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

Paper Reference(s)

6112/01

Examiner's use only

Team Leader's use only

Edexcel GCE

Biology (Human)

Advanced Subsidiary

Unit Test 2H

Monday 5 June 2006 – Morning

Time: 1 hour

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

Materials required for examination
Ruler

Items included with question papers
Nil

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.

Turn over

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Answer ALL questions in the spaces provided.

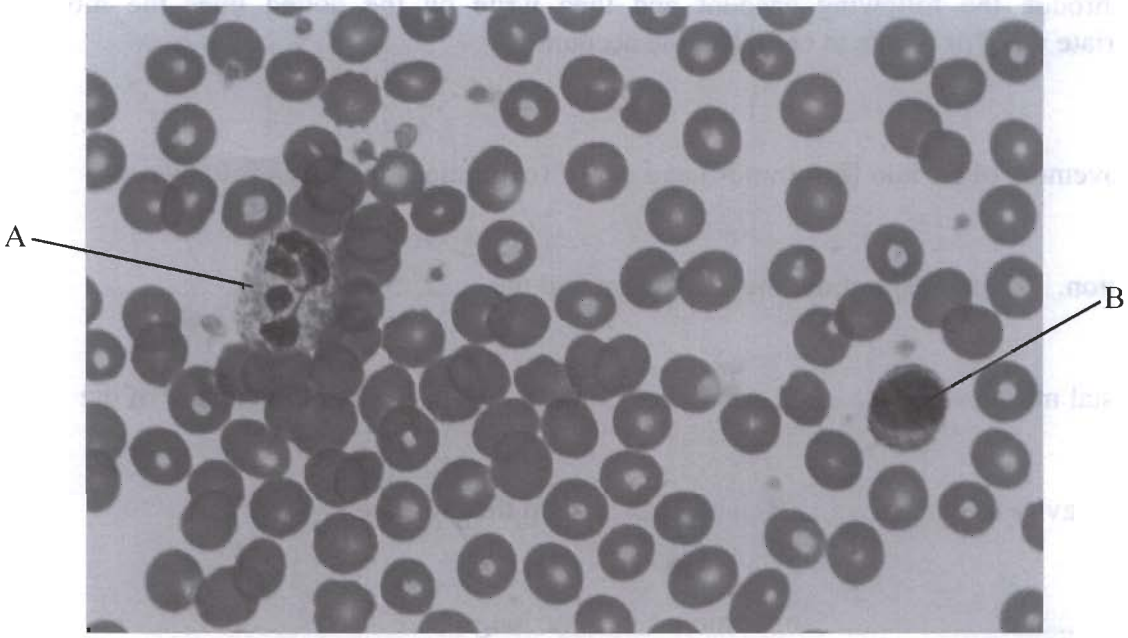
1. Read through the following account and then write on the dotted lines the most appropriate word or words to complete the account.

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)

Leave blank

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)

