UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME	
CENTRE NUMBER	CANDIDATE NUMBER

5890124480

BIOLOGY **0610/33**

Paper 3 Extended **October/November 2010**

1 hour 15 minutes

Candidates answer on the Question Paper.

No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your Centre number, Candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use a pencil for any diagrams or graphs.
Do not use staples, paper clips, highlighters, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

For Examiner's Use	
1	
2	
3	
4	
5	
6	
Total	

This document consists of **19** printed pages and **1** blank page.

1 **(a)** Fig. 1.1 shows seven species of fish that live on reefs in the Caribbean.

For Examiner's Use

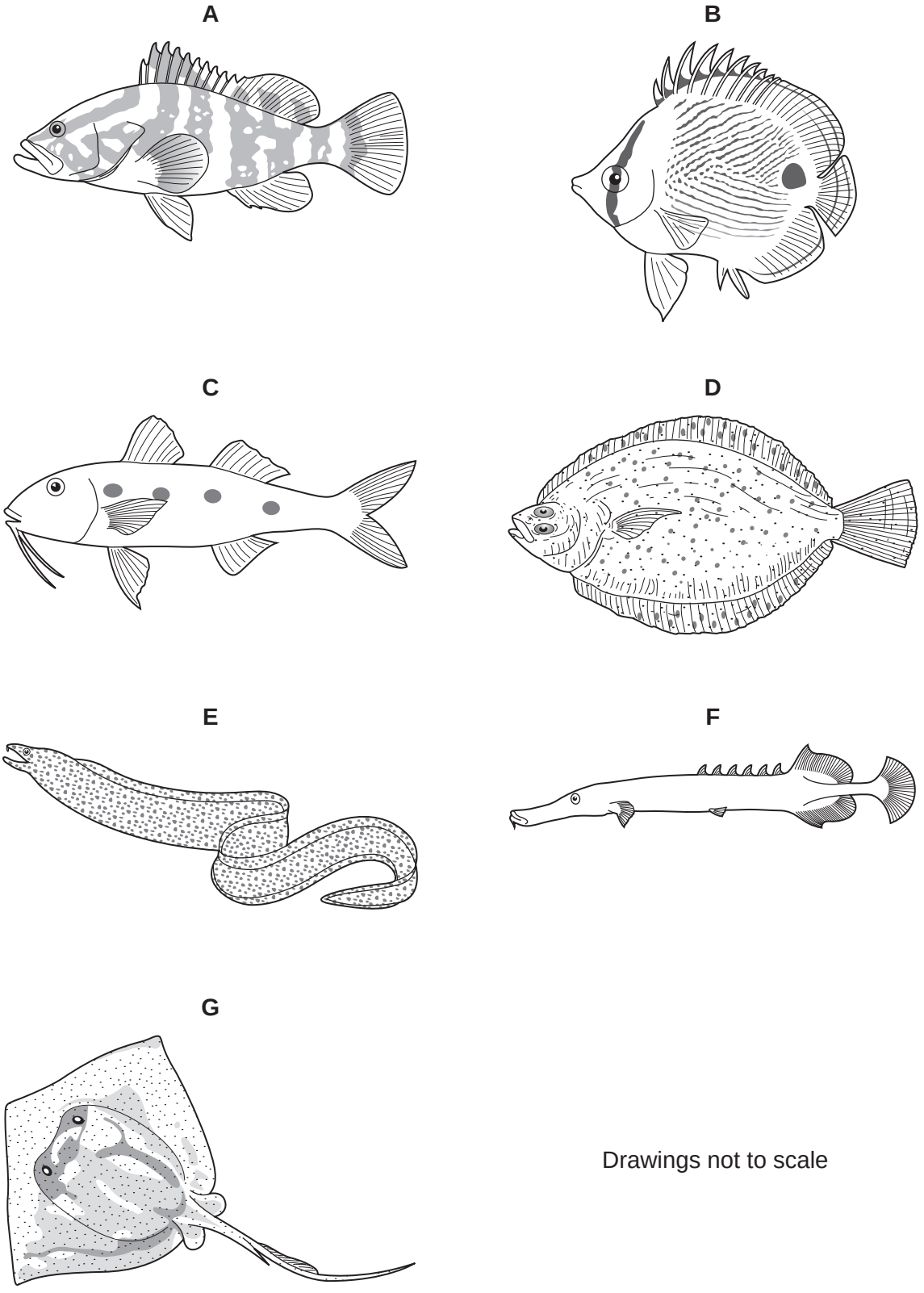

Fig. 1.1

Use the key to identify each species. Write the letter of each species (**A** to **G**) in the correct box beside the key. One has been done for you.

