Centre No.						Paper Reference							Surname	Initial(s)
Candidate No.						4	4	3	7	/	1	F	Signature	

Paper Reference(s)

4437/1F

Examiner's use only

Team Leader's use only

London Examinations IGCSE

Science (Double Award)

Biology

Paper 1F

Foundation Tier

Wednesday 20 May 2009 – Afternoon

Time: 1 hour 15 minutes

Question Number	Leave Blank
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
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.
Some questions must be answered with a cross in a box (☒). If you change your mind about an answer, put a line through the box (~~☒~~) and then mark your new answer with a cross (☒).
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 10 questions in this question paper. The total mark for this paper is 75.
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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Turn over

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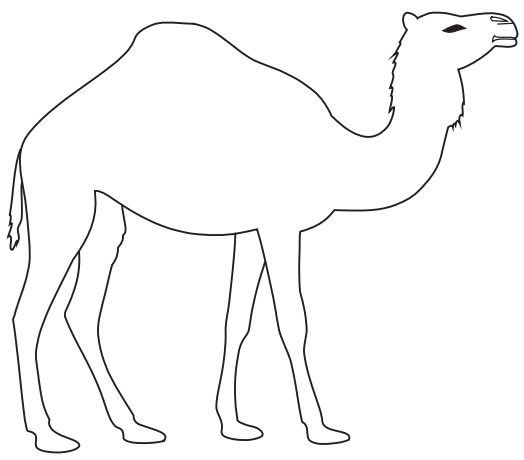
Leave blank

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

1. For each question (a) to (g), choose the correct answer. Put a cross (☒) in the correct box.

(a) This organism is …
Put a cross (☒) in the correct box.



A an animal ☒

B a plant ☒

C a bacterium ☒

D a fungus ☒

(1)

(b) Which is correct for a food chain? Put a cross (☒) in the correct box.

A producer → primary consumer → secondary consumer ☒

B secondary consumer → producer → primary consumer ☒

C primary consumer → secondary consumer → producer ☒

D secondary consumer → primary consumer → producer ☒

(1)

(c) A gene has two alleles. Allele **A** is dominant to allele **a**.
How many different genotypes can be produced from the cross **AA** × **Aa**?
Put a cross (☒) in the correct box.

A one ☒

B two ☒

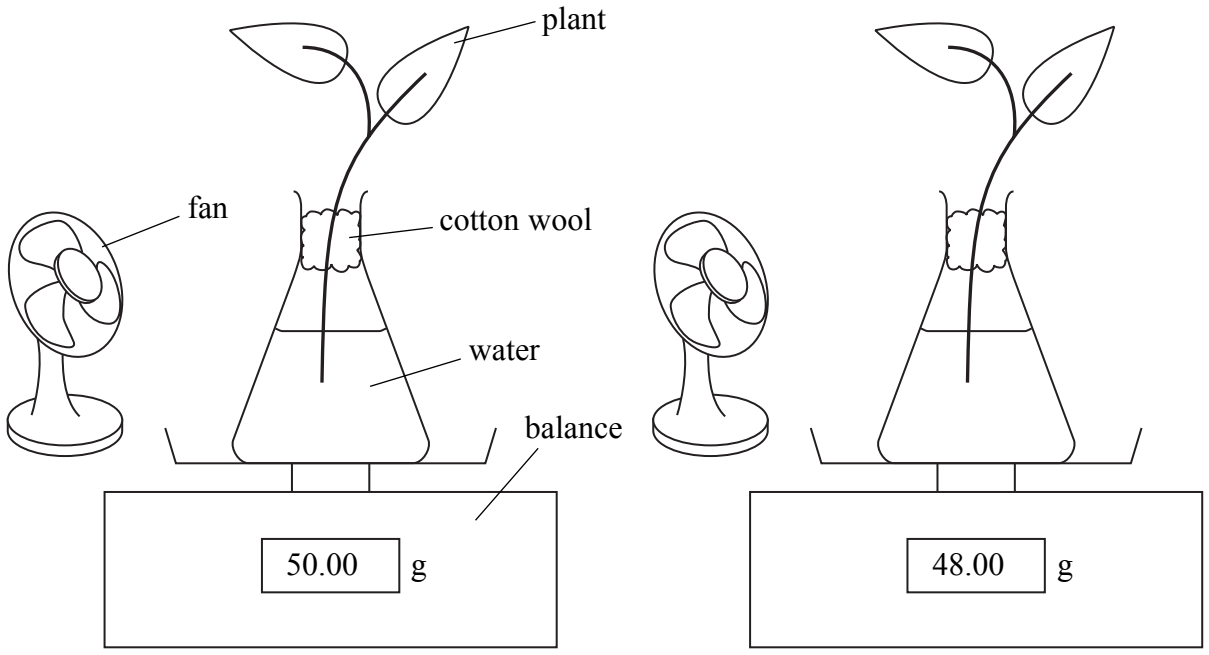
C three ☒

D four ☒

(1)

Leave blank

(d) The diagrams show a plant on a balance at the start of a transpiration experiment and after one hour. In this experiment the fan was switched off.



before **after**

If the experiment is repeated with the fan switched on, the mass after one hour is most likely to be …
Put a cross (☒) in the correct box.

