Centre No.						Paper Reference							Surname	Initial(s)
Candidate No.						4	4	3	7	/	4	H	Signature	

Paper Reference(s)

4437/4H

Examiner's use only

Team Leader's use only

London Examinations IGCSE

Science (Double Award)

Biology

Paper 4H

Higher Tier

Friday 21 May 2010 – Morning

Time: 1 hour 30 minutes

Question Number	Leave Blank
1	
2	
3	
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9	
10	
11	
12	
13	
Total	

Materials required for examination
Nil

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.
The paper reference is shown at the top of this page. Check that you have the correct question paper.
Answer **ALL** the questions in the spaces provided in this question paper.
Show all the steps in any calculations and state the units.
Calculators may be used.

Information for Candidates

The marks for individual questions and the parts of questions are shown in round brackets: e.g. **(2)**.
There are 13 questions in this question paper. The total mark for this paper is 90.
There are 20 pages in this question paper. Any blank pages are indicated.

Advice to Candidates

Write your answers neatly and in good English.

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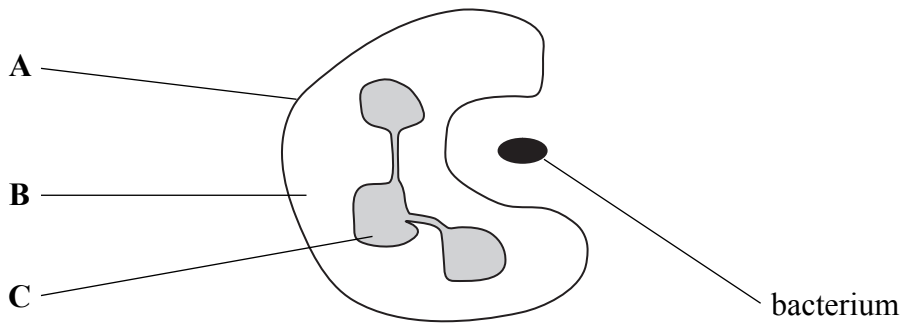
Answer ALL the questions. Write your answers in the spaces provided.

1. White blood cells help to prevent disease.

The diagram shows one type of white blood cell ingesting a bacterium.



(a) (i) Complete the table to give the names and functions of the parts of the cell labelled **A**, **B** and **C**.

Part of cell	Name of part of cell	Function of part of cell
A		
B		
C		

(4)

(ii) Describe what happens to the bacterium after it has been ingested.

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(2)

Leave blank

(b) Describe how a different type of white blood cell can also help to prevent disease.

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(2) **Q1**

(Total 8 marks)

Leave blank

2. The table lists the names of some human conditions and their symptoms.

Complete the table by writing the name of the organ affected in each empty box.

One has been done for you.

Condition	Symptom	Organ affected
emphysema	poor gas exchange	
cataract	cloudy lens	
Alzheimer's	loss of memory	
coeliac	poor food absorption	
arthritis	swollen joints	bones
infertility	lack of sperm	

(Total 5 marks)

Q2

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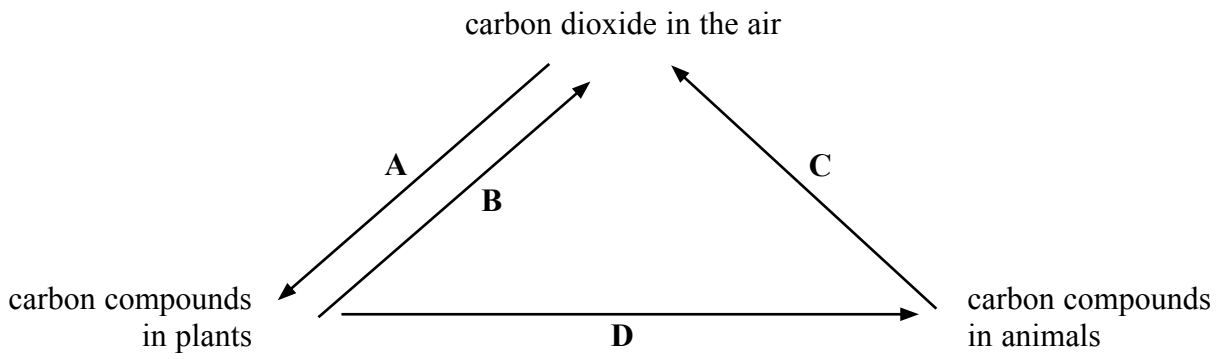
3. The diagram shows the carbon cycle.



(a) (i) Which letter represents photosynthesis?

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(1)

(ii) Arrow **C** could represent two processes.

Name these **two** processes.

1 .....

2 .....

(2)

(b) Human activities can increase the carbon dioxide in the air.

Describe the possible consequences of too much carbon dioxide in the air.

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(5)

Q3

(Total 8 marks)

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4. A farmer had a field of maize.

(a) He found weeds growing amongst the maize plants.

(i) Explain how the weeds could reduce the yield of maize.

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(2)

(ii) Describe **one** way in which the farmer could get rid of the weeds.