For Examiner's Use

Key

1 (a)	Body shape is long and narrow, at least 10 times as long as its depth	go to 2	
(b)	Body shape is not long and narrow, less than 10 times long as its depth	go to 3	
2 (a)	Fins are pointed	*Aulostomus maculatus*	**F**
(b)	Fins are smooth	*Gymnothorax moringa*	
3 (a)	Both eyes are on top of the head	go to 4	
(b)	Eyes are on either side of the head	go to 5	
4 (a)	Tail fin is long and thin	*Dasyatis americana*	
(b)	Tail fin is short	*Bothus ocellatus*	
5 (a)	Fish has one or several dark spots	go to 6	
(b)	Fish has no dark spots	*Epinephelus striatus*	
6 (a)	Fish has two fins on its back	*Pseudupeneus maculatus*	
(b)	Fish has more than two fins on its back	*Chaetodon capistratus*	

[4]

[Turn over

For Examiner's Use

The wavelengths of light that penetrate water influence the features of fish. Blue light does not penetrate far into water; red light penetrates much further.

Many different species of cichlid fish live in Lake Victoria in Africa. Some species live in shallow water and others live in deeper water.

Table 1.2 summarises some of the features of males and females of these species.

Table 1.2

habitat	body colour of males	retina in eyes of females
shallow water	blue	detects blue light
deep water	red	detects red light

Body colour and colour vision are both inherited features. Females select the males that they mate with and prefer bright coloured males. Male and female eyes of the same species of cichlid fish are similar.

(b) (i) The ancestors of red and blue cichlid fish were brown.

State how the different body colours of the males first happened.

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(ii) Suggest the advantages of different cichlid fish being able to detect blue and red light.

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(c) Lake Victoria receives considerable pollution from the surrounding area which makes the water cloudier and reduces the penetration of blue light.

For Examiner's Use

Suggest and explain the likely long-term effects of the cloudy water on the red and blue cichlid fish.

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[Total: 11]

For Examiner's Use

2 Fig. 2.1 shows a diagram of human skin in hot weather.

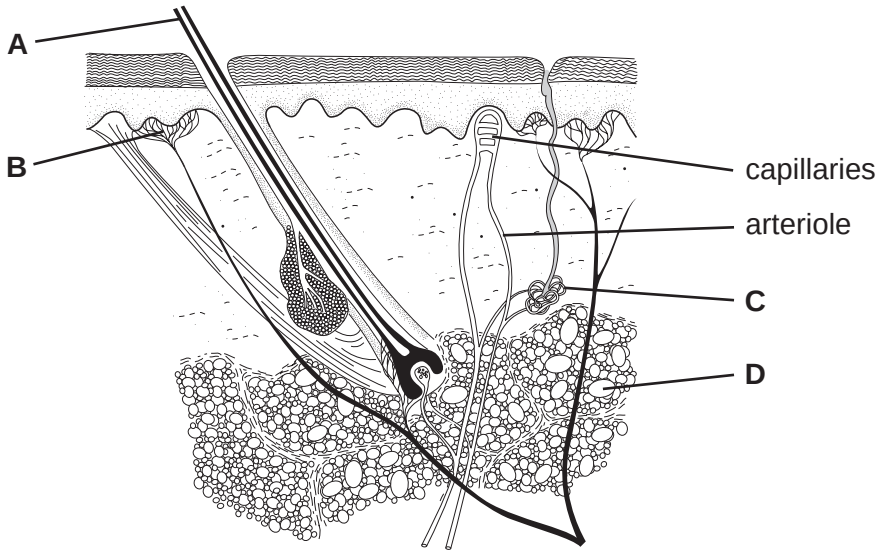

Fig. 2.1

(a) Name structures **A** to **D**.

