



Surname	Centre Number	Candidate Number
Other Names		2



GCE AS/A level

1072/01

BIOLOGY – BY2

P.M. THURSDAY, 26 May 2011

1½ hours

For Examiner’s use only		
Question	Maximum Mark	Mark Awarded
1	6	
2	8	
3	8	
4	10	
5	7	
6	11	
7	10	
8	10	
Total	70	

INSTRUCTIONS TO CANDIDATES

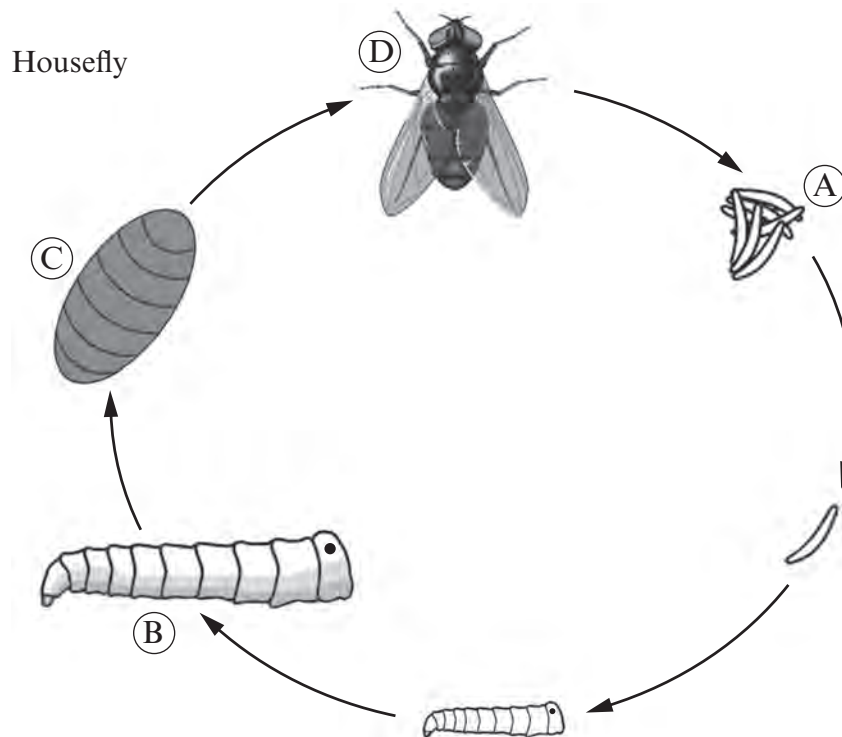
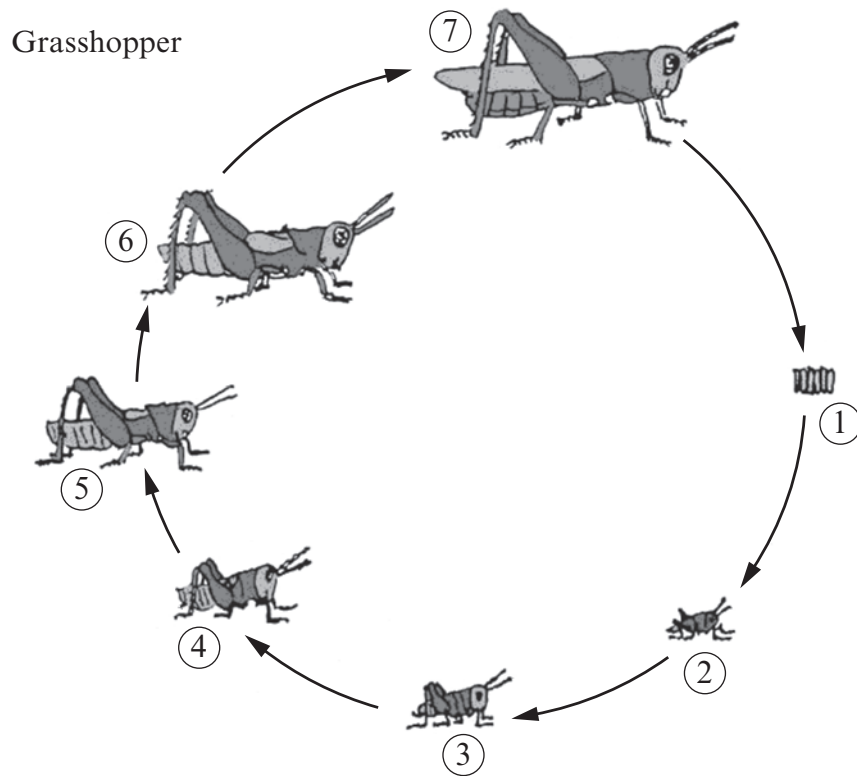
- Use black ink or black ball-point pen.
- Write your name, centre number and candidate number in the spaces at the top of this page.
- Answer **all** questions.
- Write your answers in the spaces provided in this booklet.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets at the end of each question or part-question.
- You are reminded of the necessity for good English and orderly presentation in your answers.
- The quality of written communication will affect the awarding of marks.