Leave blank

(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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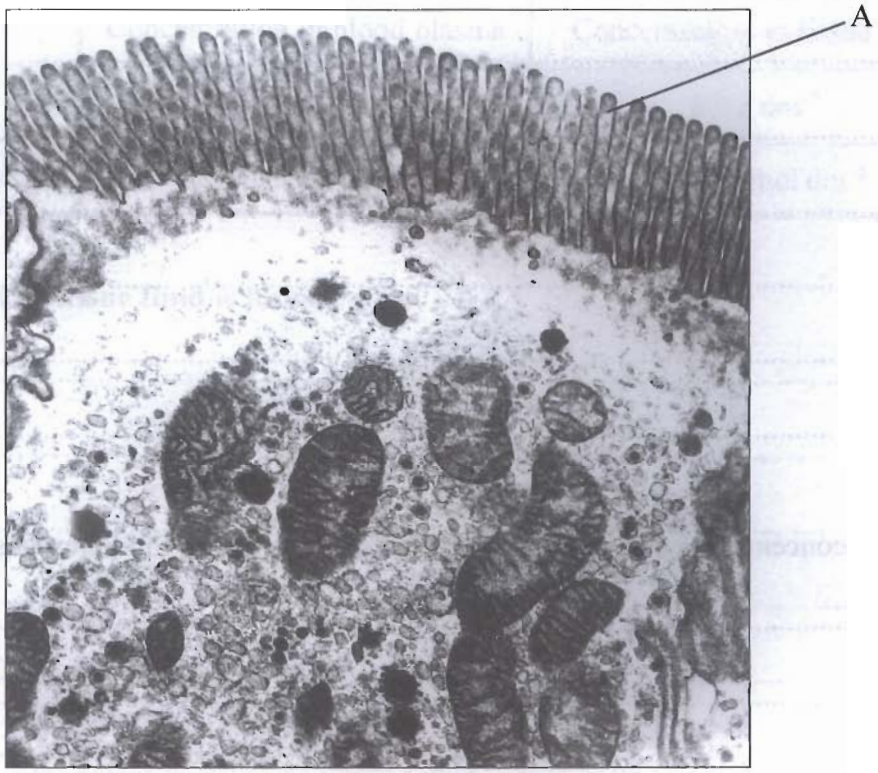
(2) **Q3**

(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)

Leave blank

5. An electrocardiogram (ECG) is a recording of the electrical activity of the heart during the cardiac cycle.

(a) Explain what is meant by the term **cardiac cycle**.

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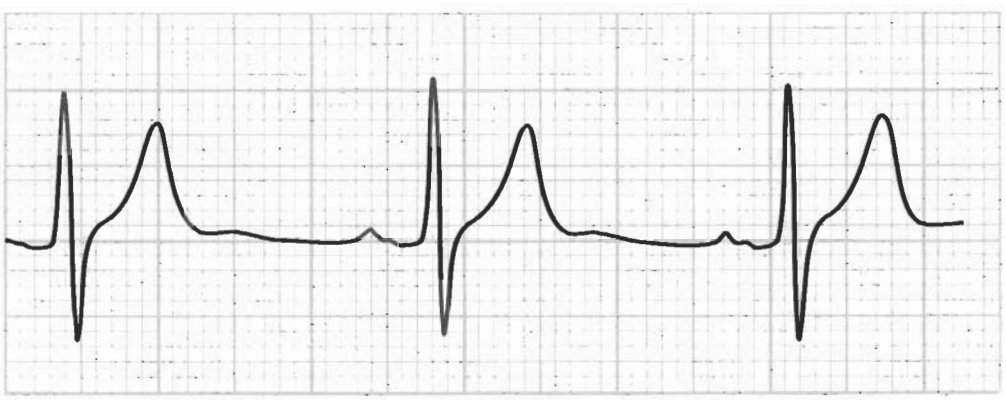
(3)

(b) The recording below shows an ECG from a healthy person.



(i) On the ECG, label an R wave.

(1)

Leave blank

(ii) The time interval between the start of the P wave and the start of the R wave indicates the time taken for the impulse to travel along the bundle of His. This time interval varies from about 0.13 to 0.16 seconds. Explain why it is important that there is a short delay between the P and R waves.

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(3) **Q5**

(Total 7 marks)

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6. The table below gives information about the relationship between altitude and air pressure. It shows how the percentage saturation of haemoglobin with oxygen varies for people when breathing air at different altitudes. It also shows the percentage saturation of haemoglobin with oxygen when breathing pure oxygen at different altitudes.

Altitude / m	Air pressure / kPa	Percentage saturation of haemoglobin with oxygen (%)	
		Breathing air	Breathing pure oxygen
0 (sea level)	100	97	100
3 000	70	90	100
6 000	45	70	100
9 000	30	20	99
12 000	4	5	87

[Data adapted from: Guyton: *Textbook of Medical Physiology*]

(a) Describe how air pressure changes as altitude increases.

