Centre Number	Candidate Number	Name

CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

BIOLOGY **0610/02**

Paper 2

October/November 2003

1 hour

Candidates answer on the Question Paper.
No additional materials are required.

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name in the spaces at the top of this page.
Write in dark blue or black pen in the spaces provided on the Question Paper.
You may use a soft pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** questions.
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	
7	
8	
9	
TOTAL	

If you have been given a label, look at the details. If any details are incorrect or missing, please fill in your correct details in the space given at the top of this page.

Stick your personal label here, if provided.

This document consists of **13** printed pages and **3** blank pages.

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[Turn over

1 Fig. 1.1 shows six arthropods.

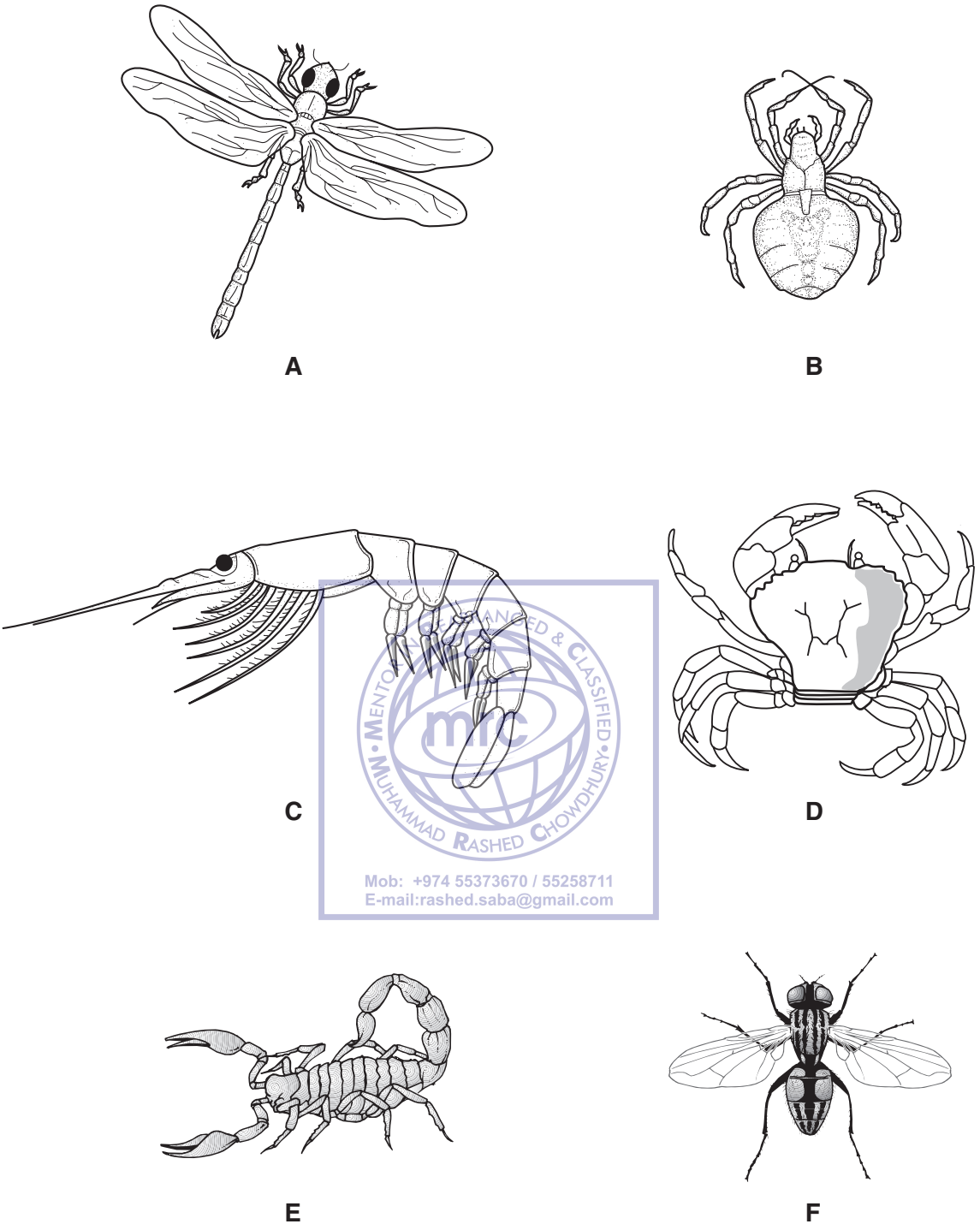

Fig. 1.1

