Centre No.						Paper Reference							Surname	Initial(s)
Candidate No.						6	1	0	2	/	0	1	Signature	

Paper Reference(s)

6102/01

Edexcel GCE

Biology

Advanced Subsidiary

Unit Test 2B

Monday 5 June 2006 – Morning

Time: 1 hour

NC001271381

Materials required for examination
Ruler

Items included with question papers
Nil

Examiner's use only

Team Leader's use only

Question Number	Leave Blank
1	
2	
3	
4	
5	
6	
7	
8	
Total	

Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initial(s) and signature.
Check that you have the correct question paper.
Answer ALL EIGHT questions in the spaces provided in this booklet.
Show all the steps in any calculations and state the units. Calculators may be used.
Include diagrams in your answers where these are helpful.

Information for Candidates

The marks for individual questions and parts of questions are shown in round brackets: e.g. (**2**).
The total mark for this paper is 60.

Advice to Candidates

You will be assessed on your ability to organise and present information, ideas, descriptions and arguments clearly and logically, taking account of your use of grammar, punctuation and spelling.

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Answer ALL questions in the spaces provided.

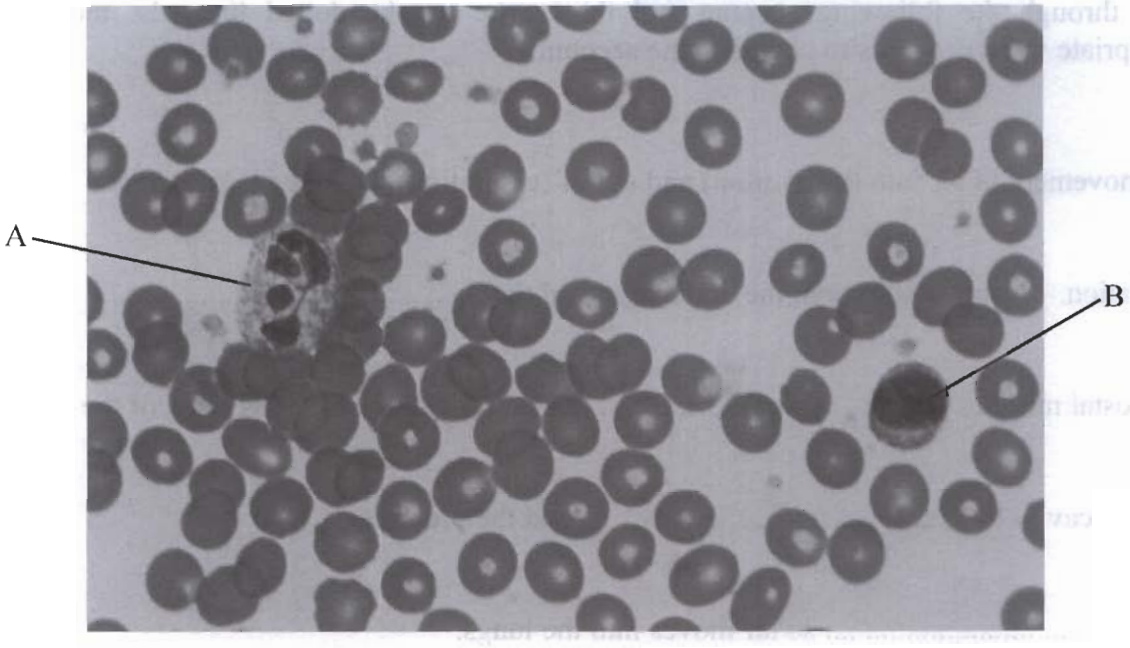
1. Read through the following account and then write on the dotted lines the most appropriate word or words to complete the account.

The movement of air into (inspiration) and out of (expiration) the lungs is known as ventilation. During inspiration, the diaphragm and the ..... intercostal muscles both ..... This causes the volume of the thoracic cavity to ..... and the pressure ..... so air moves into the lungs. **Q1**

(Total 4 marks)

Leave blank

2. The photograph below shows human blood cells, as seen using a light microscope.



Magnification ×1000

(a) Name the cells labelled A and B.

Cell A .....

Cell B .....

(2)

(b) Describe how cell B is involved in defence against disease.

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(2)

Leave blank

(c) Explain the role of erythrocytes (red blood cells) in the transport of carbon dioxide.

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(3) **Q2**

(Total 7 marks)

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3. The table below shows the concentrations of protein and sodium ions in blood plasma and in tissue fluid.

Solute	Concentration in blood plasma	Concentration in tissue fluid
Protein	70.0 g dm^{3}	0.0 g dm^{-3}
Sodium ions	140.0 mmol dm^{-3}	140.0 mmol dm^{-3}

(a) Explain how **tissue fluid** is formed.

