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London Examinations IGCSE

Biology (4325)

First examination May 2005

November 2003, Issue 1

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Specimen Papers and Mark Schemes

London Examinations IGCSE

Biology (4325)

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Authorised by Elizabeth Blount

Publications Code: UG013058

Contents

Specimen Papers

Mark Schemes

Centre No.						Paper Reference						Surname	Initial(s)
Candidate No.						4	3	2	5	/	1	F	Signature

Paper Reference(s)

4325/1F

Examiner's use only

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London Examinations IGCSE

Biology

Paper 1F

Foundation Tier

Specimen Paper

Time: 1 hour 30 minutes

Materials required for examination
Nil

Items included with question papers
Nil

Question Number	Leave Blank
1	
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Total	

Instructions to Candidates

In the boxes above, write your centre number and 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.

Information for Candidates

There are 28 pages in this question paper. All blank pages are indicated.
The total mark for this paper is 100. The marks for the various parts of questions are shown in round brackets: e.g. (**2**).

Advice to Candidates

You are reminded of the importance of clear English and careful presentation in your answers.

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W850/4325/57570 2/2/

Turn over

London Examinations
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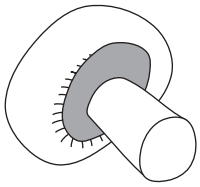
Leave blank

1. For each question, choose the best answer, **A**, **B**, **C** or **D** and write it in the box.

(a) The drawing shows a living organism.

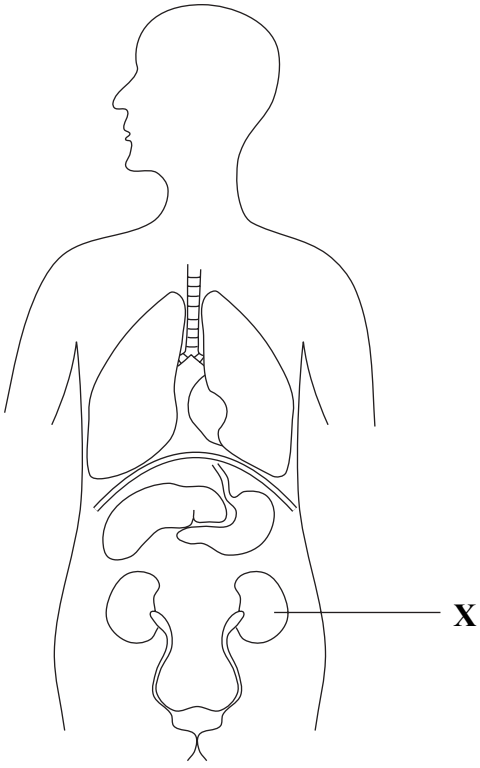


This living organism is

A an animal
B a bacterium
C a fungus
D a virus

(1)

(b) The diagram shows organs in the human body.



X is the

A large intestine
B kidney
C small intestine
D stomach

(1)

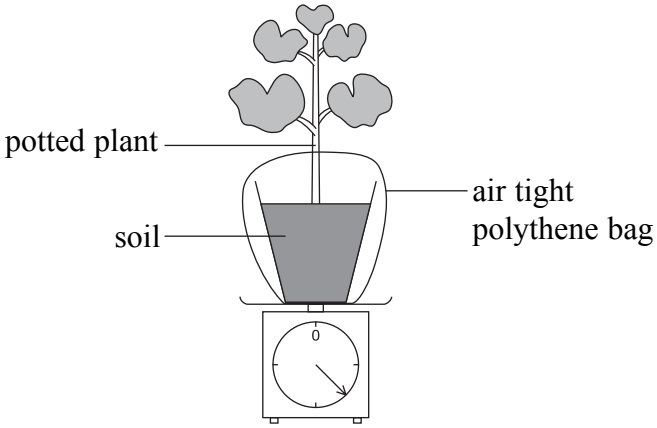
(c) A plant uses leaves for

A making food
B absorbing water
C reproduction
D holding it in the soil

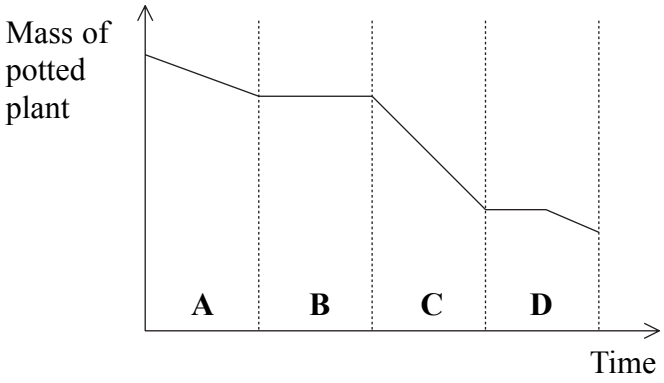
(1)

Leave blank

(d) The diagram shows a potted plant being weighed.
Its mass was recorded every 10 minutes.



The graph shows the changes in mass over a number of hours.