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(1)

(b) The farmer also found insects feeding on the leaves of the maize plants.

(i) Explain how the insects could reduce the yield of maize.

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(2)

(ii) Name **two** ways in which the farmer could get rid of the insects feeding on the maize.

1 .....

2 .....

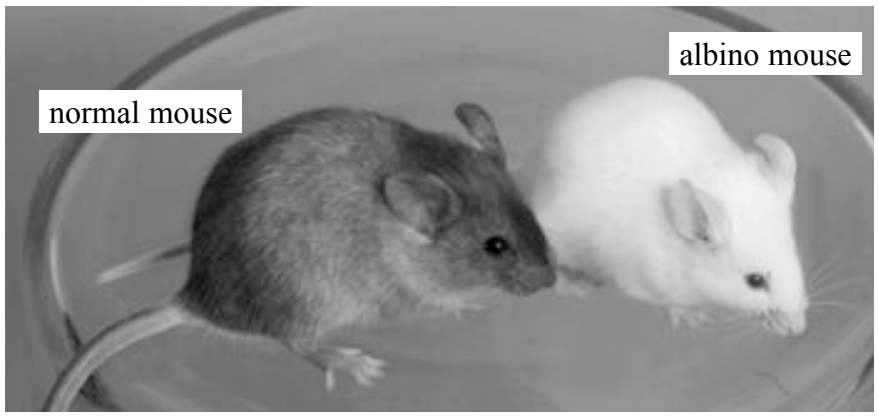
(2)

Q4

(Total 7 marks)

Leave blank

5. The photograph shows a normal mouse and an albino mouse.



Albinism is an inherited condition in which animals have white fur.

Albinism is controlled by a single gene that has two alleles.
The allele for albinism, **a**, is recessive. The dominant allele, **A**, produces brown fur.

Two mice with brown fur were mated.
They produced some offspring with brown fur and some offspring with white fur.

(a) Draw a genetic diagram to show the genotypes of the parents, their gametes, and the genotypes and phenotypes of their offspring.

(4)

Leave blank

(b) Albino mice are often kept as pets because people like their white fur.

(i) Some genotypes of parent mice are more useful than others in producing albino offspring.

The table describes different parent genotypes and the number of albino mice that would be expected if the parents produced four offspring.

Complete the table.

Parent genotypes	Number of albino offspring
homozygous dominant × homozygous dominant	none
heterozygous × homozygous recessive	
heterozygous × heterozygous	
homozygous recessive × homozygous recessive	

(3)

(ii) Suggest why mice with white fur are rarely found in the wild.

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(2) **Q5**

(Total 9 marks)

Leave blank

6. A woodland community contained a small population of a rare tree species.

(a) (i) What is meant by the term ‘population’?

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.....

(1)

(ii) What is meant by the term ‘community’?

.....

.....

.....

(2)

(b) The woodland was threatened by deforestation.

Give **two** harmful consequences of deforestation.

1 .....

.....

2 .....

.....

(2)

(c) A plant breeder wanted to grow the rare species of tree.

Explain why tissue culture (micropropagation) would be a suitable method to use.

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(4) **Q6**

(Total 9 marks)

Leave blank

7. The photograph shows a fish farm. One third of the fish we eat is produced by fish farms.

Suggest **four** advantages of farming fish rather than catching fish from the wild.

1 .....

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2 .....

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3 .....

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4 .....

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Q7

(Total 4 marks)

Leave blank

8. A person moves from a cold room to a warm room.

Describe the changes that take place in the skin of this person.

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Q8

(Total 6 marks)

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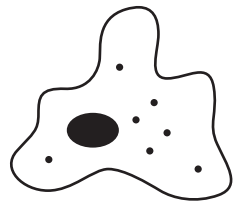
9. The drawing shows a small unicellular organism called *Amoeba*.



(a) What is meant by the term ‘unicellular’?

.....

.....

(1)

(b) Large organisms use a transport system to move substances around the body.

(i) Explain why an *Amoeba* does not need a transport system.

.....

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(2)

(ii) The table below is about the transport system of large organisms.

Complete the table to show the substances transported, where they enter the blood and how they are carried.

Substance	Enter the blood from	Carried by
glucose		plasma
oxygen	alveoli	
adrenaline	adrenal glands	
	respiring muscle cells	plasma
urea		plasma

(5)

Q9

(Total 8 marks)

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10. (a) The food chain below is found in Asia.

rice ⟶ rat ⟶ python ⟶ mongoose

(i) Name the secondary consumer in this food chain.

.....

(1)

(ii) Name the top carnivore in this food chain.

.....

.....

(1)

(b) The food chain below is found in Australia.

sugar cane ⟶ scarab beetle ⟶ cane toad

(i) The cane toad was brought into Australia in 1937 and released in large numbers by farmers.

Suggest why the farmers did this.

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(2)

(ii) The cane toad does not have any predators in Australia.

Suggest how the release of cane toads has caused ecological problems.

