

Surname						Other Names					
Centre Number						Candidate Number					
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General Certificate of Education
 June 2005
 Advanced Level Examination



BIOLOGY (SPECIFICATION B)
Unit 8 Section A Behaviour and Populations

BYB8/A

Friday 24 June 2005 1.30 pm to 3.45 pm

In addition to this paper you will require:

- Section B provided as an insert (enclosed);
- a ruler with millimetre measurements.

You may use a calculator.

For Examiner's Use			
Number	Mark	Number	Mark
1			
2			
3			
4			
5			
6			
Total (Column 1)	→		
Total (Column 2)	→		
TOTAL			
Examiner's Initials			

Time allowed: The total time for Section A and Section B of this paper is 2 hours 15 minutes.

Instructions

- Use blue or black ink or ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** the questions in **Section A** in the spaces provided. All working must be shown.
- **Section A** and **Section B** will be marked by different examiners. You must ensure that any supplementary sheets are fastened to the appropriate question paper answer book.
- Do all rough work in this book. Cross through any work you do not want marked.

Information

- The maximum mark for **Section A** is 50.
- Mark allocations are shown in brackets.
- You are reminded of the need for clear presentation in your answers. All answers should be in good English and should use accurate scientific terminology.
- You are advised to spend 1 hour on **Section A**.
- You are reminded that **Section A** requires you to use your knowledge of different parts of the specification as well as Module 8 in answering synoptic questions. These questions are indicated by the letter **S**.

SECTION A

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

1 Thyroxine is a hormone involved in the control of metabolism and growth.

(a) (i) Describe the effect of thyroxine on glucose metabolism.

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(1 mark)

(ii) Explain how the effect of thyroxine on glucose metabolism can influence rate of growth during childhood.

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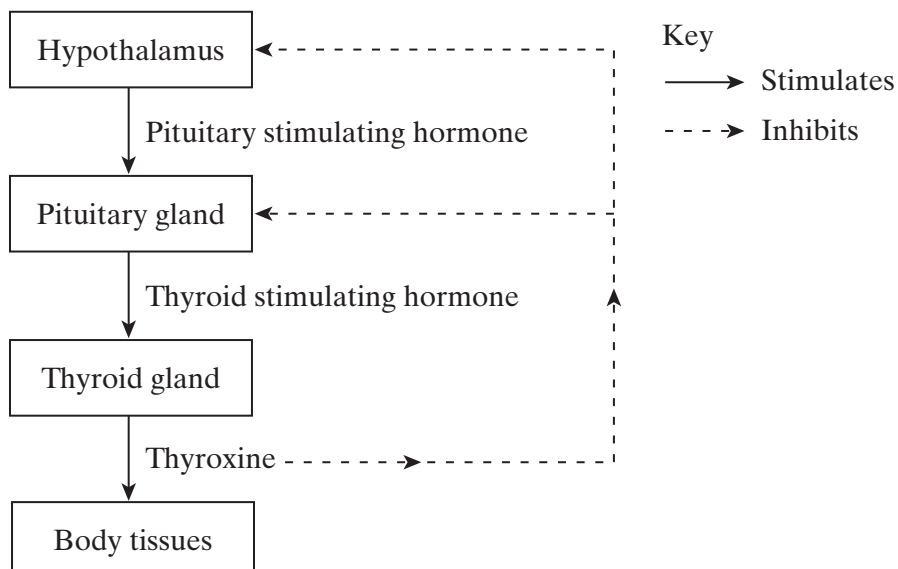
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(2 marks)

S (b) The diagram shows how the secretion of thyroxine is regulated.



A woman starts to take a daily dose of thyroxine. This increases the amount of energy she requires each day but her dietary energy input remains the same.

(i) Explain why the woman initially loses body mass.

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(1 mark)

(ii) Use the diagram to explain why, after a short time, her mass remains constant.

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

6

TURN OVER FOR THE NEXT QUESTION

Turn over ▶

2 Ducklings move out of the nest soon after hatching. They imprint on the first moving object they see, usually a parent.

