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

Paper Reference(s)

6112/01

Edexcel GCE

Biology (Human)

Advanced Subsidiary

Unit Test 2H

Monday 6 June 2005 – Morning

Time: 1 hour

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 passage on blood cells, and complete the passage by writing the most appropriate word or words in the spaces provided.

Leucocytes (white blood cells) include neutrophils, lymphocytes and

..... Neutrophils have a lobed nucleus but lymphocytes have

a ..... nucleus.

The function of neutrophils is to engulf pathogens in a process known as

..... Lymphocytes secrete ..... in

response to antigens.

(Total 4 marks)

Q1

Leave blank

2. (a) Describe **three** properties of haemoglobin that enable it to function efficiently as a respiratory pigment.

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(3)

(b) Myoglobin is a pigment found in muscle cells. Explain the role of this pigment in muscle cells.

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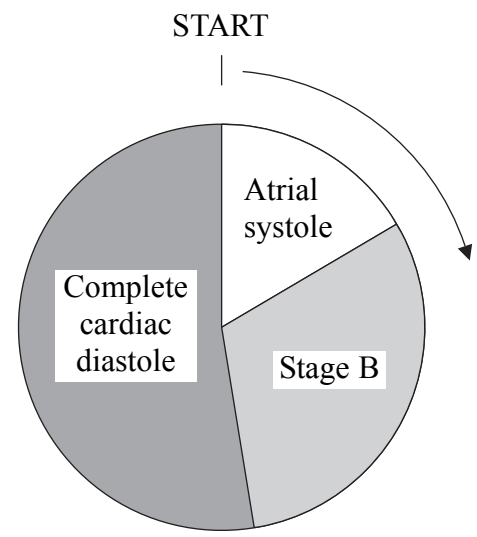
(3)

(Total 6 marks)

Q2

Leave blank

3. The diagram below represents the sequence of stages during one complete cardiac cycle.



(a) Name Stage B.

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(1)

(b) Describe what is happening in the heart during complete cardiac diastole.

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(2)

Leave blank

(c) Describe how cardiac muscle is supplied with oxygen.

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(3)

Q3

(Total 6 marks)

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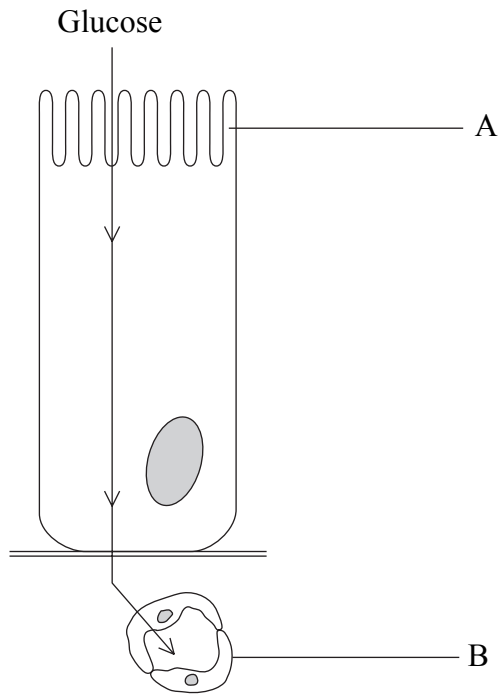
4. The diagram below shows absorption of glucose into an epithelial cell lining the ileum and the movement of glucose into a blood vessel.



(a) Name the cell structure labelled A and the type of blood vessel labelled B.
In each case explain how they function to assist in glucose absorption.

Cell structure A

Name .....

Function .....

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(3)

Blood vessel B

Name .....

Function .....

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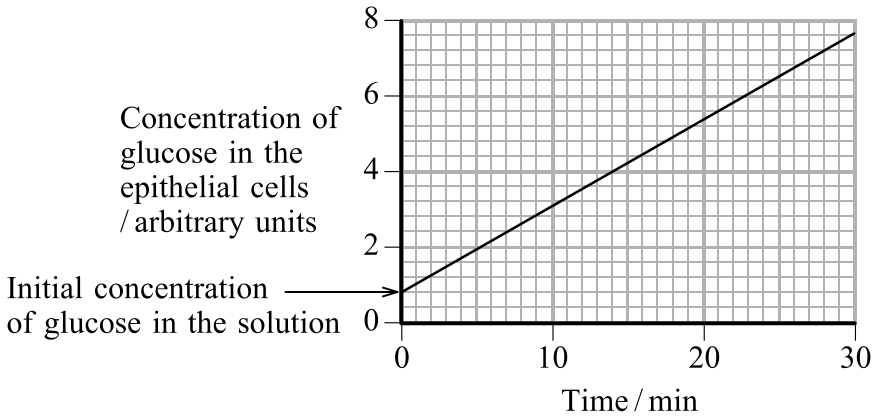
(3)

Leave blank

(b) An investigation was carried out into the uptake of glucose by the epithelial cells of the ileum. A small piece of the wall of the ileum was placed in a solution of glucose. The concentration of glucose in this solution was lower than the concentration of glucose inside the epithelial cells. The results of this investigation are shown in the graph below.



