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

Tuesday 11 November 2008 – Afternoon

Time: 1 hour 30 minutes

Materials required for examination
Nil

Items included with question papers
Nil

Question Number	Leave Blank
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
Total	

Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initial(s) and signature.
The paper reference is shown above. Check that you have the correct question paper.
Answer **ALL** the questions. Write your answers 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 11 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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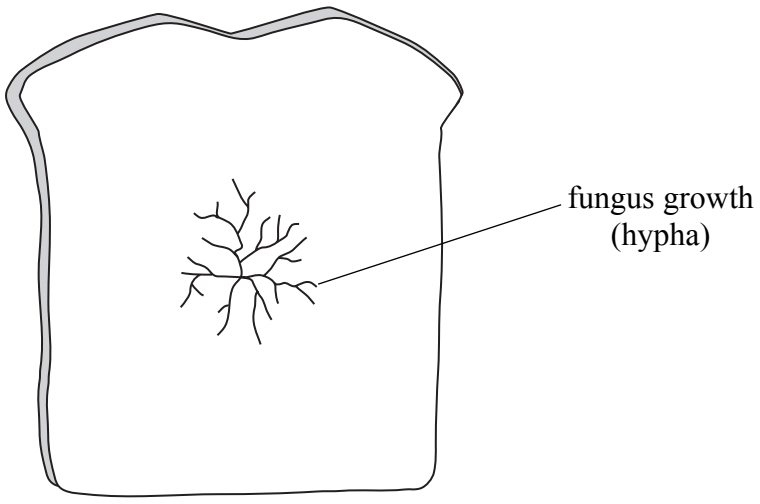
Answer ALL the questions. Write your answers in the spaces provided.

1. The drawing shows a piece of bread. The bread is going mouldy because a fungus is growing and feeding on it. When the fungus grows it produces many threads (hyphae) that spread over the bread.



The hyphae secrete enzymes that digest the bread. The products from this digestion are then absorbed by the fungus.

(a) Complete the table to name the type of enzyme secreted by the fungus and the products of digestion.

Name of enzyme secreted by fungus	Product of digestion
	maltose
protease	
	fatty acids and glycerol

(3)

Leave blank

(b) The passage below describes the part played by fungi in the carbon cycle. Complete the passage by choosing a suitable word or words to write on the dotted lines.

Many fungi are decomposers and play an important part in the carbon cycle.

Decomposition is the .....

of dead organisms, or other organic material, such as bread. The process releases

inorganic mineral ions, such as .....,

into the soil. Decomposition also releases a gas called

..... into the air. This gas is

produced by a process called .....,

which releases the energy that fungi need to grow. The same gas is taken

out of the air by plants and used in a process called

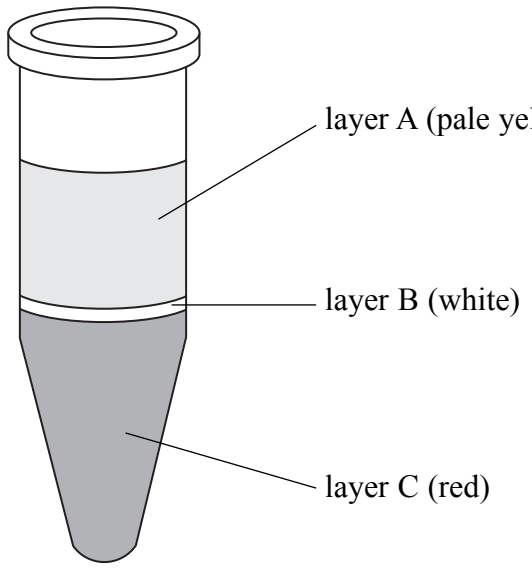
..... to make food.

(5) **Q1**

(Total 8 marks)

Leave blank

2. A sample of blood was taken from a healthy adult. The blood was placed in a tube in a machine called a centrifuge. A centrifuge spins the tube around very fast and after a time the blood separates into different layers. When the tube of blood was taken out of the centrifuge it looked like this.



(a) (i) Name the pale yellow liquid found in layer A.

.....

(1)

(ii) Give **one** function of this liquid.

.....

.....

(1)

Leave blank

(b) Layer B contains cells. These cells are involved in protecting the body from infection.