(a) Explain the importance of imprinting

(i) in the weeks following hatching;

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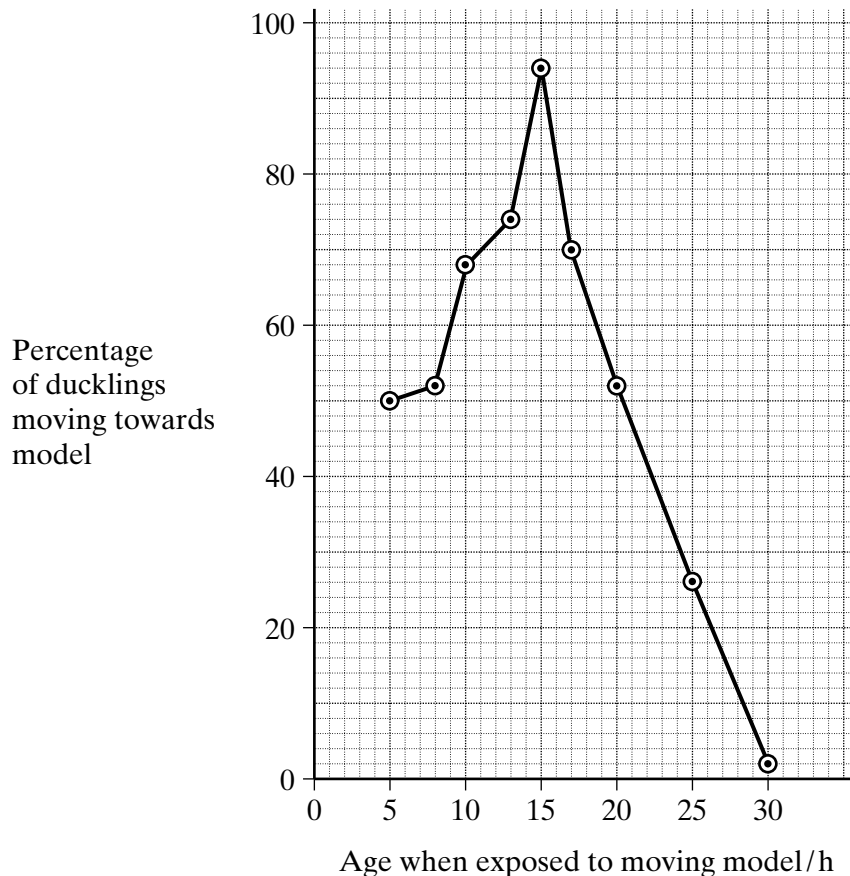
 (1 mark)

(ii) when selecting a mate as an adult bird.

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 (1 mark)

An investigation was carried out into the effect of age on imprinting in mallard ducklings. Eggs were incubated and, after they hatched, each duckling was reared in isolation. At different ages, separate groups were exposed to a model of a moving duck. Later, the ducklings were tested for the strength of imprinting. This was measured by recording the percentage of ducklings moving towards the model. The results are shown in the graph.



(b) Explain the importance of rearing the ducklings in isolation after they hatched.

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(2 marks)

(c) (i) Using evidence from the graph, what is the optimum age for the ducklings to leave the nest?

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(1 mark)

(ii) Explain the evidence from the graph which supports your answer.

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(1 mark)

(iii) Suggest **two** advantages to the ducklings in being able to leave the nest at an early age.