A .....

B .....

C .....

D ..... [4]

For Examiner's Use

(b) Describe how the structures (**A** to **D**) in the skin help to maintain a constant body temperature. You may refer to the structures by their letters.

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(c) (i) Blood flow through the skin changes in response to changes in the air temperature.

State **and** explain what happens to blood flow through the skin when the temperature of the surrounding air becomes very cold.

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(ii) Explain how the changes you have described in **(c)(i)** reduce heat loss.

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(d) The control of body temperature is an example of negative feedback.

Describe how negative feedback is involved in the control of body temperature.

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[Total: 16]

For Examiner's Use

3 Enzymes are biological catalysts. Fig. 3.1 shows how the enzyme, sucrase, breaks down a molecule of sucrose.

For Examiner's Use

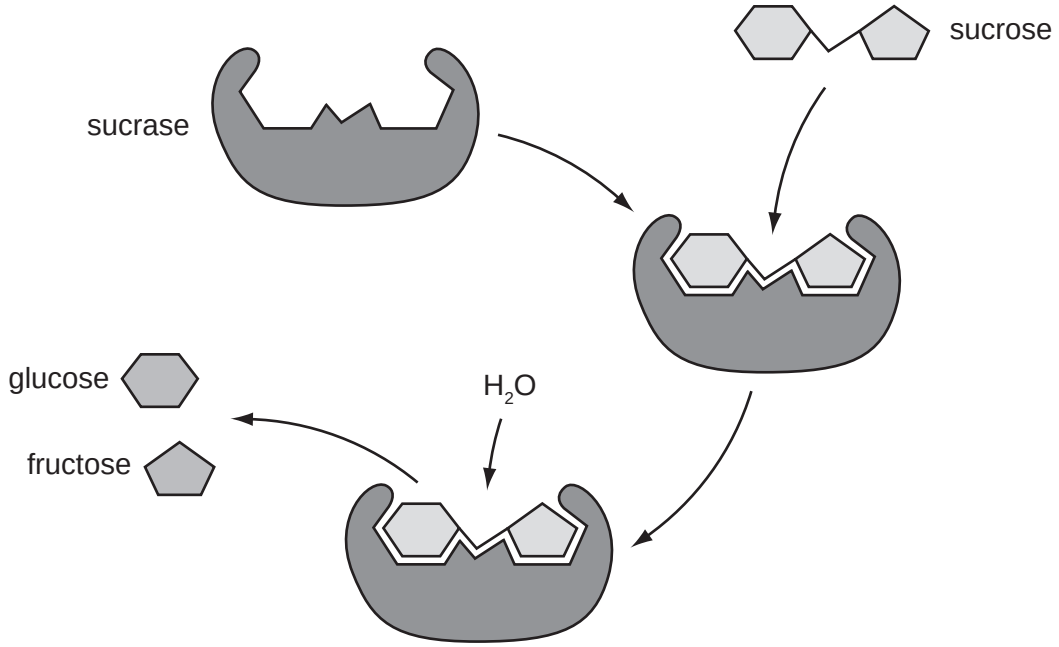

Fig. 3.1

(a) Describe how sucrase catalyses the breakdown of sucrose. You should refer to Fig. 3.1 in your answer.

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For Examiner's Use

(b) Three enzymes, **P**, **Q** and **R**, were extracted from different regions of the alimentary canal of a mammal. The effect of pH on the activity of the enzymes was investigated at 40 °C. The results are shown in Fig. 3.2.