1072
010001

1. The two diagrams below show life cycles of two different groups of insects (not drawn to scale).



(a) (i) What name is given to the type of life cycle of the grasshopper?

[1]

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(ii) Name the stages labelled

1,

7,

2-6.

[2]

(b) (i) What name is given to the type of life cycle of the housefly?

[1]

.....

(ii) Name the stages labelled

A,

B,

C,

D.

[2]

(Total 6 marks)

2. Twenty thousand years ago, cheetahs (*Acinonyx jubatus*) roamed throughout the savannahs and plains of four continents: Africa, Asia, Europe, and North America.



About 10 000 years ago - because of climate changes - all but one species of the cheetah became extinct. With the drastic reduction in their numbers, close relatives were forced to breed and the cheetah became genetically inbred, meaning that all cheetahs are closely related.

- (a) Classify the cheetah.

[3]

Phylum

Class

Genus

- (b) Name **one** feature that a cheetah has which allows the correct identification of each of its phylum and class. [2]

Feature of the phylum

.....

Feature of the class

.....

- (c) The drastic reduction in the numbers of cheetah results in the loss of genetic diversity in the population. What term is applied to this? [1]

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- (d) (i) What biochemical method could have been used to determine that all cheetahs are closely related? [1]

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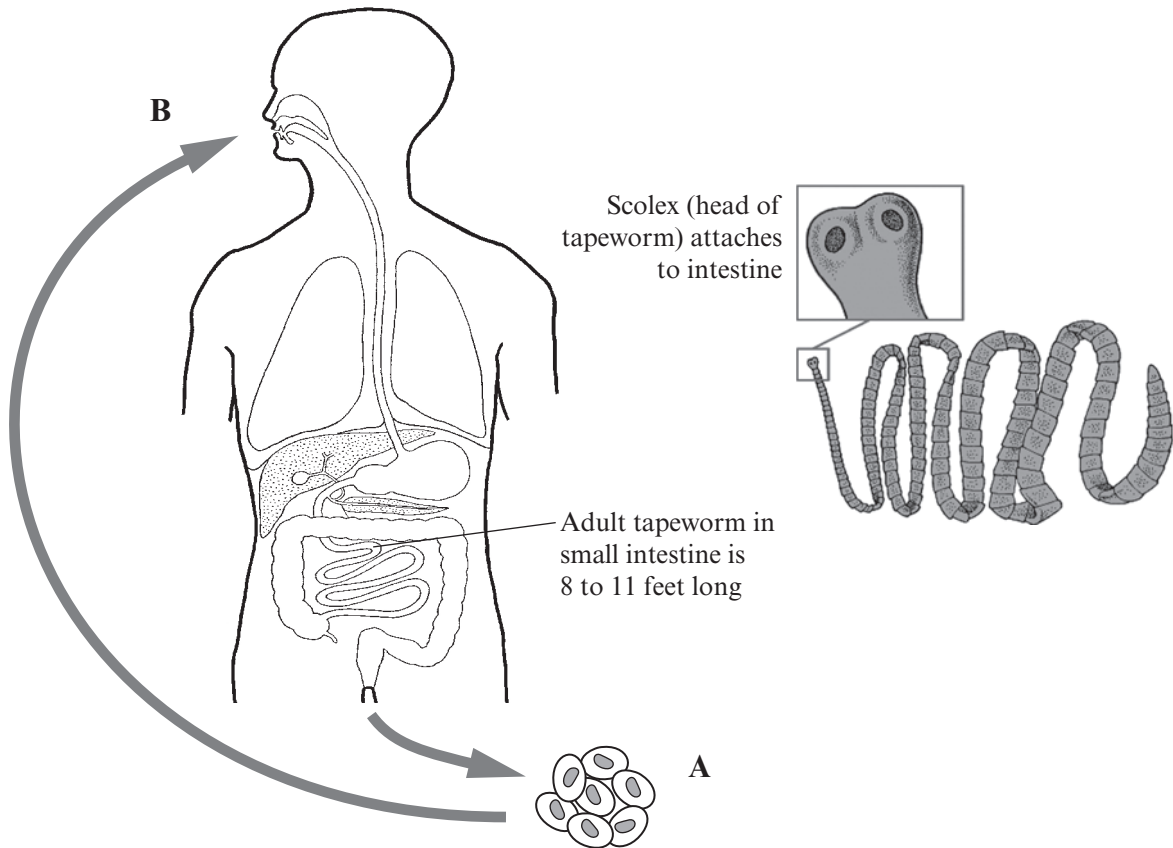
- (ii) What would the results show? [1]