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(2)

(b) Calculate the difference in the percentage saturation of haemoglobin with oxygen when breathing air, compared with breathing pure oxygen, at an altitude of 12 000 m.

Show your working.

Answer .....%

(1)

Leave blank

(c) Using the information in the table, explain why mountaineers usually need cylinders of oxygen when climbing high mountains (over 3000 m).

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(4) **Q6**

(Total 7 marks)

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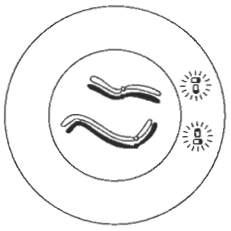
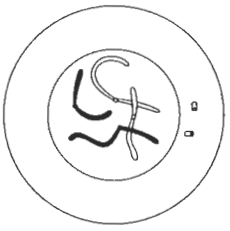
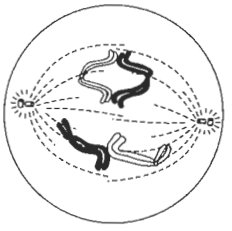
7. The diagrams below show some of the stages of meiosis I in an animal cell.



A



B



C

D

E

(a) State the diploid (2n) number of this cell.

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(1)

(b) Write the letters in the correct order to show the sequence of stages in meiosis I.

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(2)

Leave blank

(c) Explain the importance of meiosis in spermatogenesis.

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(4)

(d) Semen contains about 100 million sperm per cm^3. Suggest why the chances of fertilisation are significantly reduced if this number falls below about 30 million per cm^3.

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(2) **Q7**

(Total 9 marks)

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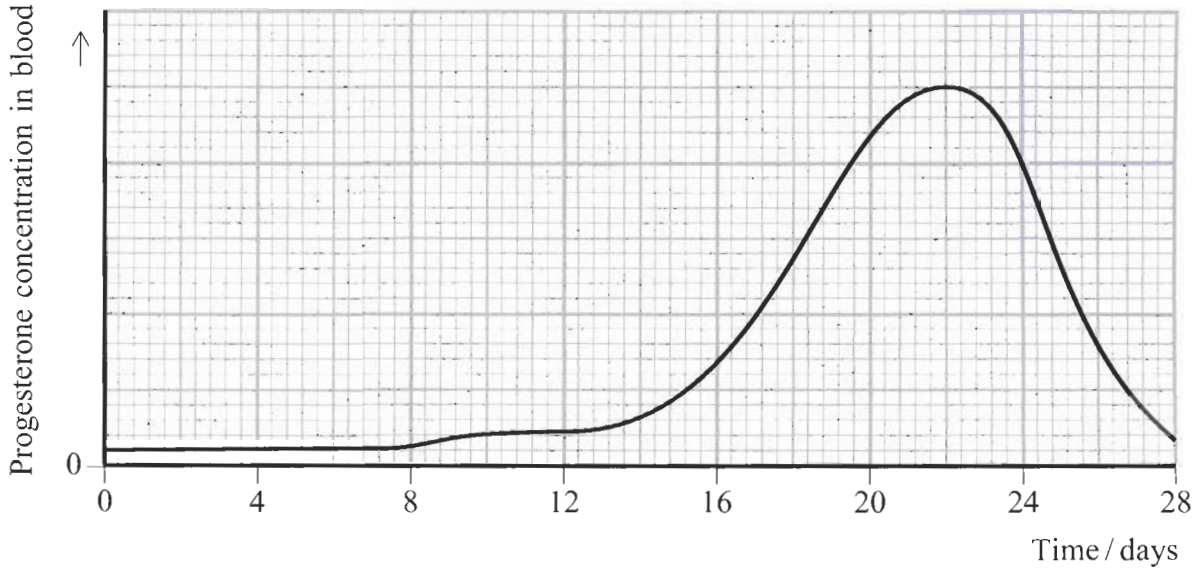
8. The graph below shows changes in the concentration of progesterone in the blood during the menstrual cycle.



(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)

Leave blank

(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