Use the key below to identify each of these arthropods. Write the name of each arthropod in the correct box in Table 1.1.

		name of arthropod
1	arthropods with three pairs of legs arthropods with four or more pairs of legs	go to 2 go to 3
2	arthropods with one pair of wings arthropods with two pairs of wings	*Musca* *Anax*
3	arthropods with pincers at the front end of body arthropods without pincers at front end of body	go to 4 go to 5
4	arthropods with tail held above body arthropods with tail tucked under body, not visible	*Buthus* *Cancer*
5	arthropods with four pairs of legs arthropods with more than four pairs of legs	*Aranea* *Pandalina*

Table 1.1

arthropod picture	name of arthropod
A	
B	
C	
D	
E	
F	

[4]

[Total : 4]

For Examiner's Use

2 The graph, Fig. 2.1, shows a population curve for a species of an animal colonising a new habitat.

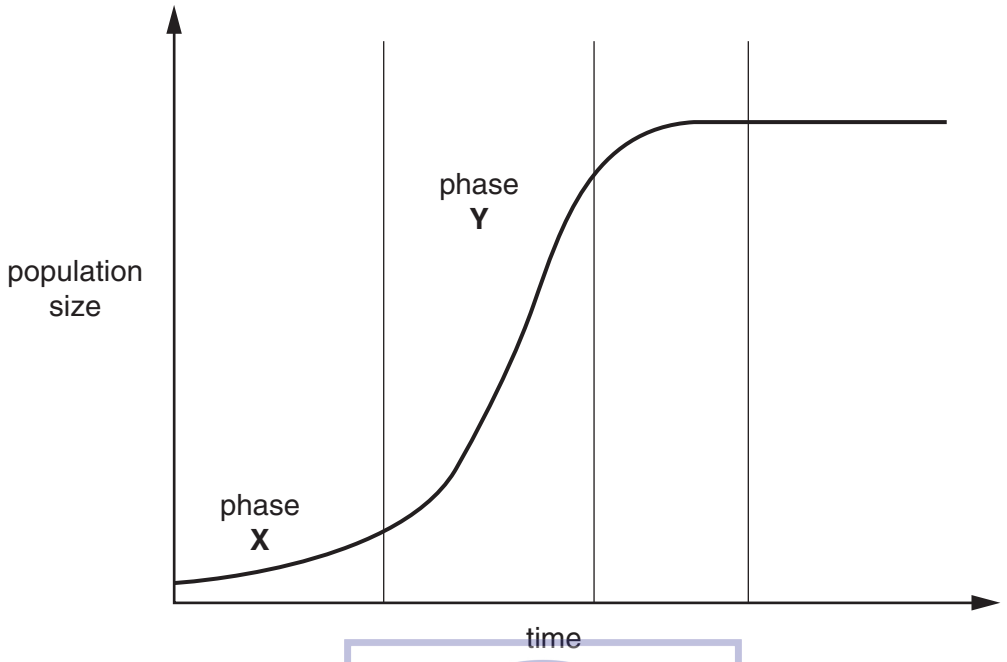

Fig. 2.1

(a) (i) Identify phase **Y** of the curve.

Y .....[1]

(ii) Suggest why the population increase in phase **X** is slow.

.....

.....