With reference to the graph, explain how glucose is absorbed into the epithelial cells.

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(4)

(Total 10 marks)

Q4

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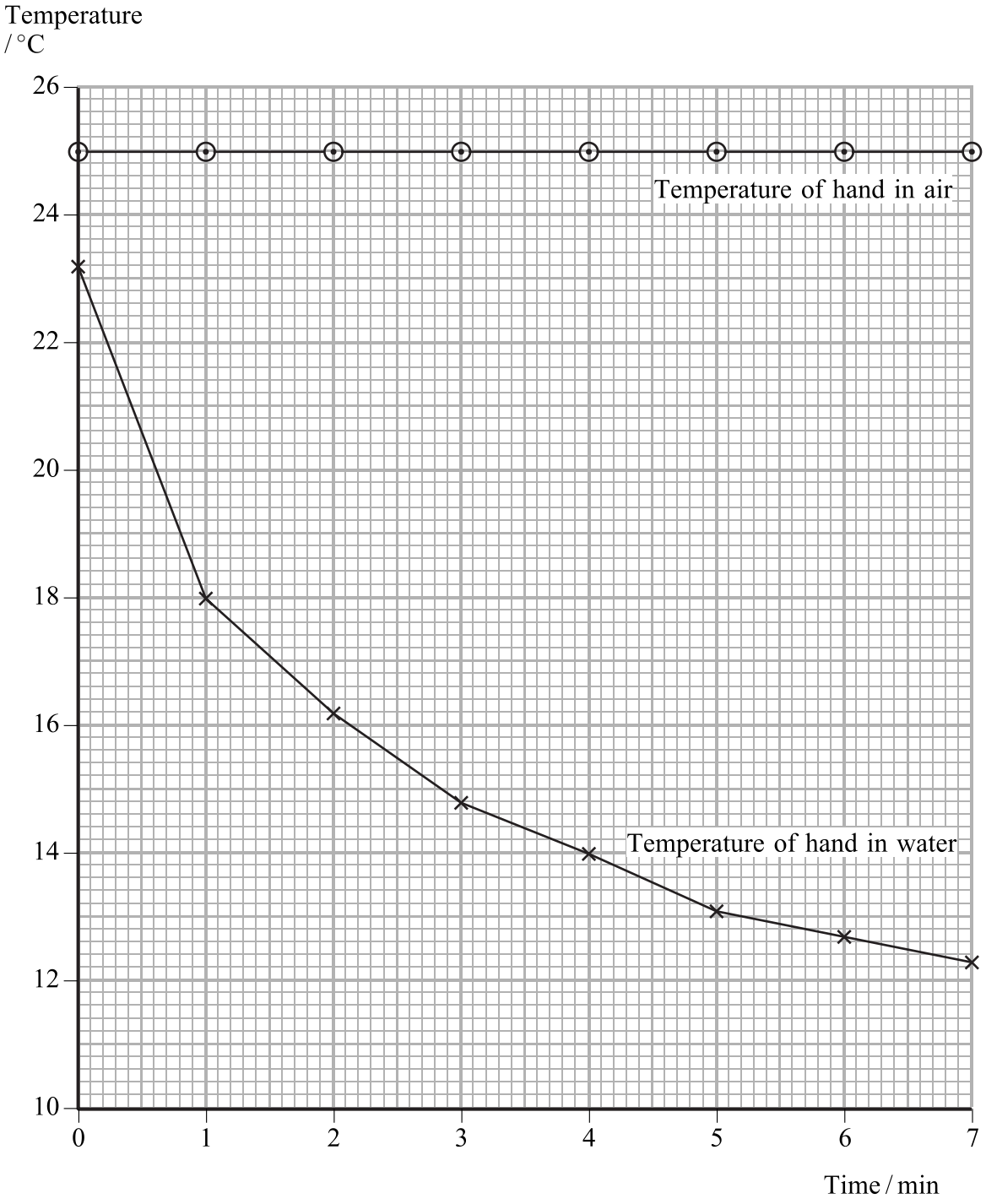
5. An investigation was carried out into body temperature regulation in humans. A healthy volunteer was immersed in a bath of water at 10 °C. During the investigation he kept one hand in the air and one hand submerged in water. The temperature of the hand in air and the temperature of the hand in water were recorded immediately after he got into the bath, and then every minute for seven minutes. His core (internal) temperature was also recorded and found to remain at almost exactly 37 °C. The air temperature in the room remained at 26 °C during the investigation.

The results are shown in the graph below.



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(a) Compare the temperature of the hand in air with the temperature of the hand immersed in water during this investigation.

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(2)

(b) Suggest reasons for the differences you have described in (a).