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(3)

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(b) Suggest explanations for each of the following.

(i) Protein is present in the plasma but absent from tissue fluid.

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(2)

(ii) The concentrations of sodium ions in plasma and tissue fluid are the same.

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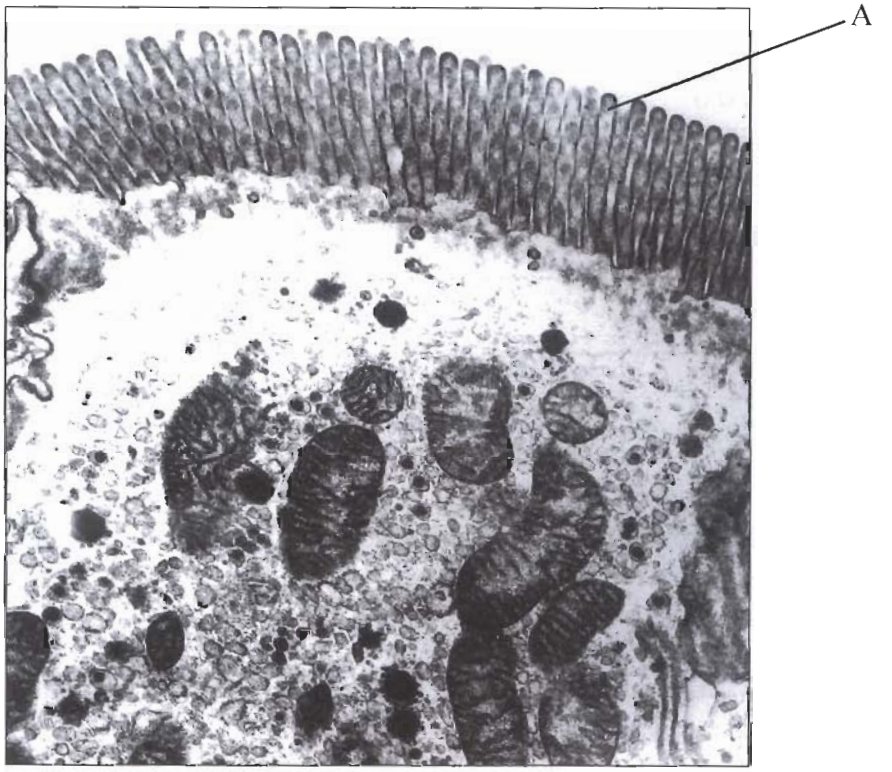
(2) **Q3**

(Total 7 marks)

Leave blank

4. (a) The photograph below shows part of the surface of one epithelial cell facing the lumen of the ileum, as seen using an electron microscope.



Magnification ×15 000

(i) Name the structure labelled A.

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(1)

(ii) Explain how the membrane of structure A is involved in the digestion of carbohydrates.

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(2)

Leave blank

(b) Describe how glucose is absorbed in the ileum.

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(4)

(c) Suggest why the concentration of glucose in the blood rises more quickly after a meal of white bread and jam, than after a meal containing wholemeal bread only.

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(3)

Q4

(Total 10 marks)

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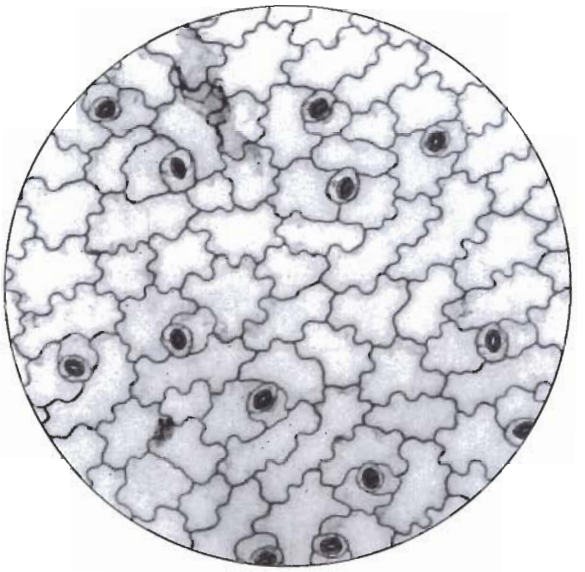
5. The photograph below shows part of the lower epidermis of a leaf, as seen using a light microscope.



Magnification ×100

(a) The area of the field of view is 0.102 mm^2. Count the number of stomata present, and then calculate the number per mm^2. Show your working.