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(Total 8 marks)

3. The diagram below shows the life cycle of the pork tapeworm *Taenia solium*.



- (a) Describe the sequence of events which occur between A and B, from passing of the tapeworm eggs in human faeces to the infection of another human host. [2]

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- (b) Give **three** features of the tapeworm which show how the parasite is adapted to its way of life. [3]

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- (c) What **two** simple precautions can be taken to avoid infection by the pork tapeworm? [2]

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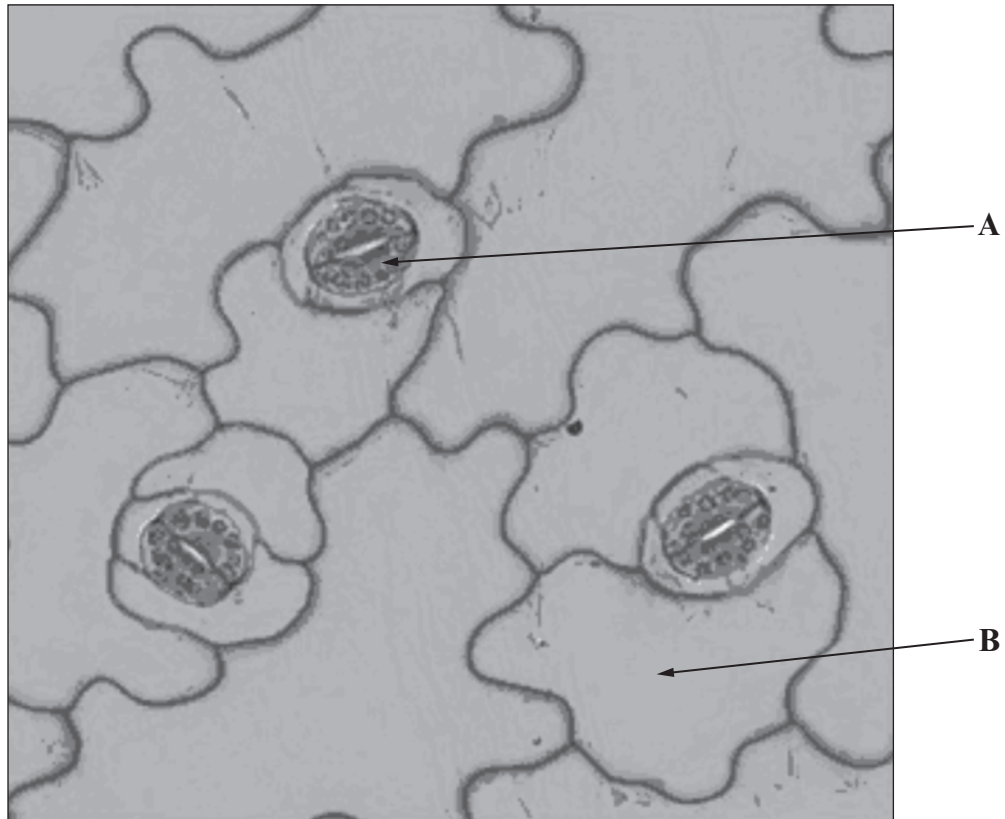
- (d) The drug used to treat infections is Praziquantel which works by inducing severe spasms and paralysis of the worm's muscles.
Suggest how this may cause the removal of the tapeworm. [1]

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(Total 8 marks)

4. The photograph below shows the surface view of stomata found on the lower surface of *Kalanchoe* (*Kalanchoe* sp.) leaves.