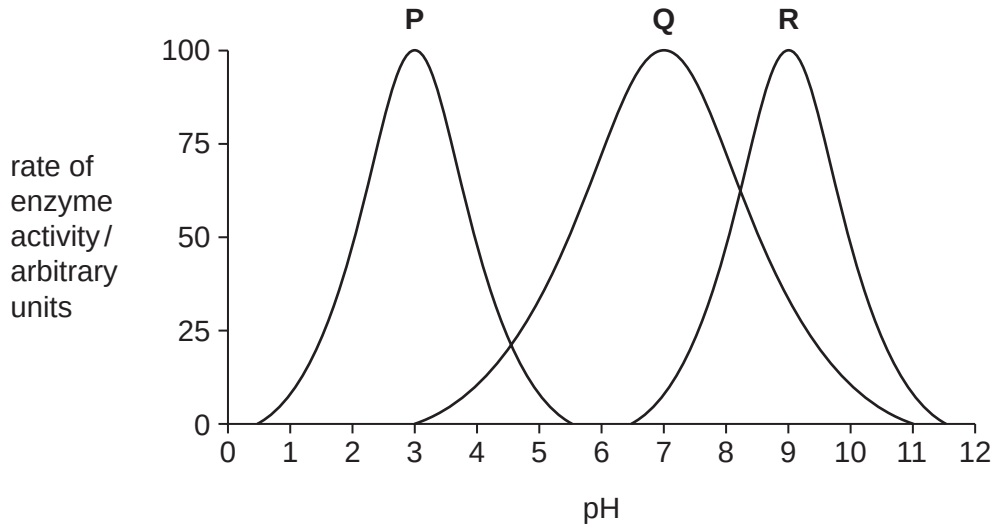

Fig. 3.2

(i) Explain why the investigation was carried out at 40 °C.

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(ii) Using information in Fig. 3.2, describe the effects of increasing pH on the rate of activity of enzyme **Q**.

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For Examiner's Use

(iii) Enzymes increase the rate of breakdown of different types of food substances in digestion.

Name enzymes **P**, **Q** and **R**.

P .....

Q .....

R ..... [3]

(c) Some baby foods are manufactured by pre-digesting foodstuffs containing carbohydrates, fats and proteins with enzymes.

Describe the roles of different types of enzymes in preparing these baby foods.

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[Total: 15]