.....[2]

(b) Identify three factors that limit the size of such a population but do not appear to limit the total human population.

1. .....

.....

2. .....

.....

3. .....

.....[3]

[Total : 6]

For Examiner's Use

3 Fig. 3.1 shows the female reproductive system.

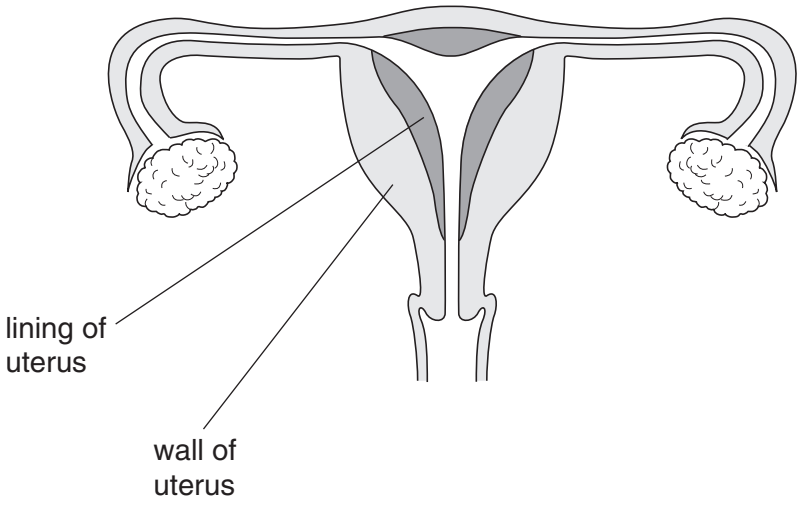

Fig. 3.1

(a) On Fig. 3.1, label

(i) where sperm are deposited during intercourse; [1]

(ii) where fertilisation normally takes place; [1]

(iii) where implantation normally takes place; [1]

(iv) where oestrogen is produced. [1]

(b) State three effects oestrogen can have on parts of the body other than those shown in Fig. 3.1.

1. .....

.....

2. .....

.....

3. .....

.....[3]

(c) Complete the table, by using ticks (✓) to show what can cross the placenta from the mother's blood to the fetus.

	can cross the placenta
oxygen	
blood cells	
glucose	

[1]

[Total: 8]

For Examiner's Use

4 **(a)** **(i)** Plants need a supply of nitrate ions.

State the use made of nitrate ions in plants.

.....[1]

(ii) Many farmers regularly add nitrate fertilisers to their fields.

Explain why this is necessary.

.....

.....[2]

(b) A farmer spreads a nitrate rich fertiliser over his fields. Each time he does this, he washes out his spreading equipment in a farm pond.

Suggest and explain what the likely effects of such pollution will be on the plants and animals in the pond.

.....

.....

.....

.....

.....

.....

.....[5]

[Total : 8]

For Examiner's Use

5 The production of chlorophyll in a variety of tomato plant is controlled by a gene. The dominant allele causes normal chlorophyll production and the recessive allele causes a lack of chlorophyll in the leaves.

(a) (i) Using the symbols **G** to represent the dominant allele and **g** to represent the recessive allele, explain, using a genetic diagram, the expected outcome of crossing two heterozygous tomato plants.

[4]

(ii) If 500 seeds from the heterozygous cross were germinated, how many seedlings would you expect to have green leaves and how many white leaves?

green leaves ..... white leaves ..... [1]

(b) A further 500 seeds from the heterozygous cross were planted. Only 480 germinated. Of these only 360 developed into plants. All these plants had green leaves.

Suggest an explanation for these results.

.....

.....

.....

.....

.....

.....[5]

[Total : 10]

For Examiner's Use

6 A mixture of vegetable oil, an enzyme and a pH indicator was put into a test-tube. The tube was incubated at 35 °C and the colour of the mixture was recorded at 5 minute intervals. The indicator changes from blue to yellow at pH 5 or less.