© Image by J. Adds, courtesy of SAPS

- (a) Identify cells **A** and **B**.

[2]

A

B

- (b) Give **two** functions of stomata in leaves.

[2]

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(c) Explain how the flow of water into cells **A** leads to opening of stomatal pores. [4]

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(d) When cells **A** were treated with cyanide the stomatal pores failed to open.
Explain why cyanide is having this effect on these cells. [2]

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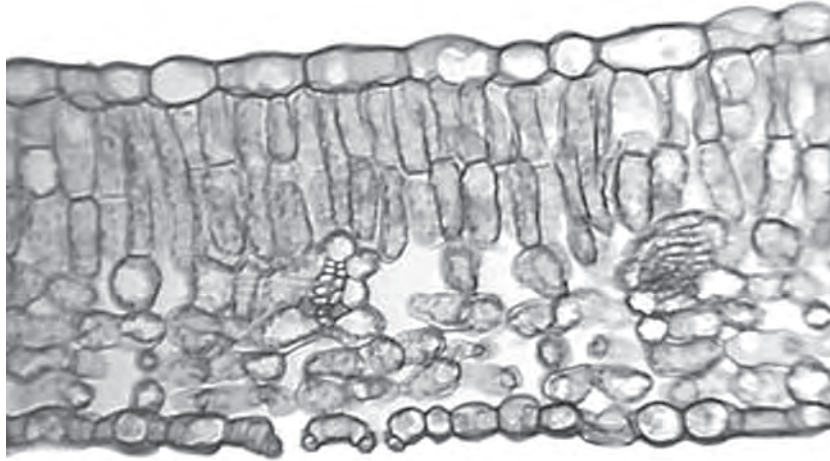
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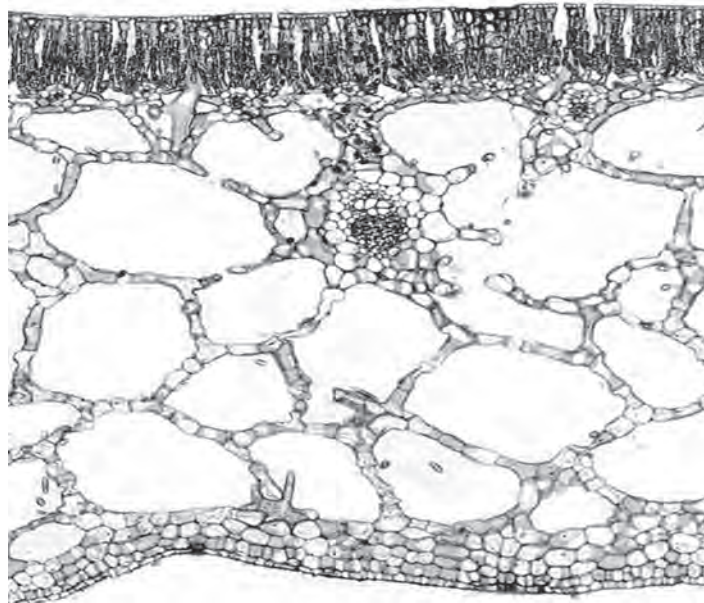
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(Total 10 marks)

5. The photographs below show sections of two leaves from two species of plant. *Ligustrum* is a mesophyte plant.



TS *Ligustrum* leaf (Privet)



TS *Nymphaea* leaf (Waterlily)

(a) What type of plant is *Nymphaea*?

[1]

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(b) Using the information in the photographs, describe **two** visible differences between the two species.

[2]

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(c) State **three** adaptations of *Nymphaea* for living in an aquatic environment and state why each is important.

[3]

