

Surname		Other Names	
Centre Number		Candidate Number	
Candidate Signature			

For Examiner's Use
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General Certificate of Education  
June 2007  
Advanced Level Examination



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

**BYB8/A**

Friday 22 June 2007 1.30 pm to 3.45 pm

**For this paper you must have:**

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

You may use a calculator.

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 the questions in **Section A** in the spaces provided.
- **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 to be marked.

**Information**

- The maximum mark for **Section A** is 50.
- The marks for questions are shown in brackets.
- You are reminded of the need for good English and clear presentation in your answers.
- Use accurate scientific terminology in all answers.
- 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**.

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

**There are no questions printed on this page**

## SECTION A

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

- 1 The table shows the population in different age groups in the UK in 1971 and in 2004.

Age group / years	Population / millions	
	1971	2004
0 – 15	14.0	11.4
16 – 64	34.7	38.9
Over 65	7.3	9.6
Total	56.0	59.9

- (a) Calculate the percentage increase in the 16 – 64 age group from 1971 to 2004. Show your working.

Answer ..... (2 marks)

- (b) For each age group, suggest **one** factor that could account for the change shown in the table. Give a different explanation in each case.

0 – 15 years .....

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16 – 64 years .....

.....

over 65 years .....

.....

(3 marks)

2 (a) Give **two** advantages to male birds of defending a territory during the breeding season.

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2 .....

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(2 marks)

(b) Describe **two** ways in which courtship contributes to successful mating.

1 .....

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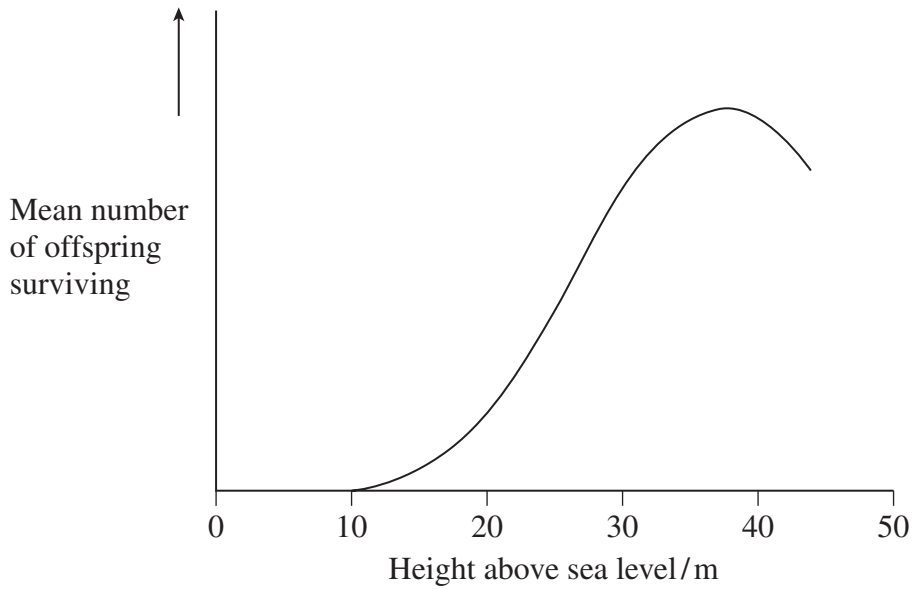
2 .....

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(2 marks)

- (c) Scientists investigated the reproductive success of a species of seabird. These birds build nests on ledges on cliffs next to the sea. They eat fish.

The scientists recorded the height of the nests above sea level and the mean number of offspring surviving. The graph shows the results.



Describe and explain the relationship between the height of the nests above sea level and the mean number of offspring surviving.

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(3 marks)

7

3 (a) A dog salivates when it hears a tin being opened.

(i) Name this type of learned behaviour.

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(1 mark)

(ii) Describe how this learning has taken place.

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(2 marks)

S (b) Dogs do not sweat. A dog loses body heat by panting. This involves rapid, shallow breathing with the tongue extended from the mouth. The tongue is covered with saliva. Explain how panting causes a reduction in core body temperature.

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(3 marks)

4 (a) The formation of atheroma may lead to myocardial infarction. Explain how.

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(3 marks)

S (b) A person has a damaged semilunar valve between the right ventricle and the pulmonary artery.

Suggest how this would affect the supply of oxygen to the muscles during exercise.

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(3 marks)

6

**Turn over for the next question**

**Turn over ►**

5 Growth hormone causes liver cells to produce a growth factor, IGF-1, and to release it into the blood. IGF-1 is a polypeptide. There are IGF-1 receptors on the cell surface membranes of many types of cells.