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(2) **Q10**

(Total 6 marks)

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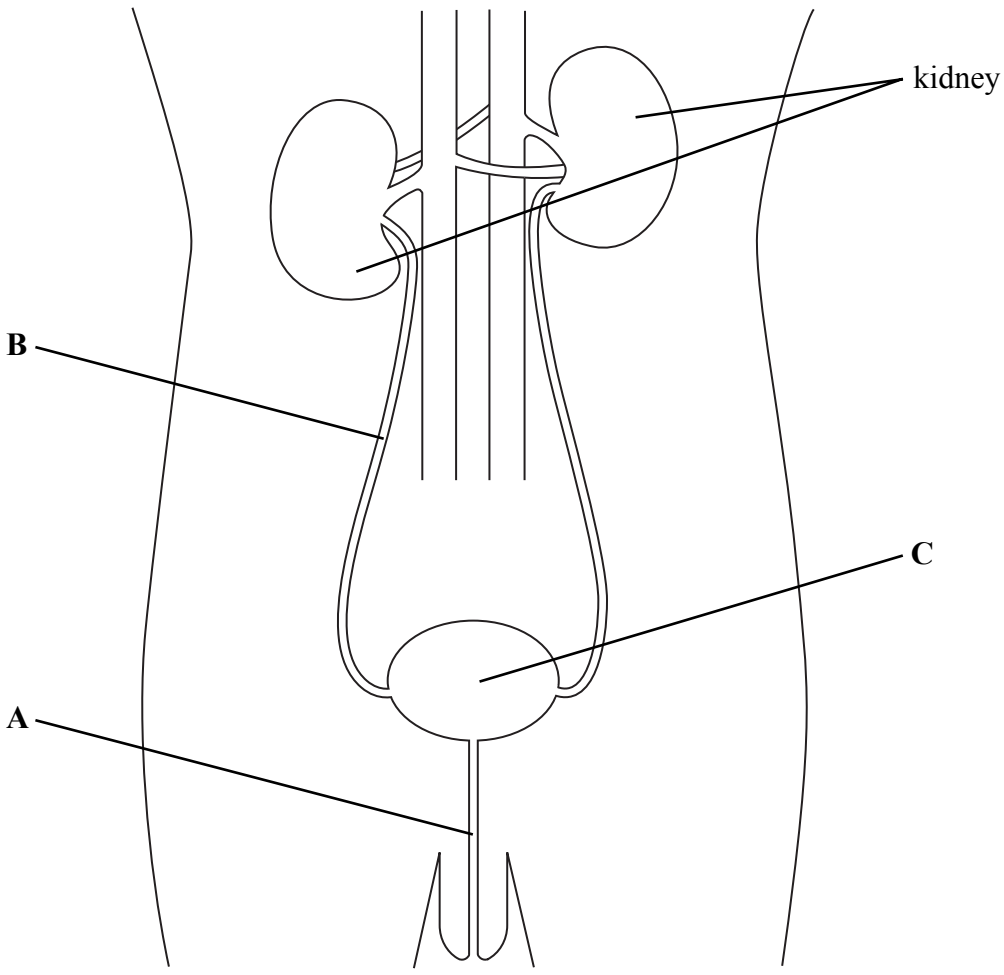
11. The diagram shows the kidneys and associated structures.



(a) (i) The kidneys are part of a system in the body.

Name this system.

.....

(1)

(ii) Name the structures labelled **A**, **B** and **C**.

A .....

B .....

C .....

(3)

Leave blank

(b) Name the **two** liquids that could pass down tube **A** in a male.

1 .....

2 .....

(2)

(c) If the kidneys fail to work, a kidney can be transplanted from another person (donor).

Suggest **two** reasons why there is a shortage of suitable donor kidneys.

1 .....

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2 .....

.....

(2) **Q11**

(Total 8 marks)

Leave blank

12. (a) The table shows the names, sources and functions of some components of a balanced diet.

Complete the table.

Name of component	Source	Function
	pasta	energy source
lipid	fish	
	meat	synthesis of enzymes
iron	red meat	

(4)

(b) (i) Give the chemical elements present in lipid.

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(1)

(ii) Describe how lipids are digested in the human gut.

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(3) **Q12**

(Total 8 marks)

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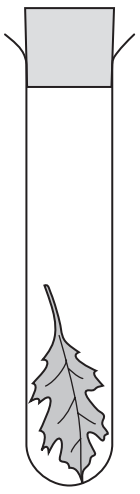
13. A plant leaf was placed in a sealed test tube as shown below. The test tube was exposed to different levels of light intensity.



The table shows the rate of photosynthesis and respiration at different levels of light intensity. It also shows the amount of oxygen and carbon dioxide in the tube at each level of light intensity.

Complete the table using only the words below. The first row has been done for you.

high **medium** **low**

Level of light intensity	Rate of photosynthesis	Rate of respiration	Amount of oxygen	Amount of carbon dioxide
Bright light	high	medium	high	low
Low light				
Darkness				

Q13

(Total 4 marks)

TOTAL FOR PAPER: 90 MARKS

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