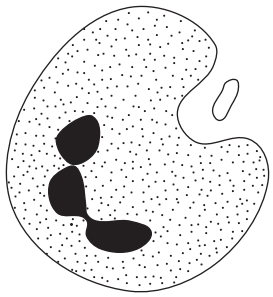
During which period of time was transpiration fastest?

(1)

Turn over

(e) What does the diagram show?

Leave blank



A a white blood cell ingesting a bacterium
B fibrin strands forming a scab
C an antibody destroying a bacterium
D a red cell fighting a bacterium

(1)

(f) Which of these is **not** a feature of all living organisms?

A movement
B photosynthesis
C reproduction
D sensitivity

(1)

(g) Which row of the table shows the sex chromosomes found in an egg and in a sperm that produce a boy?

	Egg	**Sperm**
A	X	X
B	X	Y
C	Y	Y
D	Y	X

(1)

(h) Acid rain may be formed if air is polluted by

A carbon monoxide
B sulphur dioxide
C oxygen
D water vapour

(1)

(i) Which row correctly shows the flow of energy along a food chain?

Leave blank

A sun ← grass ← cow ← human

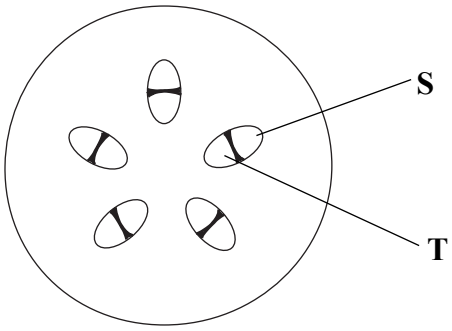
B sun ← grass → cow → human

C sun → grass → cow → human

D sun → grass ← cow ← human

(1)

(j) The diagram shows a section through a plant stem. Two tissues, **S** and **T**, are labelled.



Which row of the table shows the names of tissue **S** and tissue **T**?

	Name of tissue S	Name of tissue T
A	phloem	phloem
B	phloem	xylem
C	xylem	phloem
D	xylem	xylem

(1)

Q1

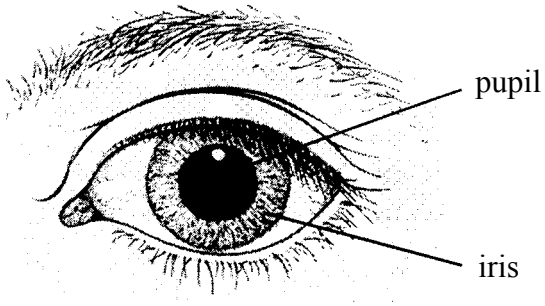
(Total 10 marks)

Turn over

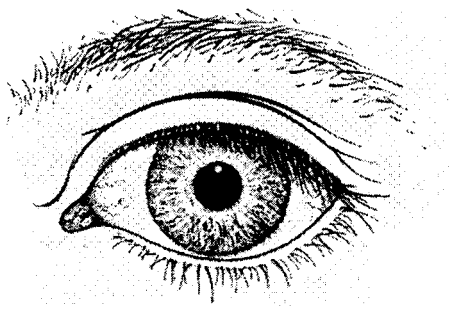
2. (a) The diagrams below show what happens when a bright light is shone into a human eye.

Leave blank

Before light is shone into the eye



Bright light shining into the eye



(i) How has the pupil changed in bright light?

.....

(1)

(ii) Explain how the iris helps this change take place.

.....

.....

.....

(2)

(b) It used to be fashionable for women to put drops into their eyes to prevent their pupils becoming smaller in bright light.

Leave blank

Suggest why this could harm the eyes in bright light.

.....

.....

(1)

(c) Five hormones are named in the box.

adrenaline	**insulin**	**testosterone**
oestrogen	**progesterone**	

Match the correct hormone with each statement below.

	controls sperm production
	lowers blood glucose levels
	repairs the uterus lining after menstruation
	increases heart rate

(4)

Q2

(Total 8 marks)

Turn over

3. Diagram 1 shows a section through part of a leaf.

Leave blank

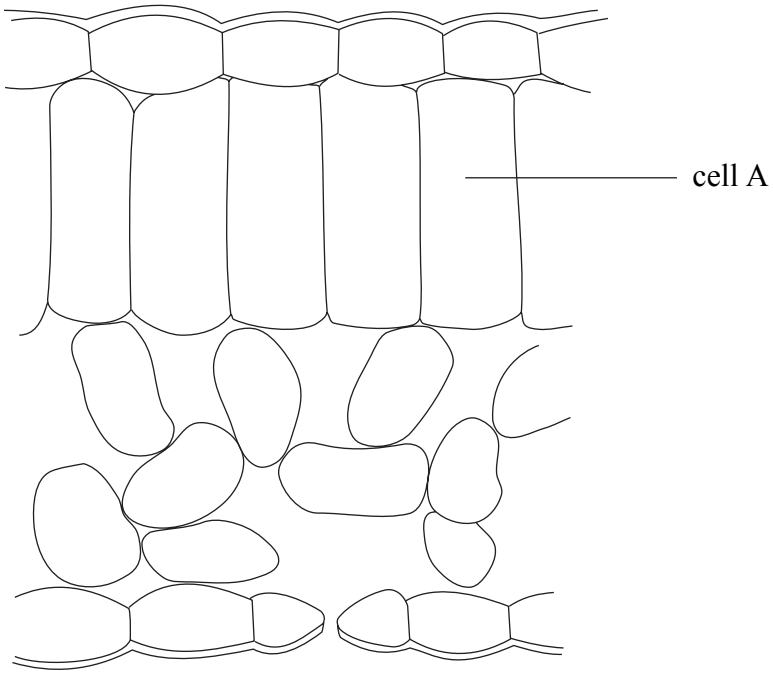


Diagram 1

(a) On the diagram, draw an arrow to show where gases enter the leaf.