When IGF-1 binds to its receptor, it causes a phosphate group to be added to certain enzymes. This changes them from inactive to active enzymes.

S (a) (i) Explain why IGF-1 binds only to its receptor.

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(2 marks)

(ii) Adding a phosphate group to certain enzymes makes them active. Using your knowledge of proteins, explain how.

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(2 marks)



- (b) Scientists investigated the effect of smoking by mothers on the growth of their babies during pregnancy. The scientists measured the nicotine concentration in the blood of each mother, the birth weight of her baby and the concentration of IGF-1 in the baby's blood. They measured the same factors for mothers who did not smoke. The table shows the results.

	<b>Mothers who smoked at least 15 cigarettes per day</b>	<b>Mothers who did not smoke</b>
Mean concentration of nicotine in the mothers' blood / arbitrary units	4.51	0.45
Mean birth mass of the babies / kg	2.95	3.46
Mean concentration of IGF-1 in the babies' blood / arbitrary units	2.30	7.00

- (i) Using the information given, describe and explain the effects of smoking by a mother on her baby's growth.

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(3 marks)

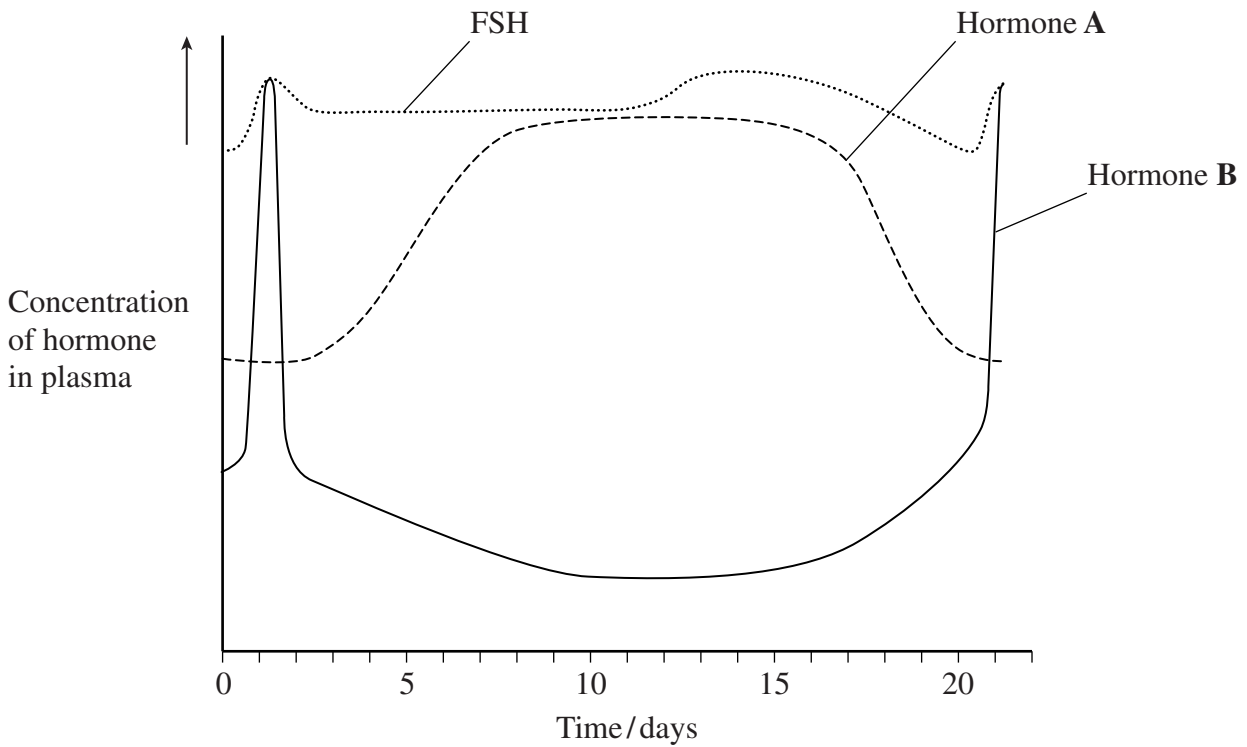
- (ii) Suggest **one** explanation for the nicotine found in the blood of the mothers who did not smoke.

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(1 mark)

6 The menstrual cycle in humans is controlled by hormones. The equivalent cycle in cows is controlled by the same hormones. The graph shows changes in the concentration of some of these hormones in a cow.



(a) (i) Name hormone **A**. Explain your answer.

Name .....

Explanation .....

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(1 mark)

(ii) Name hormone **B**. Explain your answer.

Name .....

Explanation .....