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(2)

(c) Suggest why the volunteer's core temperature remained almost constant during this investigation.

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(3) **Q5**

(Total 7 marks)

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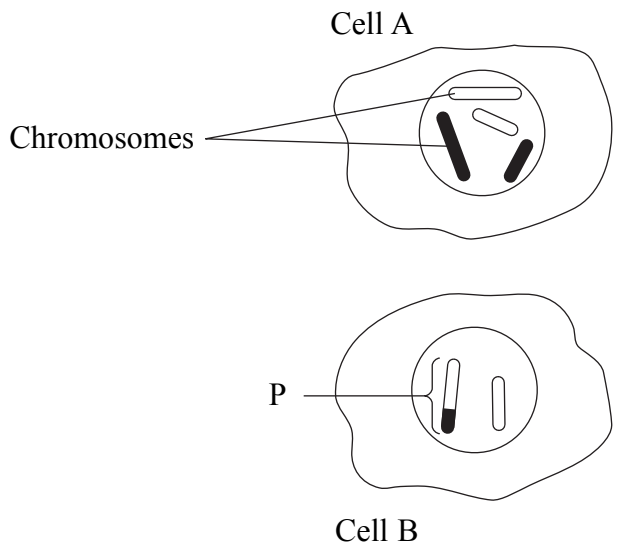
6. Cell A in the diagram below has two pairs of chromosomes. Cell B is one of four cells that were produced from cell A by cell division.



(a) State the type of cell division which has occurred to produce cell B, and give a reason for your answer.

Type of cell division .....

Reason .....

.....

(2)

(b) Explain what happened during this cell division which resulted in the different appearance of chromosome P.

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(3)

(c) Give the exact location in a human male where this type of cell division occurs.

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(1)

(Total 6 marks)

Q6

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7. (a) Describe how you would find the breathing rate of a person at rest.

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(1)

(b) The table below shows the pulmonary ventilation rate (volume of air breathed in or out per minute) of a man at rest, and walking at four different speeds.

Walking speed / km hour^{-1}	Pulmonary ventilation rate / dm^3 min^{-1}
0 (rest)	11
3.2	19
4.8	25
6.4	37
8.0	60

(i) Describe the relationship between walking speed and the pulmonary ventilation rate.

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(2)

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(ii) Explain the mechanism by which these changes in pulmonary ventilation rate are brought about.

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(3)

(c) An experiment was carried out to determine the composition of a sample of expired air, using a gas burette. A person breathed out as far as possible through a gas burette, which was then closed. The initial gas volume was recorded. A small volume of saturated potassium hydroxide solution was then injected into the gas burette and the final gas volume was recorded. Potassium hydroxide solution absorbs carbon dioxide.

The results are shown in the table below.

Gas burette reading	Volume / cm^3
Initial volume	75.0
Final volume	72.0

Calculate the percentage of carbon dioxide in the air sample. Show your working.

Answer .....

(3) **Q7**

(Total 9 marks)

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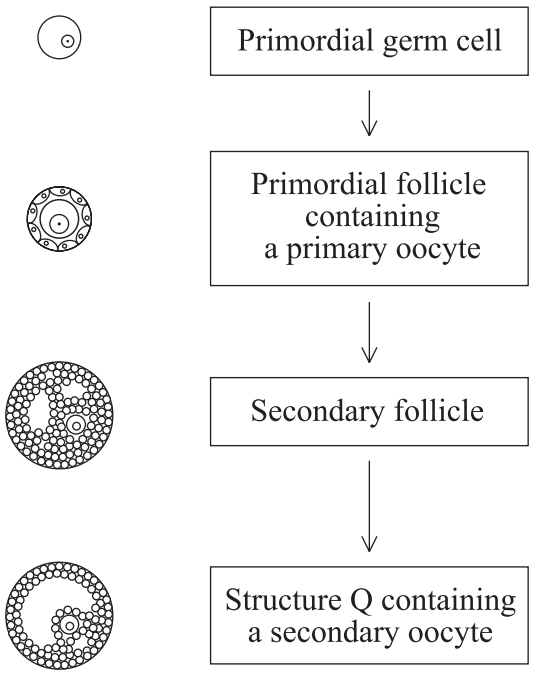
8. (a) The diagram below shows some of the stages during the development of a human ovum.



(i) On the diagram, write the letter M to show when the first division of meiosis is complete.

(1)

(ii) Name structure Q, shown in the diagram.

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(1)

(iii) After ovulation, structure Q develops to form a corpus luteum. Name **two** hormones that are secreted by the corpus luteum.

1 .....

2 .....

(2)

Leave blank

(b) Describe the process of fertilisation in humans.

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(3)

(c) After fertilisation, the blastocyst implants in the endometrium. By the fourth week of pregnancy a placenta has developed. Describe the functions of the placenta.

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(5)

Q8

(Total 12 marks)

TOTAL FOR PAPER: 60 MARKS

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