(1)

(b) (i) What is the main function of cell A?

.....

(1)

(ii) What is the advantage of cell A being at the top of the leaf?

.....

.....

(1)

(c) Diagram 2 shows the structure of cell A.

Leave blank

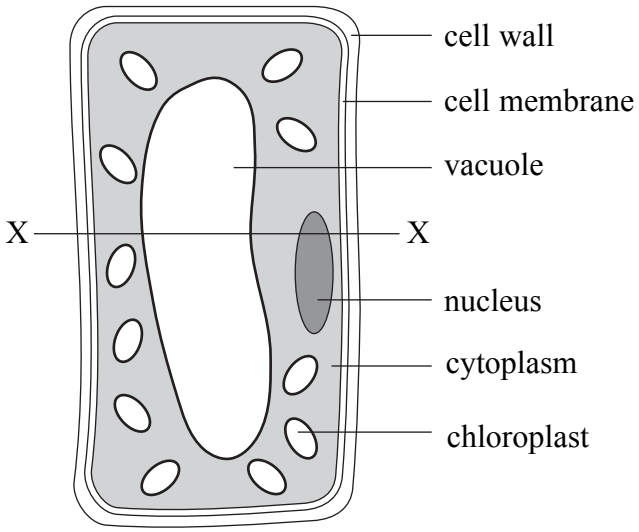


Diagram 2

Imagine cell A is cut across the line X—X. The appearance of this cross section is shown in diagram 3 below.

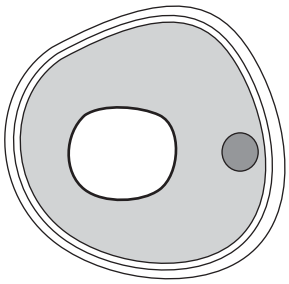


Diagram 3 Cross section along line X—X

Use words from the list to label diagram 3.

cell wall

cytoplasm

nucleus

vacuole

(4) **Q3**

(Total 7 marks)

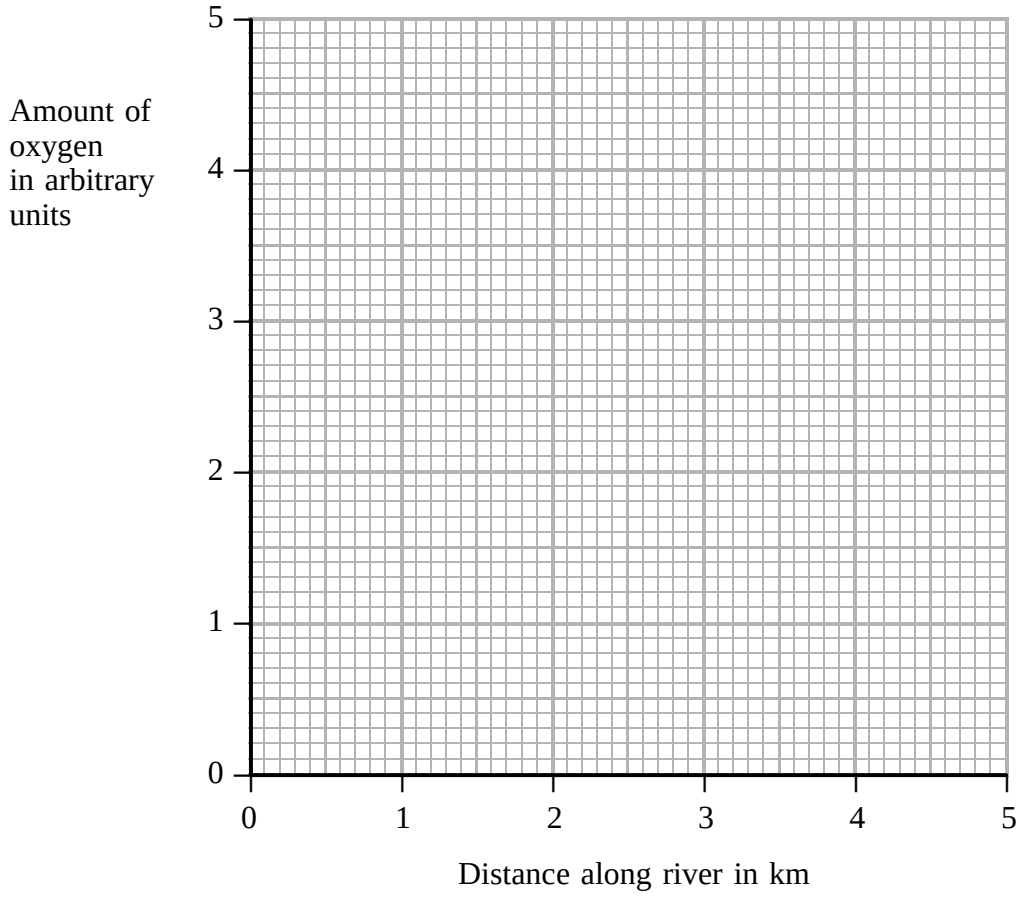
Turn over

4. The table below shows the amount of oxygen in the water at different distances along a river.

Leave blank

Distance along river in km	Amount of oxygen in arbitrary units
0	5
1	5
2	1
3	2
4	3
5	5