(i) Name the cells in layer B.

.....

(1)

(ii) Describe how these cells protect the body from infection.

.....

.....

.....

.....

(2)

(c) Name the cells found in layer C.

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(1)

(d) Explain why a person who loses a lot of blood quickly could die.

.....

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(2)

Q2

(Total 8 marks)

Leave blank

3. A farmer noticed that small insects called aphids were feeding on the leaves of his tomato plants. The farmer knew that ladybirds eat aphids, so he released lots of ladybirds onto his tomato plants.

(a) (i) Use this information to draw a food chain in the space below.

(2)

(ii) Suggest how the aphids would affect the yield of tomatoes.

.....

.....

.....

(2)

(iii) The farmer released ladybirds to reduce the number of aphids.
What name is given to this method of reducing the numbers of an insect pest?

.....

(1)

(b) The farmer could also use pesticides to reduce the numbers of an insect pest.
Describe the disadvantages of using pesticides compared to using ladybirds.

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(3) **Q3**

(Total 8 marks)

Leave blank

4. The photograph shows a dog called Snuppy. Snuppy was the first dog to be produced by cloning. He was cloned using cells from the skin of his father.

Describe the stages that might have been used to produce Snuppy.

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Q4

(Total 5 marks)

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5. Huntington's disorder affects the nervous system. It is controlled by a single gene that has two alleles. If a person has the dominant allele **H**, they develop the condition, but usually it does not show until later in life. If a person is homozygous recessive they do not develop the condition, and are described as being 'normal'.

(a) Explain what is meant by the term **homozygous recessive**.

.....

.....

.....

.....

(2)

(b) Dick and Janet married and had children. Genetic tests later revealed that Dick was homozygous recessive for this condition but Janet was heterozygous.
In the space below draw a genetic diagram to show their genotypes, the possible gametes, and the genotypes and phenotypes of their children.

	Dick	Janet
Genotype		
Gametes		
Genotypes of children		
Phenotypes of children		

(4)

(c) Describe how information from receptors in the nervous system is passed to the central nervous system.

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(2) **Q5**

(Total 8 marks)

Leave blank

6. The kidney acts as an organ of excretion, ion balance and osmoregulation.

(a) Describe what happens during the following processes in the kidney.

(i) Ultrafiltration

.....

.....

.....

.....

.....

(2)

(ii) Selective reabsorption

.....

.....

.....

.....

.....

(2)

(b) The data below show the average values for several components that undergo filtration and reabsorption.

Substance	Amount filtered per day	Amount excreted per day	Percentage reabsorbed
Water	180 litres	1.8 litres	**?**
Sodium	630 g	3.2 g	99.5
Glucose	180 g	0.0 g	100
Urea	54 g	30.0 g	44.0

(i) Calculate the percentage of the water filtered that is reabsorbed. Show your working.

Answer .....%

(2)

Leave blank

(ii) Which part of the kidney nephron is used to reabsorb the filtered glucose?

.....

.....

(1)

(c) As a result of exercise on a hot day, there are changes in the volume and concentration of urine.
Describe these changes in urine and explain how these changes are brought about.

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(5)

Q6

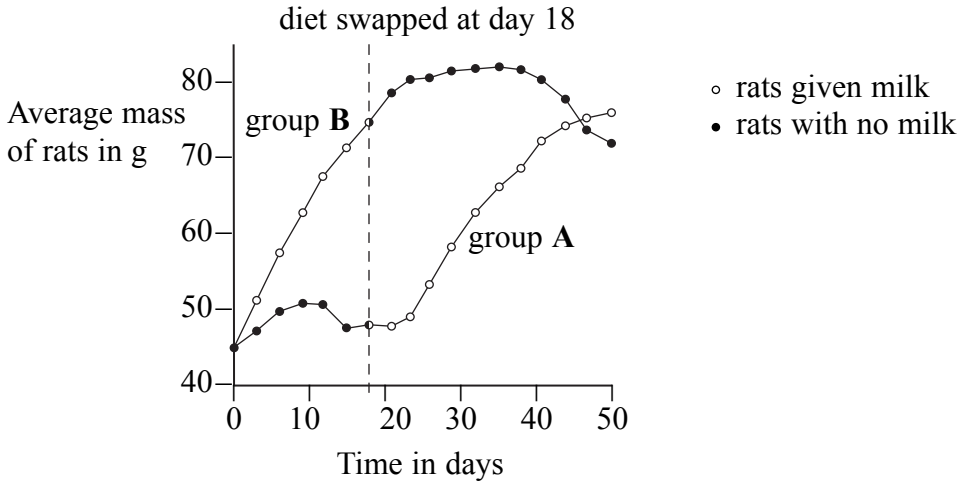
(Total 12 marks)

