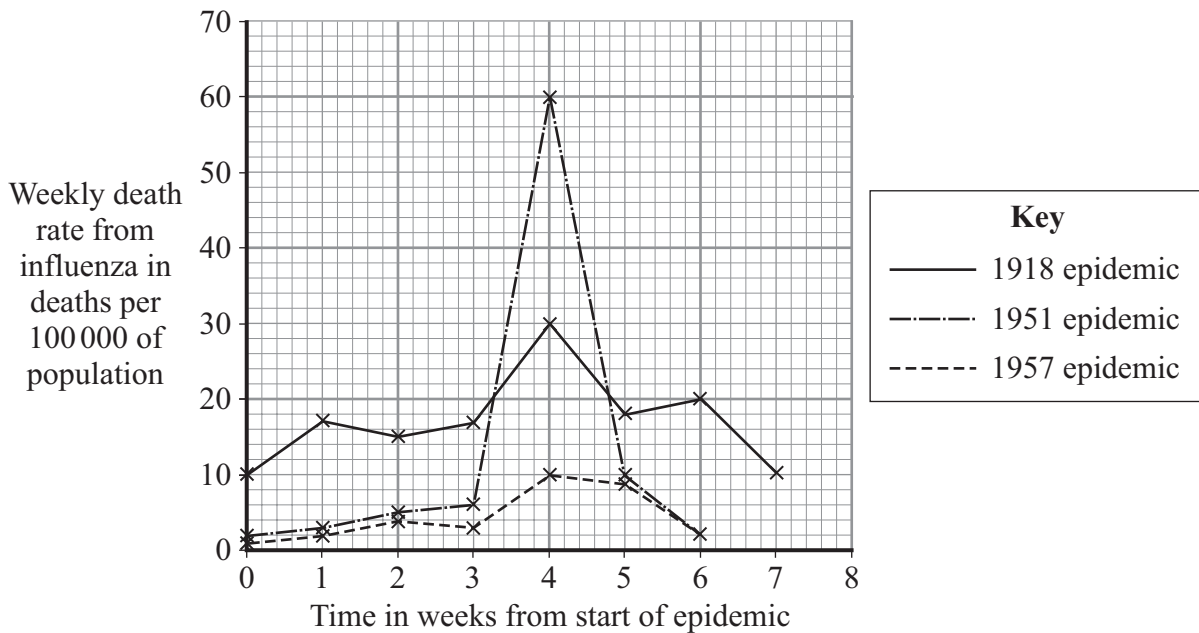
4 (b) (i) The population of Liverpool in 1951 was approximately 700 000.

Calculate the approximate number of deaths from influenza in week 4 of the 1951 epidemic.

Show clearly how you work out your answer.

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Number of deaths............................

(2 marks)

4 (b) (ii) In most years, the number of deaths from influenza in Liverpool is very low.

Explain, in terms of the influenza virus and the body's immune system, why there were large numbers of deaths in years such as 1918 and 1951.

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(3 marks)

(Extra space) ....

7

Turn over for the next question

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5 The photograph shows a snake eating a toad.

Cane toads were first introduced into Australia in 1935. The toads contain toxins and most species of Australian snake die after eating the toad.

The cane toad toxin does not affect all snakes the same way. Longer snakes are less affected by toad toxin.

Scientists investigated how red-bellied black snakes had changed in the 70 years since cane toads were introduced into their area. They found that red-bellied black snakes had become longer by around 3 – 5%.

Suggest an explanation for the change in the body length of the red-bellied black snakes since the introduction of the cane toads.

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(4 marks)

(Extra space) ....

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Turn over ▶

6   Cattle give out methane.

6   (a)   Explain how the methane given out by cattle is affecting the Earth's climate.
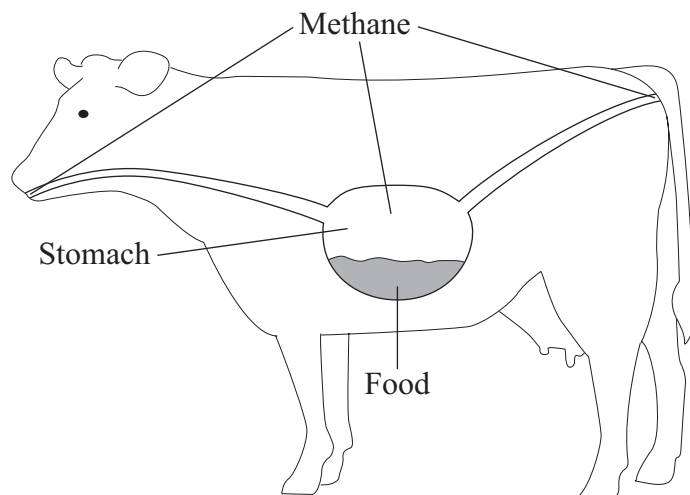
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(3 marks)

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6   (b)   Scientists are investigating how to reduce methane emissions from cattle.

Most of this methane is emitted by the cows belching.

Scientists have found that less methane is belched if the cows eat high-sugar rye grass.

This rye grass has been produced by genetic engineering.

6 (b) (i) Suggest how the high-sugar rye grass might have been produced by genetic engineering.

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(3 marks)

(Extra space) ....

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6 (b) (ii) Some people might object to the growing of genetically-engineered, high-sugar rye grass for feeding cattle.

Give **two** reasons why.

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(2 marks)

8

Turn over for the next question

Turn over ▶

7 Two types of fertility treatment are in-vitro fertilisation (IVF) and in-vitro maturation (IVM).

7 (a) Describe the role of hormones in IVF treatment.

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(3 marks)

(Extra space) ....

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7 (b) Read the passage about fertility treatment.

> During normal IVF, a woman undergoes several weeks of hormone injections. The treatment can lead to a condition called ovarian hyperstimulation syndrome resulting in a build-up of fluid in the lungs. Very rarely, it can cause death. The syndrome occurs in about 1 % of standard IVF cycles, but in about 10 % of the IVF cycles of some women. An IVF cycle may cost up to £4300.
>
> In IVM, hormone treatment lasts for less than 7 days. Eggs are then collected from the ovaries while they are still immature. Each egg is then matured in a laboratory for up to 48 hours before being injected with a single sperm. A few days after fertilisation, the embryos are implanted into the mother's womb. The cost of each IVM cycle is £1700.
>
> An IVM expert says: "In IVM treatment there's a small risk of abnormalities in the sex chromosomes and also of birth deformities and cancer in the babies. These risks are not massive but they are greater than in IVF."

7 (b) Evaluate the use of IVM rather than IVF in treating infertility.

Remember to give a conclusion to your evaluation.

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(4 marks)

(Extra space) ....

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END OF QUESTIONS

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