(a) Plot the data in the table on the grid below.



(2)

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Issue 1, November 2003

(b) Some sewage entered the water at a distance of 1 km along the river.

Leave blank

(i) How did the amount of oxygen change between 1 km and 2 km along the river?

.....

.....

(1)

(ii) Explain why the amount of oxygen in the water changed.

.....

.....

.....

(2)

Q4

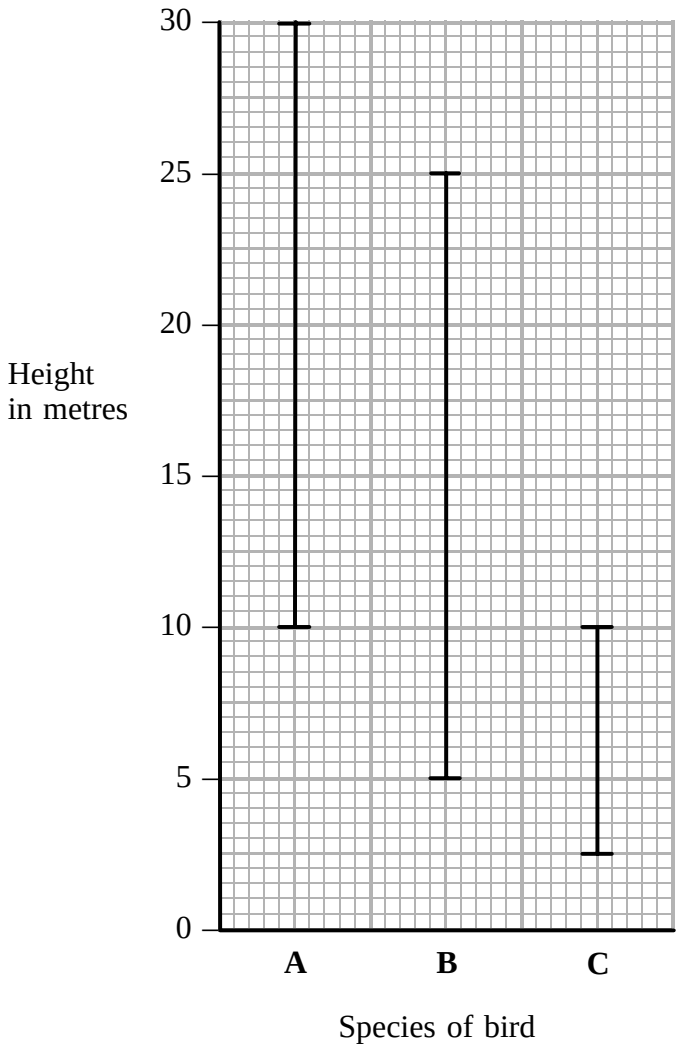
(Total 5 marks)

Turn over

5. Three species of bird (**A**, **B** and **C**) eat insects at different heights in a tree.

Leave blank

The graph below shows this.



Use the information in the graph to answer the following questions.

(a) The greatest height at which species **A** eats is 30 metres.

What is the lowest height at which it eats?

..... metres
(1)

(b) Species **B** and **C** **both** eat insects at heights between 5 and ..... metres.
(1)

(c) Complete this sentence.

Eating insects at different heights in the tree helps each species of bird avoid

.....
(1)

Q5

(Total 3 marks)

6. When athletes run races they get energy from aerobic respiration and from anaerobic respiration. The table below shows the percentage of energy from aerobic and anaerobic respiration in races of different length.

Leave blank

Length of race	Percentage of energy	
	Aerobic respiration	**Anaerobic respiration**
100 m	5	95
1 500 m	55	45
10 000 m	90	10
Marathon (42 186 m)	98	2

(a) (i) What percentage of energy is provided by anaerobic respiration in a 10 000 m race?

Answer .....%

(1)

(ii) In how many of the races does aerobic respiration provide a greater percentage of energy?

.....

(1)

(b) Use words from the box to complete the sentences below.

carbon dioxide	**energy**	**glucose**
lactic acid	**oxygen**	**water**

Aerobic respiration uses ..... and

..... to produce a lot of energy.

The two waste products are .....

and ..... .