Leave blank

7. Hopkins was a scientist who studied the effects of 'accessory food factors' on the growth of rats. He had two groups of young rats, group **A** and group **B**.

Group **A** – fed on a diet of pure protein, carbohydrate, fat, mineral salts and water. These rats failed to grow normally.

Group **B** – fed on the same diet but with the addition of 2 cm^3 of milk each day. These rats grew well. After eighteen days the diets were swapped for each group so that group **A** now got the 2 cm^3 of milk and group **B** received no milk. His results are shown below.



(a) (i) Use the graph to describe the changes in the mass of the rats in each group from day 18 to day 50.

Group **A** .....

.....

.....

.....

Group **B** .....

.....

.....

.....

.....

(4)

Leave blank

(ii) What conclusions can you draw as to the effect of milk on the growth of the rats in Hopkins' experiment?

.....

.....

.....

(2)

(b) Suggest why Hopkins swapped the diets after 18 days.

.....

.....

.....

(1)

(c) To enable a valid comparison to be made between the two groups, other variables need to be kept the same.

Suggest **one** such variable and explain how it could be kept the same.

.....

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.....

.....

(2)

(d) The 'accessory food factors' studied by Hopkins are now known as vitamins.

Complete the table by writing the name of a vitamin and a suitable source in the empty boxes.

Vitamin	Function	Source
	night vision	carrot
C	skin and gum development	
D	help absorb calcium	fish oil

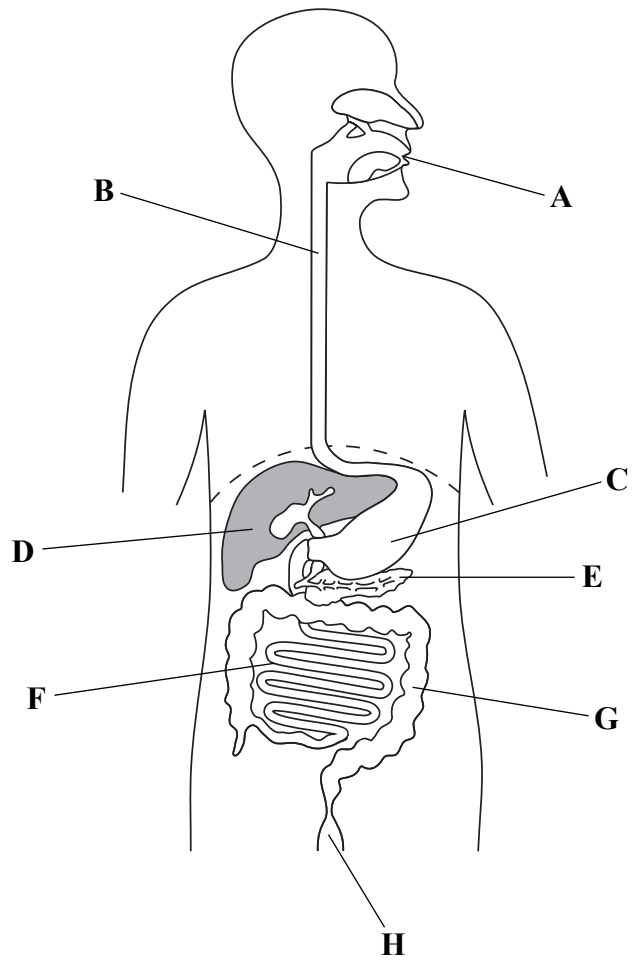
(2)

(Total 11 marks)

Q7

Leave blank

8. The diagram below shows the structure of the human gut.



(a) From the diagram select the letter, or letters, that show where each of the following processes takes place.

(i) change of pH from 7 to 2

.....