A 52.0 g ☒

B 50.0 g ☒

C 48.0 g ☒

D 46.0 g ☒

(1)

(e) Diffusion always involves the movement of molecules
Put a cross (☒) in the correct box.

A using energy from respiration ☒

B through a partially permeable membrane ☒

C from a low concentration to a high concentration ☒

D from a high concentration to a low concentration ☒

(1)

Leave blank

(f) Carbon dioxide is…
Put a cross (☒) in the correct box.

A used in respiration. ☒

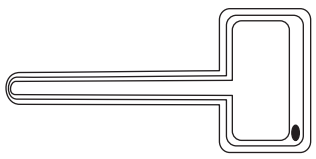
B needed for combustion. ☒

C produced in photosynthesis. ☒

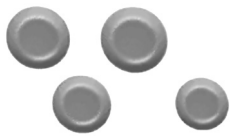
D released by germinating seeds. ☒

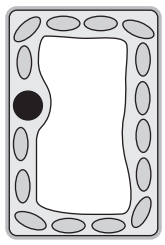
(1)

(g) Which of the following cells are found in blood? Put a cross (☒) in the correct box.

A  ☒

B  ☒

C  ☒

D  ☒

(1)

Q1

(Total 7 marks)

Leave blank

2. Farmers use fertilisers and selective breeding to increase crop yield.

(a) How can using fertiliser increase crop yield?

.....

.....

.....

.....

(2)

(b) (i) Explain what is meant by the term **selective breeding**.

.....

.....

.....

.....

(3)

(ii) Selective breeding has also been used in animals. Give **one** example of a characteristic that shows how cattle have been improved by selective breeding.

.....

(1)

Q2

(Total 6 marks)

Leave blank

3. The photograph shows an insect-pollinated flower.

(a) (i) Name the parts labelled **A**, **B** and **C**.

(3)

(ii) Give **two** features that show that this flower is insect-pollinated.

1 .....

.....

2 .....

.....

(2)

(b) What is meant by the term **pollination**?

.....

.....

.....

(2) **Q3**

(Total 7 marks)

Leave blank

4. The photograph shows a house plant. The plant makes its food by photosynthesis.

(a) (i) Use words from the list to complete the equation for photosynthesis.

carbon dioxide **nitrogen** **oxygen** **water**

..... + ... $\xrightarrow{\text{light and chlorophyll}}$ glucose + ...

(3)

(ii) Why do plants need chlorophyll to carry out photosynthesis?

.....

(1)

(b) Kieran wanted to find out if the leaves of the house plant could make starch by photosynthesis. Describe what he should do to find out if the leaves contained starch.

.....

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(4) **Q4**

(Total 8 marks)

Leave blank

5. Enzymes are important in digestion. They help break down large molecules into small molecules.

The table gives some enzymes involved in digestion. It also gives the large molecules broken down and the small molecules produced. The table is incomplete.

Use words from the list to complete the table.

amino acids **cellulose** **fatty acids** **lipid**

maltose **protease** **starch** **sucrose**

Enzyme	Large molecule broken down	Small molecule produced
amylase		
	protein	
lipase		

Q5

(Total 6 marks)

Leave blank

6. The table shows six stages used in the production of beer.

Stage	Description of stage
1	Barley seeds are germinated. The seeds produce a digestive enzyme.
2	The seeds are killed and dried to produce malt.
3	The malt is mixed with water to make a mash.
4	The mash is boiled and filtered.
5	Yeast is added to ferment the sugars in the mash. (This makes the beer.) Hops are added for taste.
6	The beer is centrifuged, filtered and heated to a high temperature.

(a) Name **two** conditions needed for the seeds to germinate in stage 1.

1 .....

2 .....

(2)

(b) Give the number of the stage in which alcohol is made.

.....

(1)

(c) (i) Suggest why the beer is filtered in stage 6.

.....

.....

(1)

(ii) Suggest why the beer is heated to a high temperature in stage 6.

.....

.....

(1) **Q6**

(Total 5 marks)

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7. The photograph shows a sea turtle on a sandy beach. Some sea turtles are regarded as endangered species.

(a) Suggest what is meant by the term **endangered species**.

.....

.....

(1)

(b) Sea turtles feed on jellyfish that have fed on microscopic organisms called plankton.