1

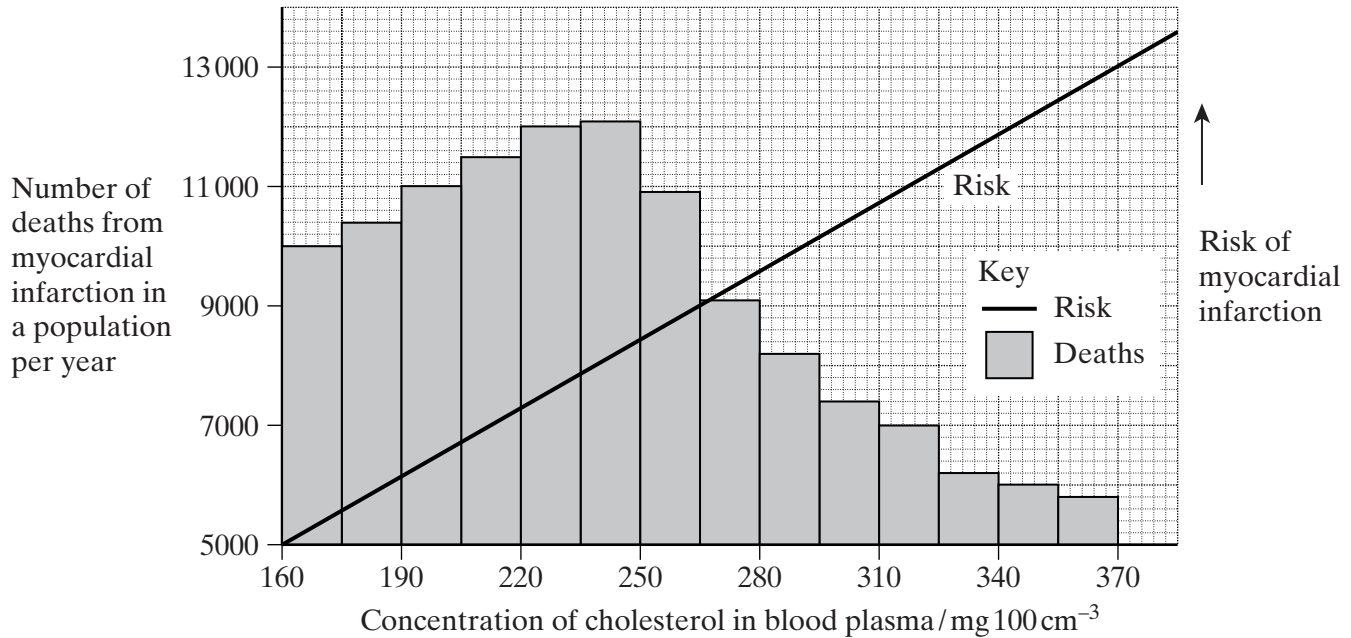
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2

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(2 marks)

- 3 An increased concentration of cholesterol in the blood is one factor increasing the risk of myocardial infarction (heart attack). The graph shows the relationship between death from myocardial infarction and blood cholesterol concentration.



- (a) (i) Describe how high concentrations of cholesterol in the blood can lead to disease of the blood vessels supplying the heart.

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(2 marks)

(ii) Explain how disease of these blood vessels may lead to death from myocardial infarction.

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(3 marks)

(b) The number of deaths from myocardial infarction decreased at concentrations of cholesterol above $250 \text{ mg } 100 \text{ cm}^{-3}$ blood whereas the risk of myocardial infarction continued to rise. Suggest an explanation for this difference.

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(2 marks)



TURN OVER FOR THE NEXT QUESTION

Turn over

4 Courtship and mating in fruitflies can occur equally well in the light or dark.

- (a) (i) Fruitflies which mate in the dark are much more likely to produce offspring than those which mate in the light. Suggest an explanation for this.

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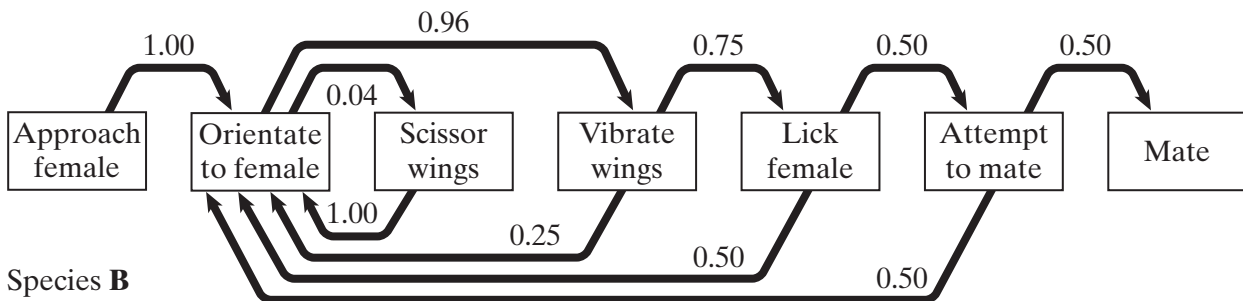
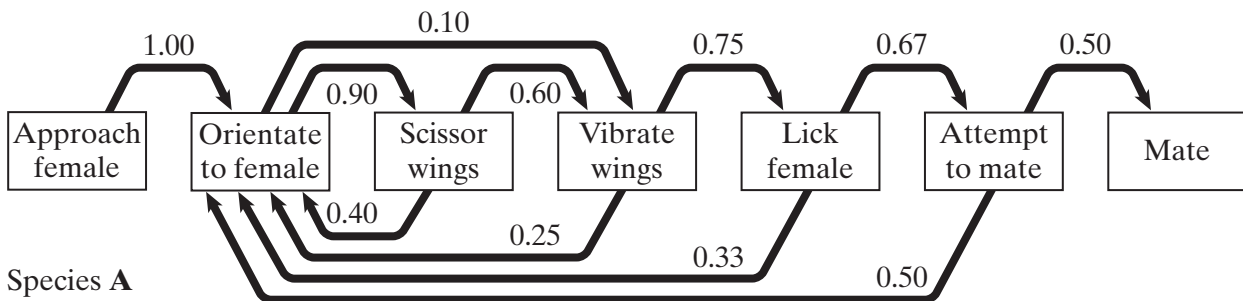
 (1 mark)