(4)

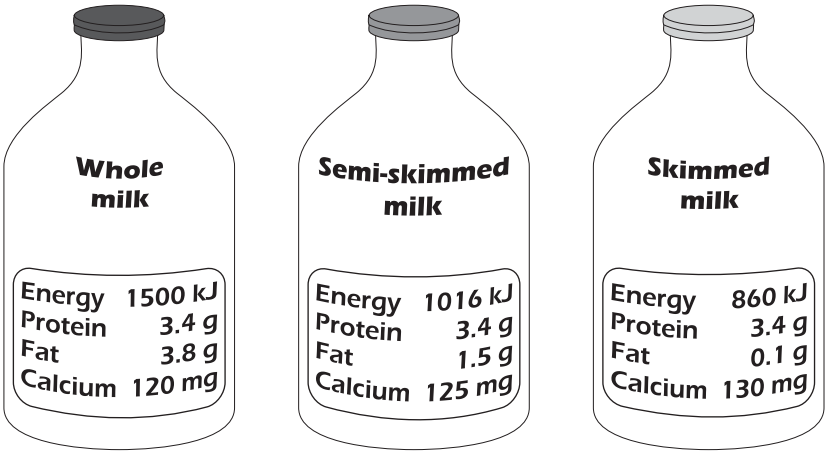
Q6

(Total 6 marks)

Turn over

7. The diagram below gives information about three different types of milk.

Leave blank



(a) Which type of milk provides the most energy?

.....

(1)

(b) Which type of milk is best for growth of the skeleton?

.....

(1)

(c) Suggest why skimmed milk is often recommended for people with heart disease.

.....

.....

.....

.....

(2)

(d) Which part of a balanced diet cannot be provided by milk?

.....

.....

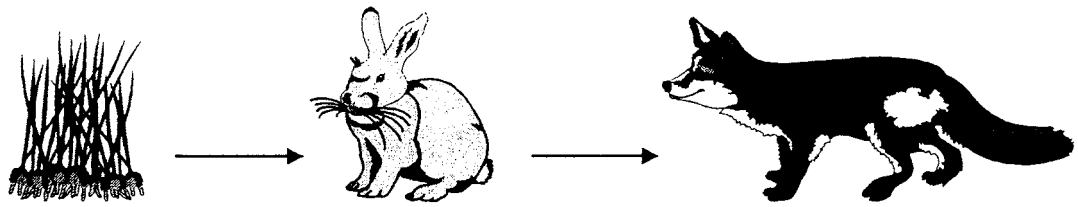
(1)

Q7

(Total 5 marks)

8. The diagram shows a food chain in a field.

Leave blank



grass rabbits fox

(a) (i) Name the primary consumer in this food chain.

.....

(1)

(ii) In the space below, draw and label a pyramid of biomass for this food chain.

(2)

(b) There are plans to build a factory on the field.

(i) What will happen to the number of rabbits and foxes if the factory is built?

.....

.....

(1)

(ii) Give reasons for your answer.

.....

.....

.....

(2)

Q8

(Total 6 marks)

Turn over

Leave blank

9. (a) Lipase is an enzyme that helps the digestion of lipids (fats and oils).

(i) What is meant by the term **digestion**?

.....

.....

.....

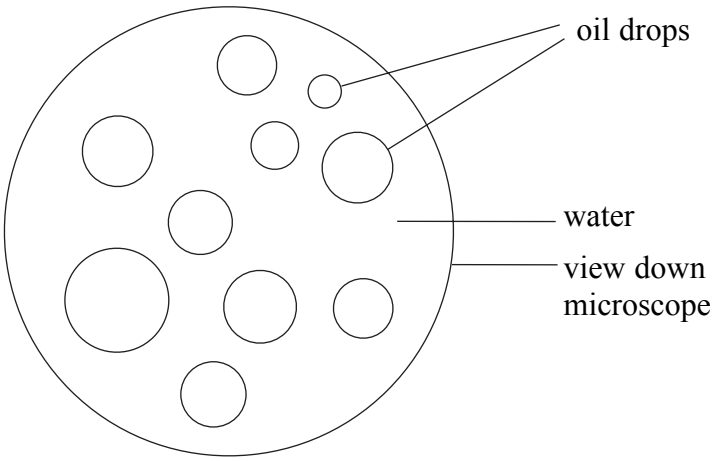
(2)

(ii) Name **one** substance produced when lipase digests fat.

.....

(1)