Answer ..... per mm^2

(3)

Leave blank

(b) In an investigation, the concentration of potassium ions (K^+) in guard cells was determined when stomata were closed and when they were open. The results are shown in the table below.

	Concentration of potassium ions / mol dm^{-3}
Stomata closed	0.10
Stomata open	0.45

(i) Describe how the concentration of potassium ions in guard cells changes when stomata open.

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(2)

(ii) Explain how this change in potassium ion concentration is related to the mechanism of stomatal opening.

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(3) **Q5**

(Total 8 marks)

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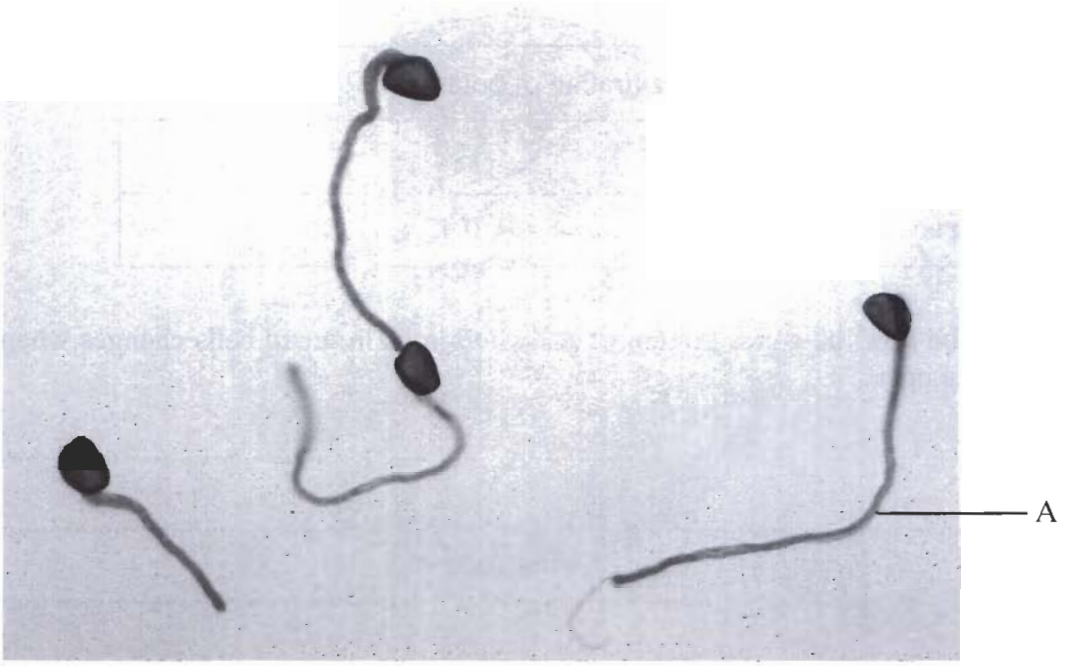
6. The photograph below shows four germinating pollen grains, as seen using a light microscope.



Magnification ×100

(a) Name the part labelled A.

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(1)

(b) Part A contains a tube nucleus and two male nuclei. Describe the roles of the two male nuclei in the process of fertilisation in a flowering plant.

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(4)

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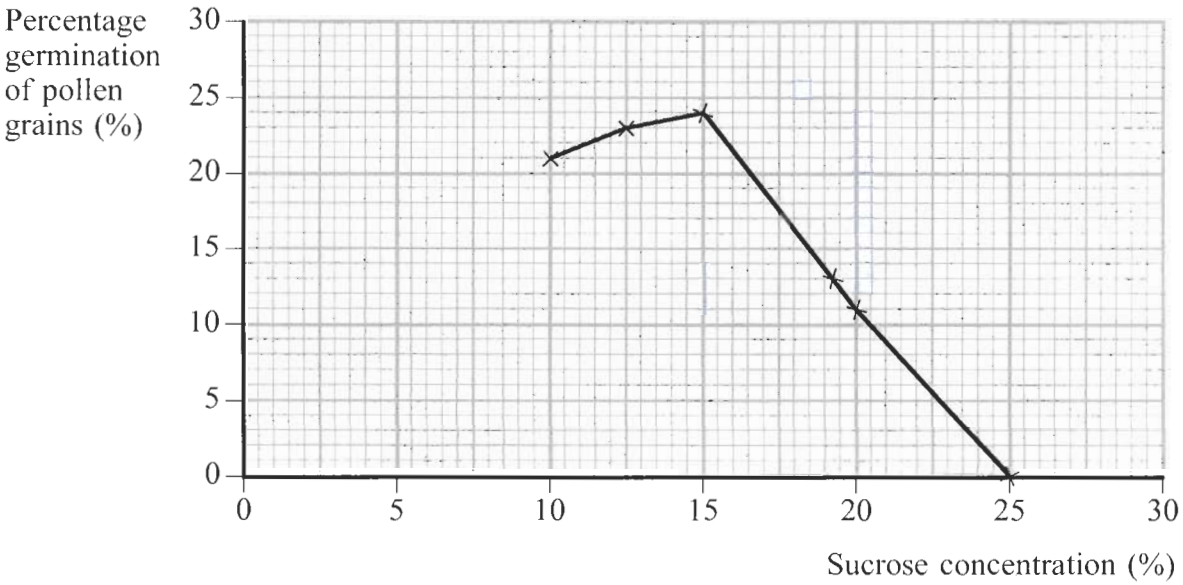
(c) An experiment was carried out to investigate the effect of sucrose concentration on the germination of pollen grains from *Camellia* flowers. The results are shown in the graph below.