- (ii) Pheromones play a part in courtship of fruitflies. What is a pheromone?

.....

 (2 marks)

The diagrams show the courtship sequence of males from two closely related species of fruitfly (species **A** and species **B**). The numbers show the probability of one courtship element following from another.



- (b) Once a male of species **A** has orientated to the female, what is the probability that he will perform each courtship element once only and then attempt to mate?
Show your working.

Probability
(2 marks)

- (c) Suggest how the courtship sequences provide evidence to support the claim that the two species are

(i) closely related;

.....
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(1 mark)

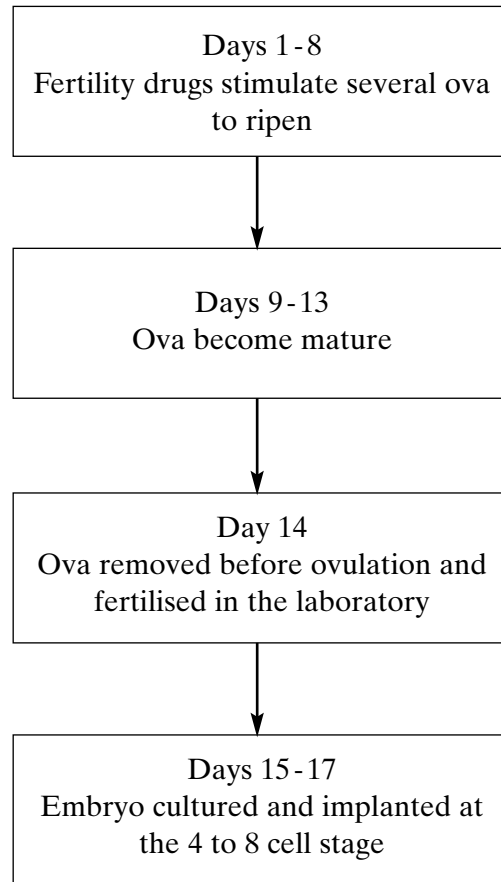
(ii) separate species.

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

- (d) During courtship, vibration of the wings creates a sound. The sound is different in the two species of fruitfly. Explain how this prevents mating between members of different species.

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(2 marks)

5 The flow chart shows the main sequence of events of in vitro fertilisation (IVF).



(a) (i) The events occurring during days 1 to 8 in the ovary in a normal menstrual cycle differ from those described during days 1 to 8 in the flow chart. Give **one** way in which they differ.

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(1 mark)

(ii) The drug clomiphene is used to stimulate production of ova. It lowers the concentration of oestrogen in the blood. Explain how, by lowering the concentration of oestrogen in the blood, clomiphene stimulates ova to develop.

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(2 marks)

S (b) A woman comes from a family with a history of the sex-linked condition haemophilia. A test was carried out to discover the sex of one of the embryos produced by IVF.

(i) Explain how observation of the chromosomes from an embryo cell could enable the sex to be determined.

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(2 marks)

(ii) The mother is known to carry the haemophilia allele. The father does not have haemophilia. What is the probability of their first child having haemophilia? Explain your answer.