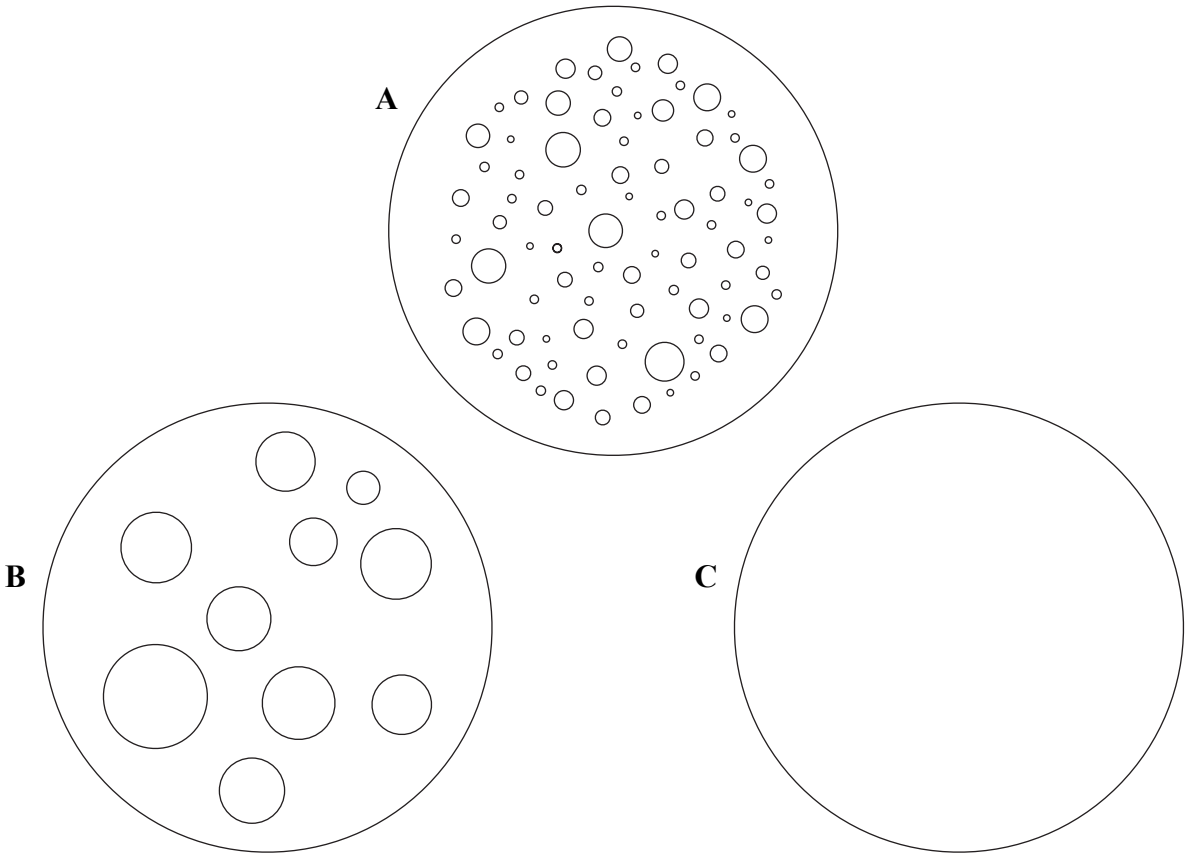
(b) The diagram below shows a mixture of cooking oil and water as seen under a microscope.



Four different substances (lipase, boiled lipase, amylase and bile) were added to separate samples of the mixture of oil and water. Each sample was left for 20 minutes.

Leave blank

The diagrams **A**, **B** and **C** below show the possible appearance for each sample after twenty minutes.



Write the correct appearance (**A**, **B** or **C**) in each box in the table below. Each letter may be used once, more than once or not at all. The first one has been done for you.

Treatment	Appearance
Oil and water mixture plus lipase	**C**
Oil and water mixture plus boiled lipase	
Oil and water mixture plus bile	
Oil and water mixture plus amylase	

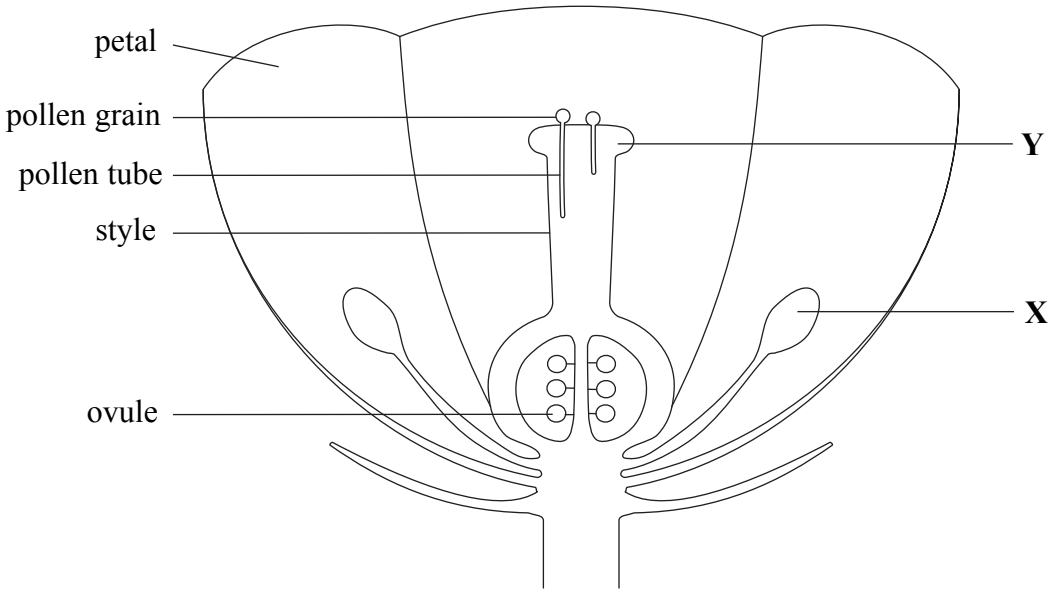
(3) **Q9**

(Total 6 marks)

Turn over

10. The diagram below shows a flower cut in half. Pollination occurs when pollen grains from part **X** land on part **Y**. Tubes from the pollen grains grow through the style.

