INTERNATIONAL BACCALAUREATE
BACCALAURÉAT INTERNATIONAL
BACHILLERATO INTERNACIONAL

M99/410/S(2)

BIOLOGY

Standard Level

Tuesday 11 May 1999 (afternoon)

Paper 2 — 1 hour

A

Candidate name:	Candidate category & number:

This examination paper consists of 2 sections, Section A and Section B.
The maximum mark for Section A is 20.
The maximum mark for Section B is 20.
The maximum mark for this paper is 40.

INSTRUCTIONS TO CANDIDATES

Write your candidate name and number in the boxes above.

Do NOT open this examination paper until instructed to do so.

Section A: Answer ALL of Section A in the spaces provided.

Section B: Answer ONE question from Section B. You may use the lined pages at the end of this paper and/or attach extra sheets of paper with your candidate number clearly marked at the top.

At the end of the examination, complete box B below with the number of the question answered in Section B.

B

QUESTIONS ANSWERED	
A/ ALL	
B/	
Number of extra sheets attached	

C

EXAMINER	TEAM LEADER
/20	/20
/20	/20
TOTAL /40	TOTAL /40

D

IBCA
/20
/20
TOTAL /40

EXAMINATION MATERIALS

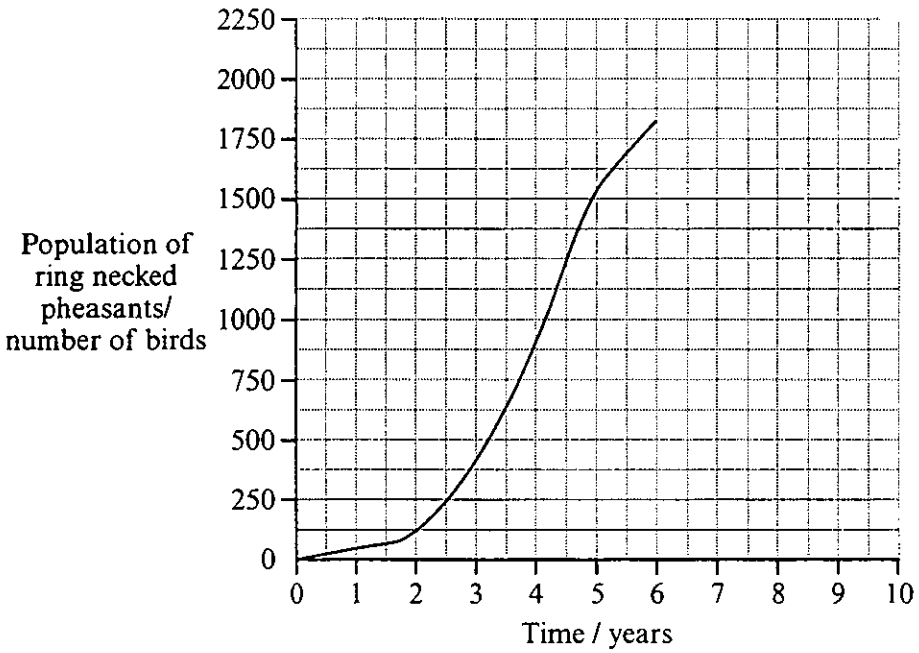
Required:
Calculator

Allowed:
A simple translating dictionary for candidates not working in their own language

SECTION A

Candidates must answer all questions in the spaces provided.

1. The graph below shows the growth of a population of ring-necked pheasants (*Phasianus colchicus)* on Protection Island off the north west coast of the United States. The original population released by the scientists consisted of two male and eight female birds. Two of the females died immediately after release.



[Source of data: Einarson A. S., *Murrelet,* (1945) 26: pages 39-44]

(a) State the term used to describe the shape of a growth curve of this type. *[1]*

. . . . . .

(b) (i) The scientists predicted that the population would reach its carrying capacity of 2000 by year 8. Draw a line on the graph to show the population growth between years 6 and 10. *[1]*

(ii) Suggest **two** factors that could limit the population increase between years 8 and 10. *[2]*

1. . . . . .

2. . . . . .

(c) (i) Predict how the population growth would change if all the female birds in the original sample had survived. *[1]*

. . . . . .

. . . . . .