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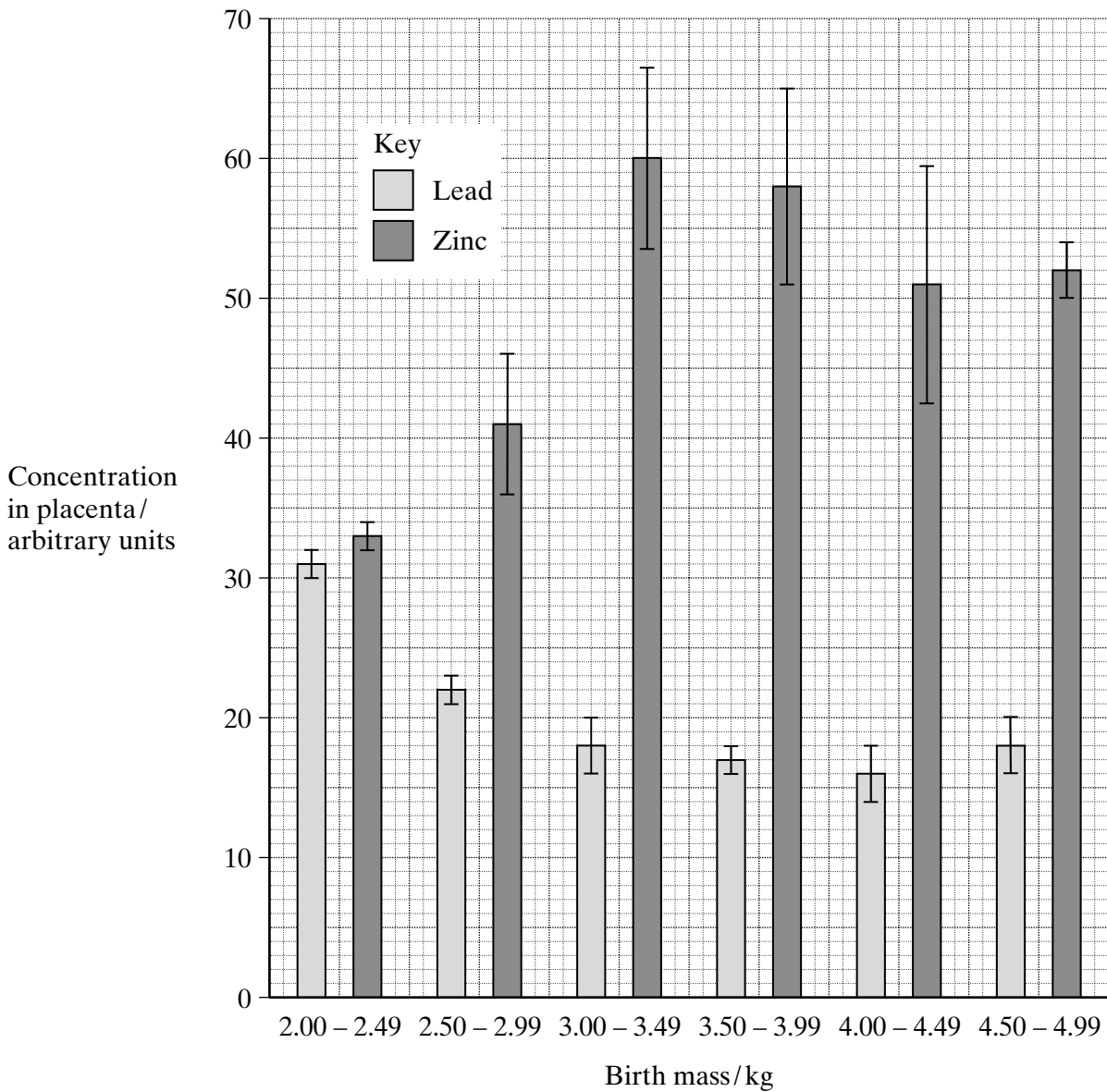
(3 marks)

8

TURN OVER FOR THE NEXT QUESTION

Turn over 

6 The bar chart shows the results of an investigation into the relationship between the birth mass of human babies and concentrations of lead and zinc in the placenta. Concentrations are shown as means, with a standard deviation bar given for each mean.



S (a) Explain what is meant by *standard deviation*.

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(1 mark)

(b) (i) Describe the relationship between the birth mass of the baby and the concentration of zinc in the placenta.

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(2 marks)

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