Leave blank



(a) (i) Name part **X**.

.....

(1)

(ii) Name part **Y**.

.....

(1)

(b) Suggest how pollen is carried from part **X** to part **Y**.

.....

.....

(1)

(c) On the diagram continue the drawing of one of the pollen tubes to show where it would go.

(1)

Q10

(Total 4 marks)

11. The table below lists changes which take place in the human body.

Leave blank

Complete the table to show the organ in which each change takes place.

The first one has been done for you.

Change	Name of organ
Amino acids to urea	liver
Diploid cell to haploid cell	
Glycogen to glucose	
Haemoglobin to oxyhaemoglobin	
High level of urea in blood to low level of urea in blood	
Thick lining to a thin lining, once a month	

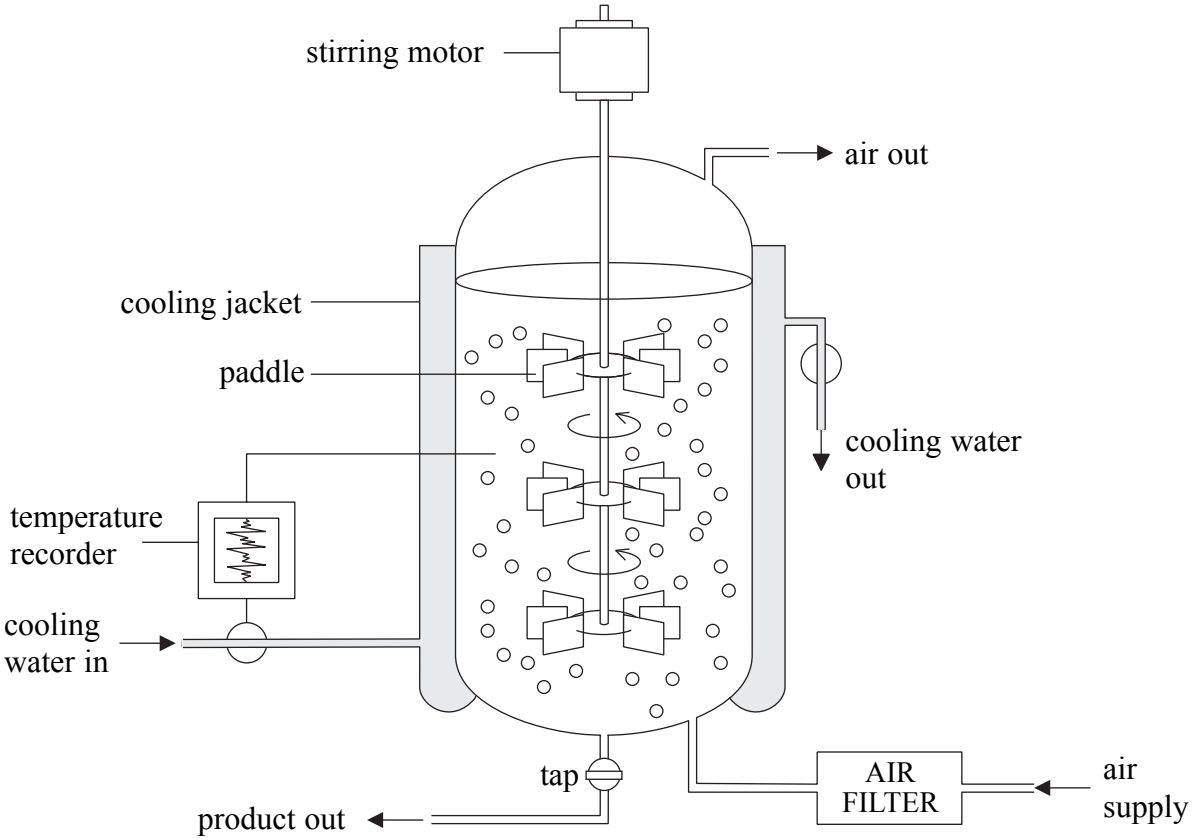
Q11

(Total 5 marks)

Turn over

12. The diagram below shows a fermenter used to grow microorganisms.

Leave blank



(a) (i) Describe how the temperature is kept constant in the fermenter.

.....

.....

.....

.....

(2)

(ii) Name **one** other factor that must be kept constant in the fermenter.

.....

(1)

(b) Explain why air is pumped into the fermenter.

Leave blank

.....

.....

.....

.....

(2)

(c) Explain what would happen to the growth of microorganisms in the fermenter if the paddles stopped working.

.....

.....

.....

.....

.....

.....

(3)

(d) Suggest why steam is used to sterilise the fermenter rather than disinfectants.

.....

.....

.....

.....