The investigation was repeated at other temperatures and the results are shown in Table 6.1.

Table 6.1

time in minutes	incubation temperature in °C					
	5	15	25	35	45	55
0	blue	blue	blue	blue	blue	blue
5	blue	blue	blue	blue	blue	blue
10	blue	blue	blue	yellow	blue	blue
15	blue	blue	yellow	yellow	blue	blue
20	blue	yellow	yellow	yellow	yellow	blue
25	blue	yellow	yellow	yellow	yellow	blue

(a) (i) Name the enzyme that digests the vegetable oil.

.....[1]

(ii) State the end products of oil digestion.

.....[1]

(iii) Suggest how these end products cause the change in colour of the indicator.

.....

.....

.....[2]

(b) Explain the difference in results between the tubes incubated at 15 °C and 35 °C.

.....

.....

.....[2]

For Examiner's Use

(c) (i) After 25 minutes, the tubes originally incubated at 5 °C and 55 °C were then incubated at 30 °C for a further 20 minutes.

Suggest what the final colour would be in each of these tubes by completing Table 6.2.

Table 6.2

	result after 25 minutes at original temperature	result after a further 20 minutes at 30 °C
tube originally at 5 °C	blue	
tube originally at 55 °C	blue	

[2]

(ii) Explain these likely results.

.....

.....

.....

.....

.....

.....[4]

[Total : 12]

For Examiner's Use

7 **(a)** Fig. 7.1 shows a section through the heart.

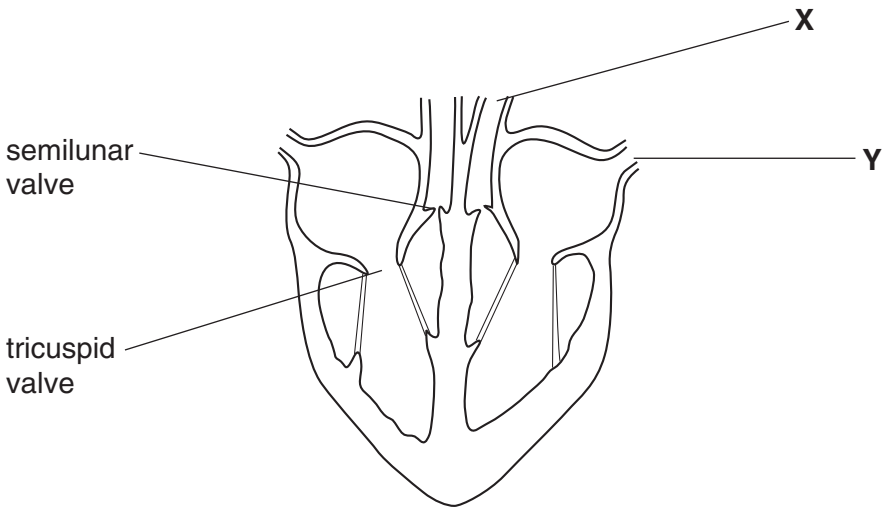

Fig. 7.1

(i) Identify the blood vessels **X** and **Y**.

X .....

Y .....[2]

(ii) What is the function of the valves within the heart?

.....

.....[1]

(iii) Explain why the wall of the left ventricle is thicker than the wall of the right ventricle.

.....

.....

.....[2]

For Examiner's Use

(b) Table 7.1 shows the relative pressures in the chambers and associated blood vessels on the right side of the heart.

Table 7.1

	relative pressure of blood in arbitrary units
vena cava	1
right atrium filling	0
right atrium emptying	2
right ventricle filling	0
right ventricle emptying	5
pulmonary artery	3

(i) Complete Table 7.2 to show whether the valves are open or closed during the events shown.

Table 7.2

	valves – open or closed	
event	tricuspid	semilunar
right ventricle filling		
right ventricle emptying		

[2]

(ii) Explain how data in Table 7.1 supports your answers in Table 7.2, for each of the valves when the **right ventricle is filling**.

tricuspid valve .....