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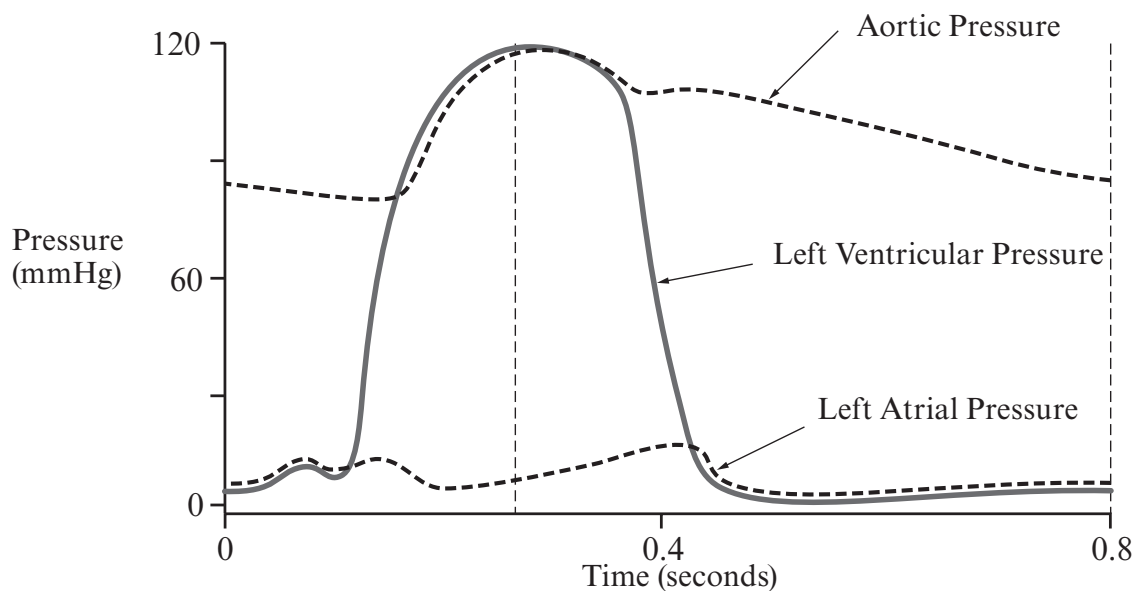
(d) Give **one** feature of *Ammophila* (Marram Grass) which shows how it is adapted to its environment.

[1]

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(Total 7 marks)

6. The cardiac cycle diagram below depicts changes in aortic pressure, left ventricular pressure, left atrial pressure during a single cycle of cardiac contraction and relaxation.



(a) On the diagram above:

- (i) Indicate with a letter **A** where the aortic semi lunar valve opens and with a **B** where it closes. [2]
- (ii) Indicate with a letter **C** where the left atrioventricular (bicuspid) valve opens and with a **D** where it closes. [2]

(b) Why does the ventricular pressure fall to zero, whilst the aortic pressure does not fall below 80 mmHg? [2]

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(c) Using the information in the diagram above, calculate the rate of heartbeat for one minute. Show your working. [2]

Answer

The table below shows the pressure in different areas of the heart.

<i>Region of heart</i>	<i>Maximum Pressure (mmHg)</i>
Right Atrium	4
Right Ventricle	25
Pulmonary Artery	25
Left Atrium	10
Left Ventricle	120
Aorta	120

- (d) Using the information in the table above, explain the difference in pressures between the **left atrium**, **left ventricle** and **right ventricle**. [3]

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(Total 11 marks)

7. An experiment was carried out to determine the effect of bile salts on the digestion of lipids. After equilibration at 37°C each tube contained:

1 cm³ enzyme
 5 cm³ full cream milk
 2 cm³ sodium carbonate
 6 drops of phenolphthalein pH indicator.

Bile salts were added to tube B and boiled enzyme used in tube C.

In alkaline solutions above pH10 phenolphthalein indicator is pink.
 In solutions below pH 8.3 it is colourless.

The colour changes of the solutions are shown in the table below.

	<i>Tube A</i> <i>No bile salts</i>	<i>Tube B</i> <i>Plus bile salts</i>	<i>Tube C</i> <i>Boiled enzyme</i>
Initial colour of indicator in experiment	Pink	Pink	Pink
Colour of indicator after 5 minutes	Pink	Colourless	Pink
Colour of indicator after 10 minutes	Pink	Colourless	Pink
Colour of indicator after 15 minutes	Colourless	Colourless	Pink

(a) Name the enzyme used in this experiment. [1]

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(b) (i) Explain the change in colour of indicator from pink to colourless. [2]

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(ii) Using your knowledge of lipid digestion in the gut, explain the results seen in the tubes **A** and **B**. [3]

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(c) Explain fully the results of tube **C**. [3]

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(d) Suggest why the experiment was carried out using full cream milk. [1]

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(Total 10 marks)

Any diagrams included in your answer must be fully annotated.

Or, (b) Using a suitably drawn and labelled graph, explain what is meant by the oxygen dissociation curve for normal adult mammalian haemoglobin and, using additional lines on the graph, explain how this differs according to the environment in which the organism lives. [10]

(Total 10 marks)