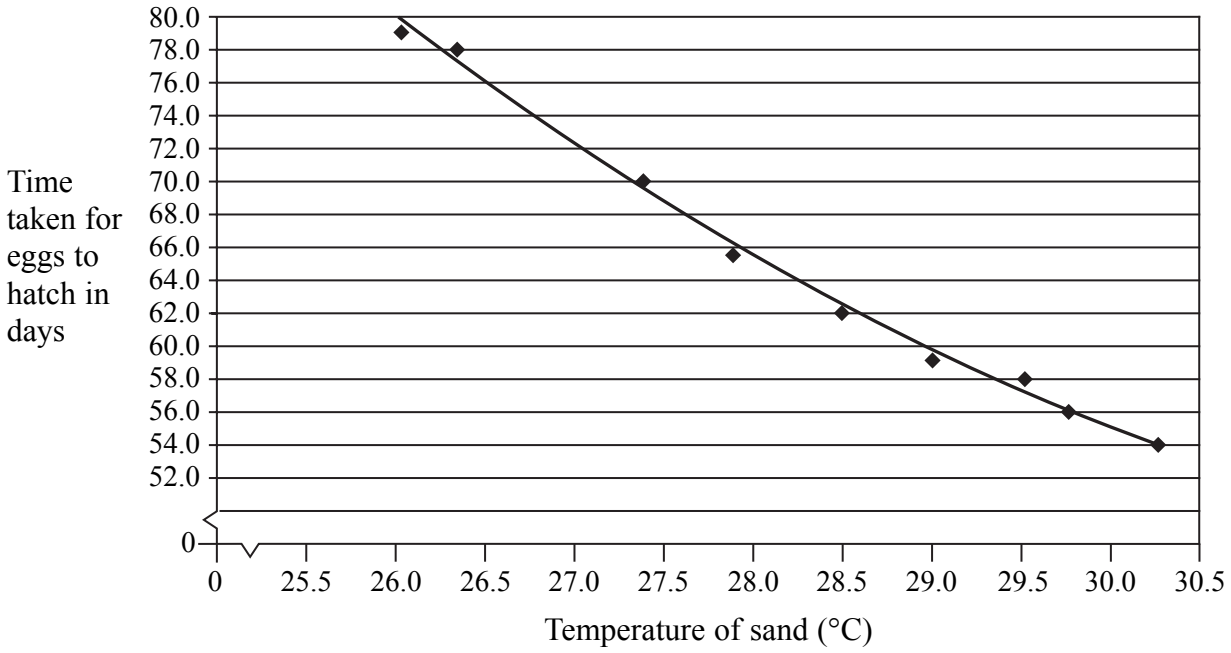
Use this information to draw a food chain in the space below.

(2)

Leave blank

(c) Sea turtles lay their eggs on sandy beaches. They dig holes (nests) in the sand and then lay up to 120 eggs in the hole. They then refill the hole with sand.

The temperature of the sand can affect the time taken for the eggs to hatch. This relationship is shown in the graph below.



(i) How does the temperature of the sand affect the time taken for the eggs to hatch?

.....

(1)

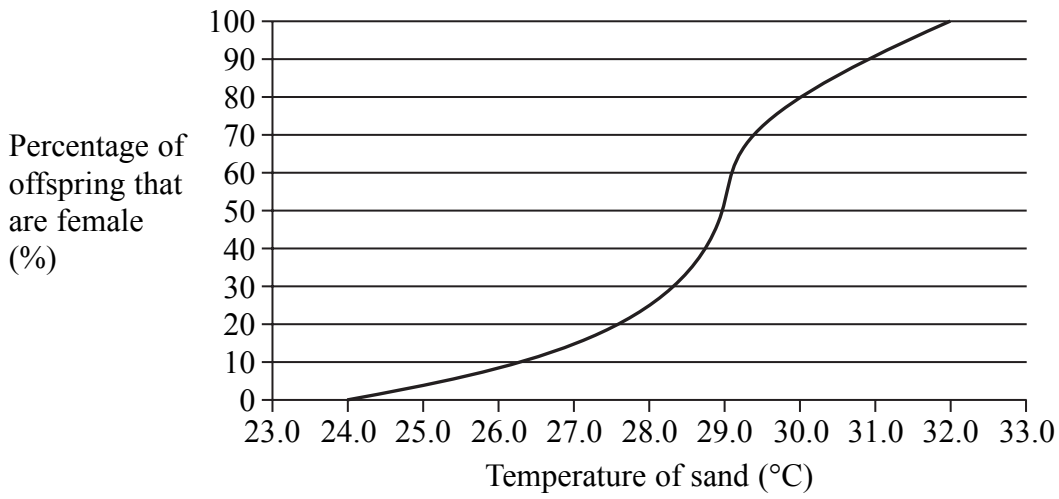
(ii) At what temperature of the sand do the eggs take 55 days to hatch?