.....

semilunar valve .....

.....[2]

[Total : 9]

For Examiner's Use

8 Fig. 8.1 shows a generalised reflex arc.

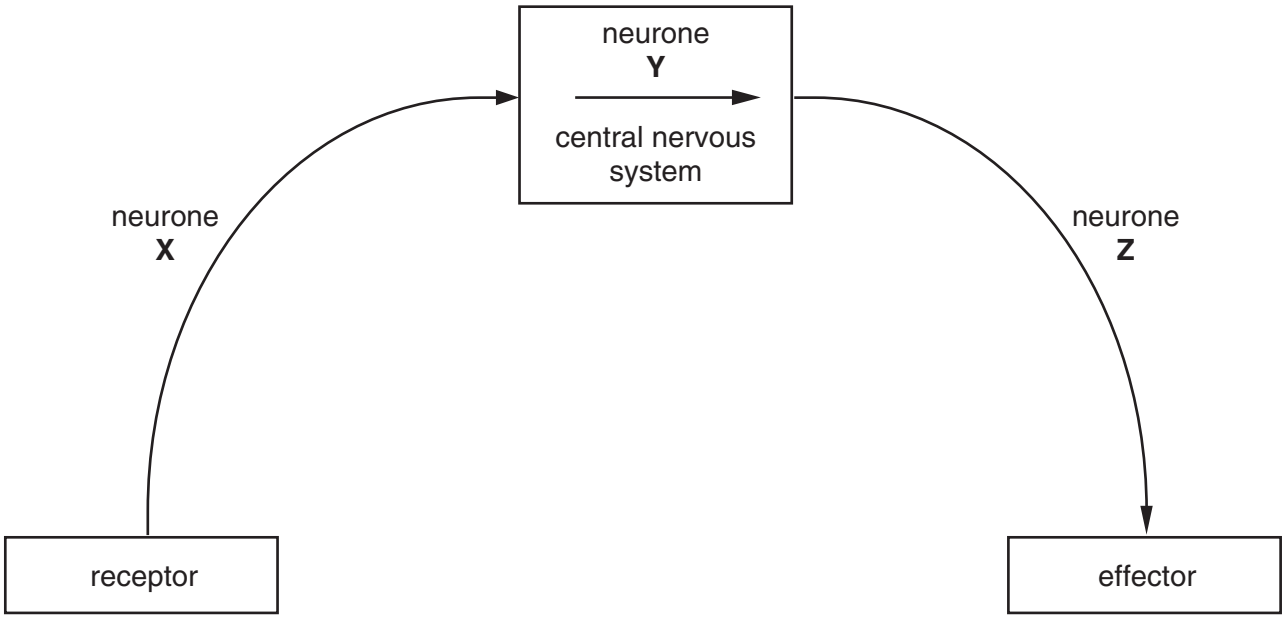

Fig. 8.1

(a) **(i)** Identify the three neurones labelled **X**, **Y** and **Z**.

X .....

Y .....

Z .....[3]

(ii) Give an example of an effector.

.....[1]

(b) Complete Table 8.1 to show the differences between nervous and hormonal control in the body.

Table 8.1

feature	nervous control	hormonal control
speed	extremely rapid	
pathway	neurones	
nature of "impulse"		chemical
origin		endocrine gland

[4]

[Total : 8]

For Examiner's Use

9 **(a)** The drug heroin is said to be addictive.

Explain the meaning of the term *addictive*.

.....

.....[1]

(b) Describe two symptoms you would look for if you suspected that a person was a regular heroin user.

1. .....

.....

2. .....

.....[2]

(c) Heroin can be heated and the fumes inhaled or heroin can be injected into the blood.

Describe a major health risk with each of these ways of taking the drug.

Inhaling the fumes .....

.....

Injecting into the blood .....

.....[2]

[Total : 5]

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