For Examiner's Use

4 The growth of the human population of Brazil between the years 1500 and 2005 is shown in Fig. 4.1.

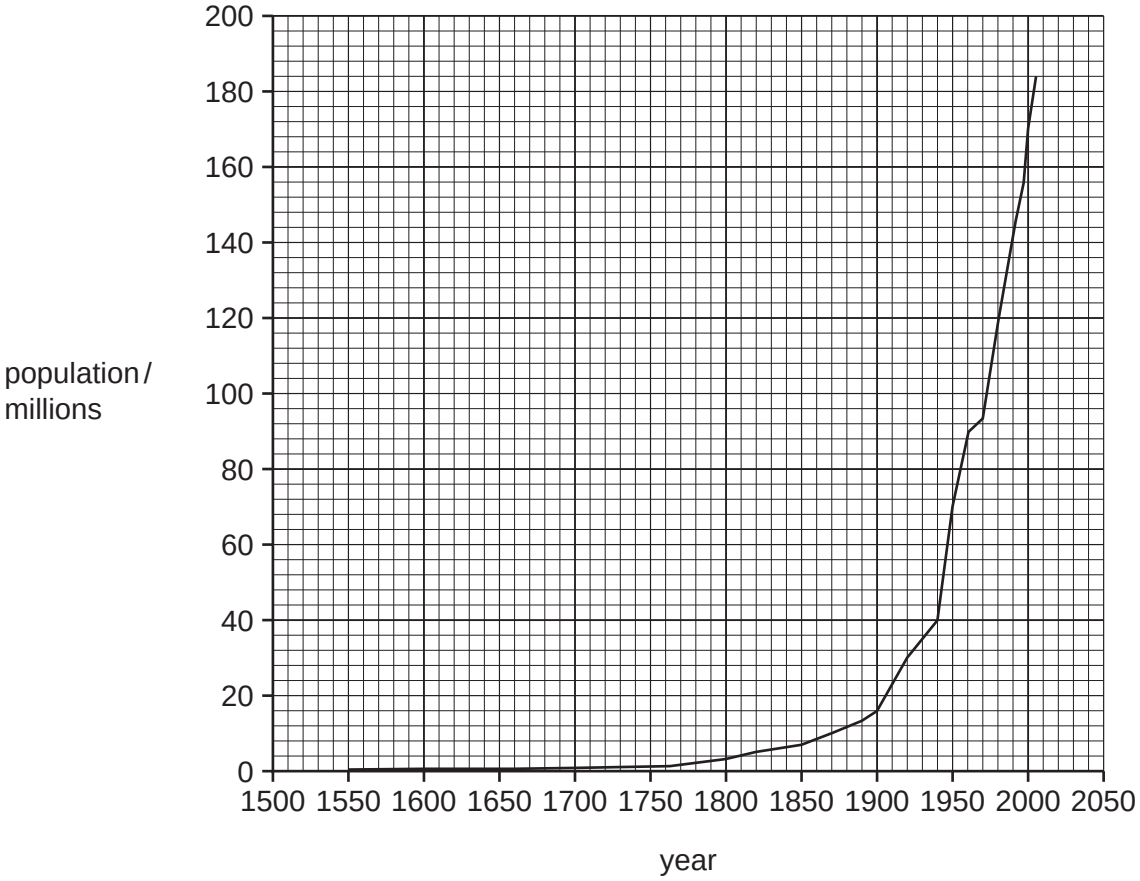

Fig. 4.1

(a) Compare the growth curve shown in Fig. 4.1 with a sigmoid growth curve.

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Table 4.1 shows information on deforestation in four South American countries that have extensive tropical rainforests. (1 hectare = 10 000 m^2.)

For Examiner's Use

Table 4.1

country	area of forest / millions of hectares		deforestation - area of forest lost as percentage of forested area in 1990
	1990	2005	
Brazil	520.0	478.0	
Bolivia	63.0	59.0	6.4
Colombia	61.7	61.0	1.1
Peru	70.4	69.0	2.0

(b) (i) Calculate the percentage loss of forest in Brazil between 1990 and 2005.

Show your working.

Answer .....% [2]

(ii) State two reasons why forests are cut down.

1. .....

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2. .....

..... [2]

(c) Outline the effects of large scale deforestation on the following aspects of the environment.

For Examiner's Use

number of species .....

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soils .....

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rivers .....

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atmosphere .....

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[8]

(d) Drinks cartons have proved difficult to recycle because they are made of plastic, aluminium and paper. A factory in Brazil uses new technology to recycle all these components as raw materials for the packaging industry.

For Examiner's Use

Explain the importance for the environment of developing technologies for recycling materials, such as those found in drinks cartons.

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[Total: 18]

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For Examiner's Use

5 Fig. 5.1 shows a root hair cell.

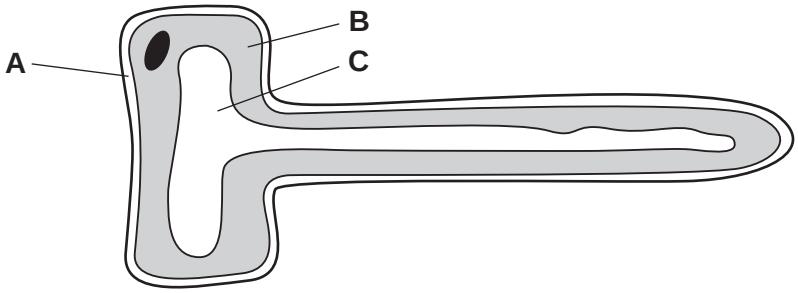

Fig. 5.1

(a) Name structures **A**, **B** and **C**.

A .....

B .....

C ..... [3]

(b) Explain two ways in which root hair cells are adapted to carry out their functions.

1. .....

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2. .....

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(c) Root hair cells need a supply of sugars to provide energy.

Explain how root hair cells obtain a supply of sugars.