(i) From the graph, find the expected percentage germination in a 16% sucrose concentration.

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(1)

(ii) Describe the relationship between the percentage germination and the sucrose concentration, as shown in the graph.

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(2) **Q6**

(Total 8 marks)

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7. The photograph below shows a cell from an insect testis, undergoing meiosis.

Magnification ×1000

(a) Name the stage of meiosis shown in the photograph and give a reason for your answer.

Name of stage .....

Reason .....

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(3)

(b) In a species of butterfly, the diploid ($2n$) number of chromosomes is 360. State the number of chromosomes present in each of the following cells.

(i) A butterfly sperm .....

(ii) A butterfly zygote .....

(2)

Leave blank

(c) Explain the importance of meiosis in the formation of gametes.

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(2) **Q7**

(Total 7 marks)

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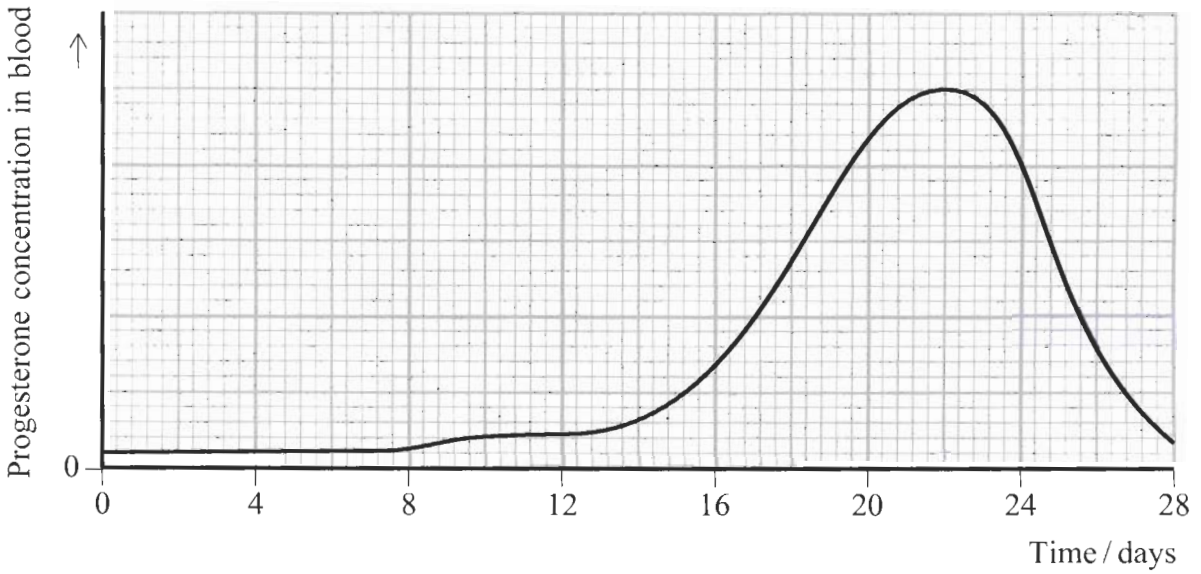
8. The graph below shows changes in the concentration of progesterone in the blood during the menstrual cycle.



(a) Name the structure in the ovary that produces progesterone during the menstrual cycle.

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(1)

(b) Give **two** effects of progesterone.

1 .....

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2 .....

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(2)

(c) If fertilisation occurs on day 14, the concentration of progesterone changes from that shown in the graph.

On the graph above, draw a line to show this change in concentration of progesterone in the blood, from day 22 to day 28.

(2)

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(d) Describe the roles of oxytocin in birth and lactation.

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(4) **Q8**

(Total 9 marks)

TOTAL FOR PAPER: 60 MARKS

END