(ii) digestion by enzymes

.....

(iii) absorption

.....

(iv) egestion

.....

(4)

Leave blank

(b) Describe **two** ways in which bile helps digestion.

1 .....

.....

2 .....

.....

(2) **Q8**

(Total 6 marks)

9. Farmers often use fertilisers on their fields. Explain the biological consequences that occur when mineral ions from fertilisers are leached from the soil and washed into a lake.

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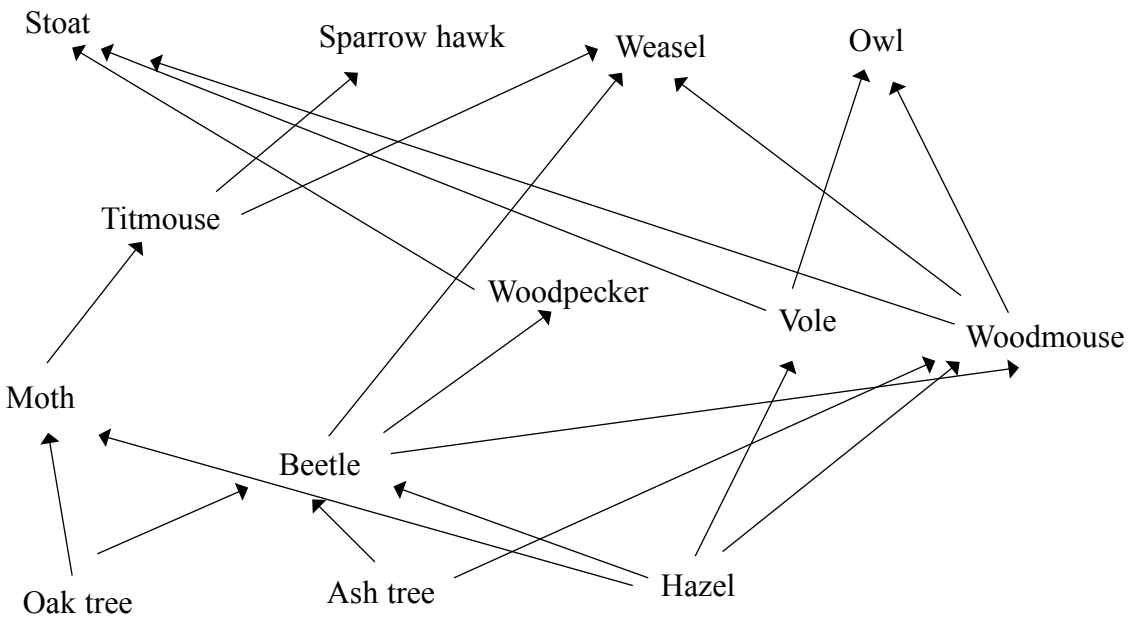
Q9

(Total 5 marks)

Leave blank

10. The diagram below shows part of a food web from a woodland.



(a) (i) Name **one** primary consumer in this food web.

.....

(1)

(ii) Name the tertiary consumers in this food web.

.....

(1)

(b) Suggest why it is an advantage for an animal such as a stoat to feed on more than one type of organism.

.....

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.....

.....

(2)

(c) Why is it difficult to place the woodmouse in a single trophic level?

.....

.....

.....

(2)

Leave blank

(d) Suggest why it is unusual to find food chains with more than five trophic levels.

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(3) **Q10**

(Total 9 marks)

Turn over for Question 11

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11. Fish are an important food source for humans and fish farming now provides an increasing proportion of the fish we eat. This is because fish farming has many advantages compared to trying to catch fish in the wild.

(a) Give **one** reason why fish are an important food source for humans.

.....

.....

(1)

(b) Give **two** ways in which fish farmers maintain water quality. In each case explain how it is achieved.

1 .....

.....

2 .....

.....

(4)

(c) Suggest **three** ways in which a fish farm might cause harm to the local ecosystem.

1 .....

.....

2 .....

.....

3 .....

.....

(3)

(d) Give **two** advantages of fish farming compared to catching fish in the wild.

1 .....

.....

.....

2 .....

.....

.....

(2) **Q11**

(Total 10 marks)

TOTAL FOR PAPER: 90 MARKS

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