.....

(1)

Leave blank

(d) Sea turtles are unusual in that the temperature of the sand can also affect the sex of the offspring. The graph below shows this relationship.



(i) What temperature of the sand would give equal numbers of males and females?

.....

(1)

(ii) In one nest, the temperature of the sand was 30 °C. In this nest 120 offspring hatched.
Use the graph to calculate how many of these offspring are likely to be male and how many are likely to be female.

Write your answers in the table below.

Sex	Number of offspring
male	
female	

(2)

(e) Scientists are concerned that global warming might reduce the population of sea turtles.

Use information in the graph from part (c) to support this suggestion.

.....

.....

.....

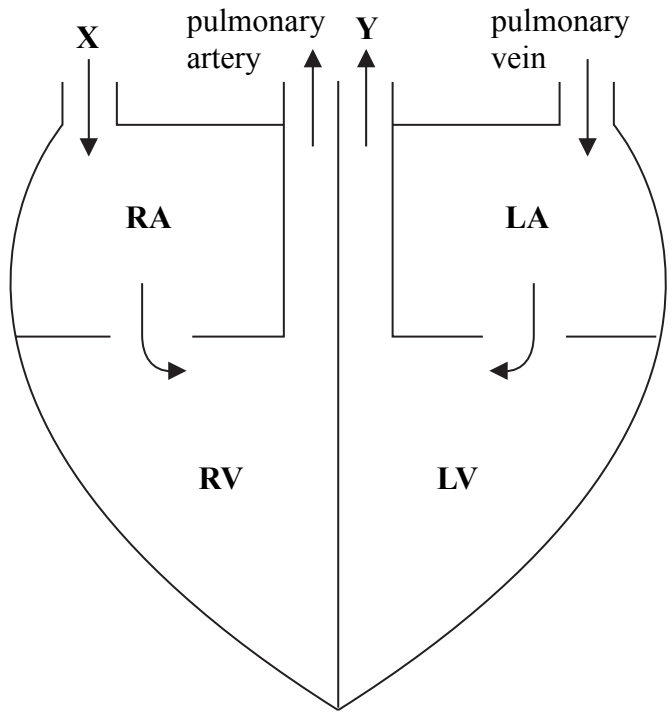
(2)

Q7

(Total 10 marks)

Leave blank

8. The diagram shows a simplified section through a human heart. The pulmonary artery and pulmonary vein have been labelled. The arrows show the direction of blood flow.



(a) (i) Name the blood vessels labelled **X** and **Y**.

X .....

Y .....

(2)

(ii) What do the letters **RA** and **LV** on the diagram stand for?

RA .....

LV .....

(2)

(iii) What is the function of the pulmonary artery?

.....

.....

.....

(2)

Leave blank

(b) Describe and explain the biological consequences of smoking on the human heart.

.....

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(5)

Q8

(Total 11 marks)

Leave blank

9. An athlete was being trained for a marathon. During a training session the athlete ran for one hour. The trainer measured the heart rate of the athlete every 10 minutes during this training session. The results are shown in the table.

Time in minutes	Heart rate in beats per minute
0	60
10	90
20	95
30	100
40	118
50	120
60	120

(a) Describe the pattern shown by the results.

.....

.....

.....

.....

(2)

(b) What was the percentage increase in the athlete's heart rate at the end of the training session when compared to the start? Show your working.

Increase = ... %

(2)

Leave blank

(c) The trainer explained to the athlete that it was important to reduce the build-up of lactic acid in muscle cells while running.

(i) Name the process that produces lactic acid.

.....

(1)

(ii) If an athlete breathes deeply, this can help reduce the build-up of lactic acid in muscle cells while running. Suggest why.

.....

.....

.....

.....

(2)

Q9

(Total 7 marks)

Leave blank

10. The photograph shows ‘CopyCat’, the first cat to be produced by cloning.

(a) The passage below describes the steps taken to produce CopyCat. Use a suitable word to write on the dotted lines to complete the passage.

A ..... from a body cell taken from CopyCat’s mother was put into an ..... egg cell. The egg cell was then given an electric shock to make it divide by the process of ...... The resulting ball of cells, called an ....., was placed into the ..... of another cat (surrogate mother) and after some time CopyCat was born. CopyCat is known as a clone because she is genetically ..... to her mother.

(6)

Leave blank

(b) Use the symbols **XX** or **XY** to complete the table to show the sex chromosomes of each of the animals used in cloning CopyCat. One has been done for you.

Animal	Sex chromosomes
CopyCat's mother	**XX**
The surrogate mother	
CopyCat	

(2) **Q10**

(Total 8 marks)

TOTAL FOR PAPER: 75 MARKS

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