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(1 mark)

(b) Scientists can clone cows. To do this they need to collect eggs from a cow. Using the graph, suggest two time periods in which the scientists should attempt to collect eggs. Give an explanation for your answer.

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(2 marks)

(c) Describe **two** changes in hormone concentrations which would indicate a cow was pregnant.

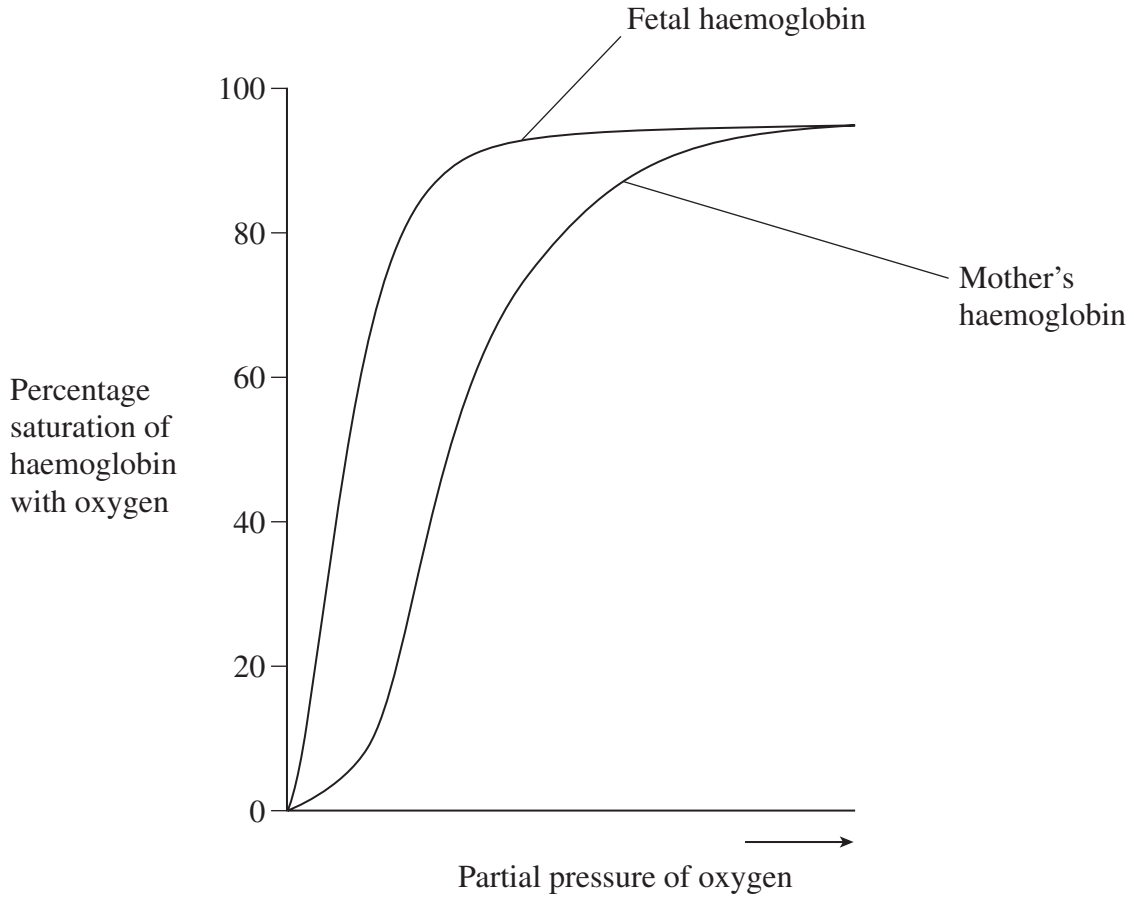
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(2 marks)

**Question 6 continues on the next page**

**Turn over ►**

S (d) During pregnancy, oxygen moves across the placenta from the mother's blood into the blood of the fetus. The graph shows the oxygen haemoglobin dissociation curve for the mother's haemoglobin and for fetal haemoglobin.



Explain the advantage to the fetus of the difference in the positions of the curves.

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(4 marks)

7 Influenza is caused by a virus.

- (a) The elderly are more likely than younger people to develop influenza if they come into contact with the virus. Explain why.

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*(2 marks)*

- (b) Vaccination gives protection against the influenza virus. Explain how.

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*(2 marks)*

**Question 7 continues on the next page**

**Turn over ►**

- S** (c) One strain of the influenza virus has particular proteins on its surface. These proteins act as antigens. When the antigens change, a new strain of virus is produced.

Explain what causes the structure of the antigens to change.

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*(4 marks)*

8
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**END OF SECTION A**

**SECTION B IS PROVIDED AS AN INSERT**

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