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[Total: 9]

6 Fig. 6.1 shows the changes in the concentrations of four hormones during one menstrual cycle.

For Examiner's Use

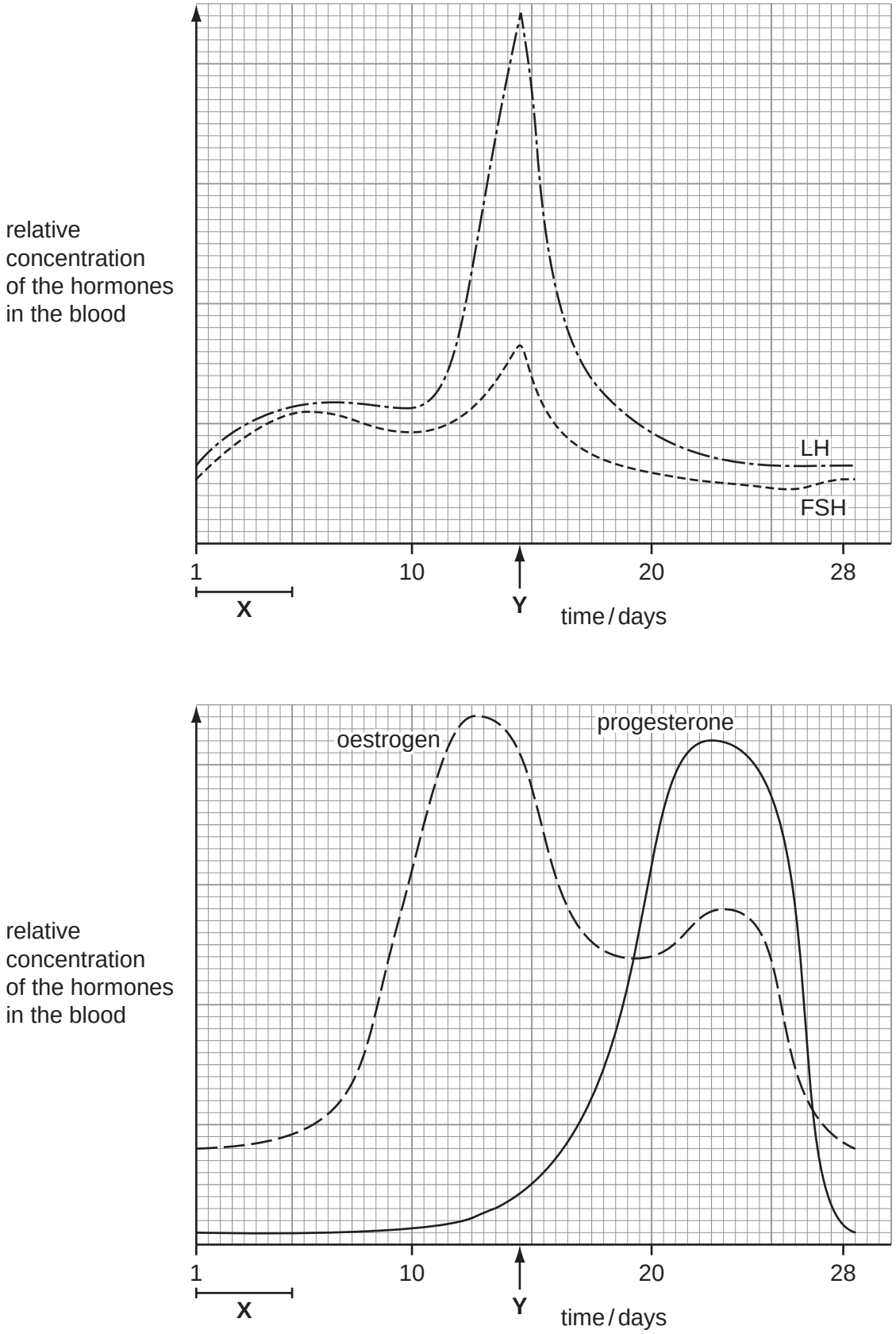

Fig. 6.1

For Examiner's Use

(a) State what happens at **X** and at **Y** during the menstrual cycle.

X .....

Y ..... [2]

(b) Describe the roles of oestrogen in controlling the menstrual cycle.

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(c) Some women who cannot conceive may be treated with FSH.

(i) Describe how FSH is used as a fertility drug and how it may allow a woman to conceive.

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..... [2]

(ii) Suggest **one** implication of using fertility drugs.

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Question 6 continues on page 20

(d) Explain why it is important that FSH is **not** secreted during pregnancy.

For Examiner's Use

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..... [2]

[Total: 11]