(This question continues on the following page)

(Question 1 continued)

(ii) Predict the effect on the carrying capacity if all the female birds in the original sample had survived. *[1]*

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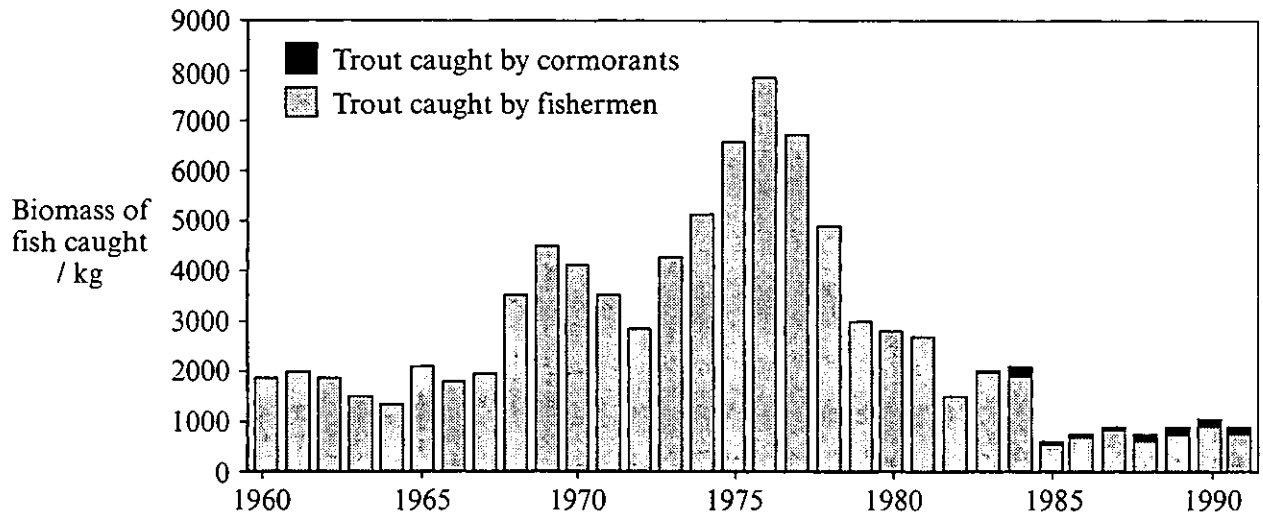
Cormorants *(Phalocrorax carbo)* are large birds which eat fish, including trout *(Salmo trutta)* from lakes and rivers. Between 1970 and 1991 the population of cormorants in Switzerland increased very greatly. During the same period there was a decrease in the number of trout caught by fishermen. The cormorants were blamed for the decreased catch. The bar chart below shows the biomass of trout caught by the fishermen and the estimated biomass caught by the cormorants in a 17 km river between Lake Walenstadt and Lake Zurich.



[Source of data: Suter, *Journal of Applied Ecology*. (1995), 32, pages 29-46]

(d) State the year in which there was the greatest increase in biomass of trout caught by fishermen, compared with the previous year. *[1]*

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(e) Using the data from the bar chart, discuss whether cormorants caused the decrease in the number of trout caught by the fishermen. *[3]*

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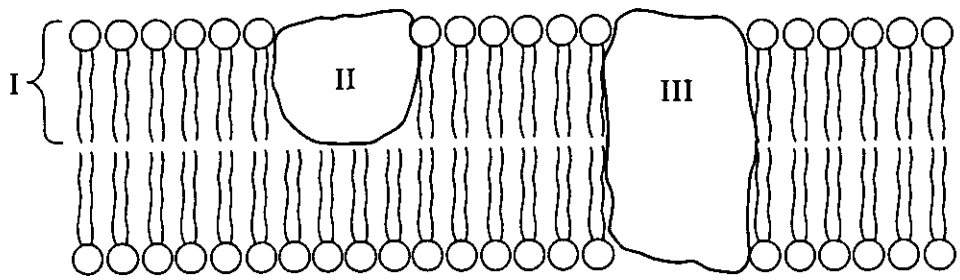
2. The diagram below represents the fluid mosaic model of a cell membrane.



(a) (i) State the name of the molecule labelled I. *[1]*

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(ii) Label the diagram to show which part of molecule I is hydrophobic and which part is hydrophilic. *[1]*

(b) (i) Identify whether molecule II is an intrinsic or an extrinsic protein. *[1]*

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(ii) Describe the part played by molecule III in active transport. *[2]*

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3. (a) Define *clone.* *[1]*

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(b) Outline **one** technique used to clone farm animals. *[2]*

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(c) Some people believe that the cloning of human embryos is unethical. Suggest **two** reasons for this belief. *[2]*

1. . . . . .

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2. . . . . .

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SECTION B

*Answer ONE question. Up to **two** additional marks are available for the quality of construction of your answer. You may use the lined pages at the end of this paper and/or attach extra sheets of paper with your candidate number clearly marked at the top.*

4. (a) Outline the structure of a DNA nucleotide. *[5]*

(b) List **three** differences between the structure of DNA and RNA. *[3]*

(c) Explain how complementary base pairing is used in replication, transcription and translation. *[10]*

5. (a) Outline the concept of negative feedback. *[4]*

(b) Describe the role of arterioles in the skin in maintaining a constant body temperature in humans. *[5]*

(c) Explain how the blood glucose level in the body is controlled. *[9]*

6. (a) List **four** features of the alveoli that allow efficient gas exchange. *[4]*

(b) Explain the increase in the breathing rate of athletes during exercise. *[9]*

(c) Health problems could affect the efficiency of gas exchange in an athlete. Outline how this could occur with **one** named disease. *[5]*