(2)

Q12

(Total 10 marks)

Turn over

13. The following advice is taken from the side of a cigarette packet.

Leave blank

STOPPING SMOKING REDUCES
THE RISK OF SERIOUS DISEASES
Health Departments' Chief Medical Officers

Describe how smoking can affect the health of your lungs.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Q13

(Total 5 marks)

14. The table gives possible features of three different types of organism.

Leave blank

Complete the table by putting a tick into the box if the organism has the feature.

Each row has **one** tick only. The first one has been done for you.

Feature	Type of organism		
	plant	**fungus**	**virus**
They are all parasites			✓
They store carbohydrate as starch			
They can only reproduce inside living cells			
They grow by producing a mycelium			
They feed by extracellular secretion of enzymes onto food			

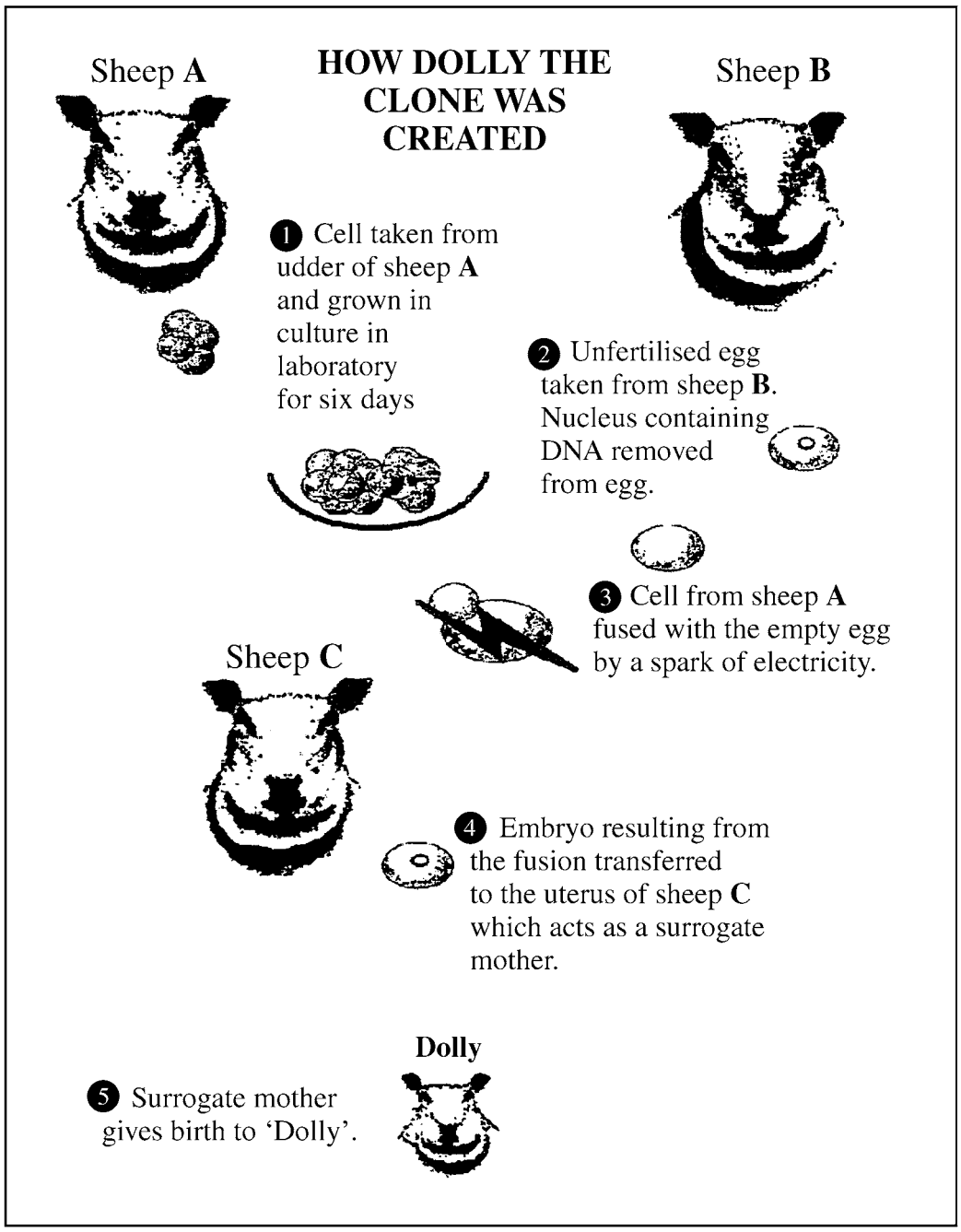
Q14

(Total 4 marks)

Turn over

15. The diagram shows how scientists produced Dolly the sheep.

Leave blank



(a) (i) Dolly was produced with the help of an unfertilised egg.
Where did the scientists get the DNA from to put into this egg?

.....

(1)

(ii) How does the nucleus in a cell from the embryo differ from the nucleus removed from the egg?

.....

.....

(1)

(iii) Dolly is genetically identical to another sheep in the diagram. Which one?

.....

(1)

(b) Give **two** ways in which this method is different from the normal method of sheep reproduction.

1. .....

.....

2. .....

.....

(2)

(c) Suggest **two** advantages of producing animal clones.

1. .....

2. .....

(2)

(Total 7 marks)

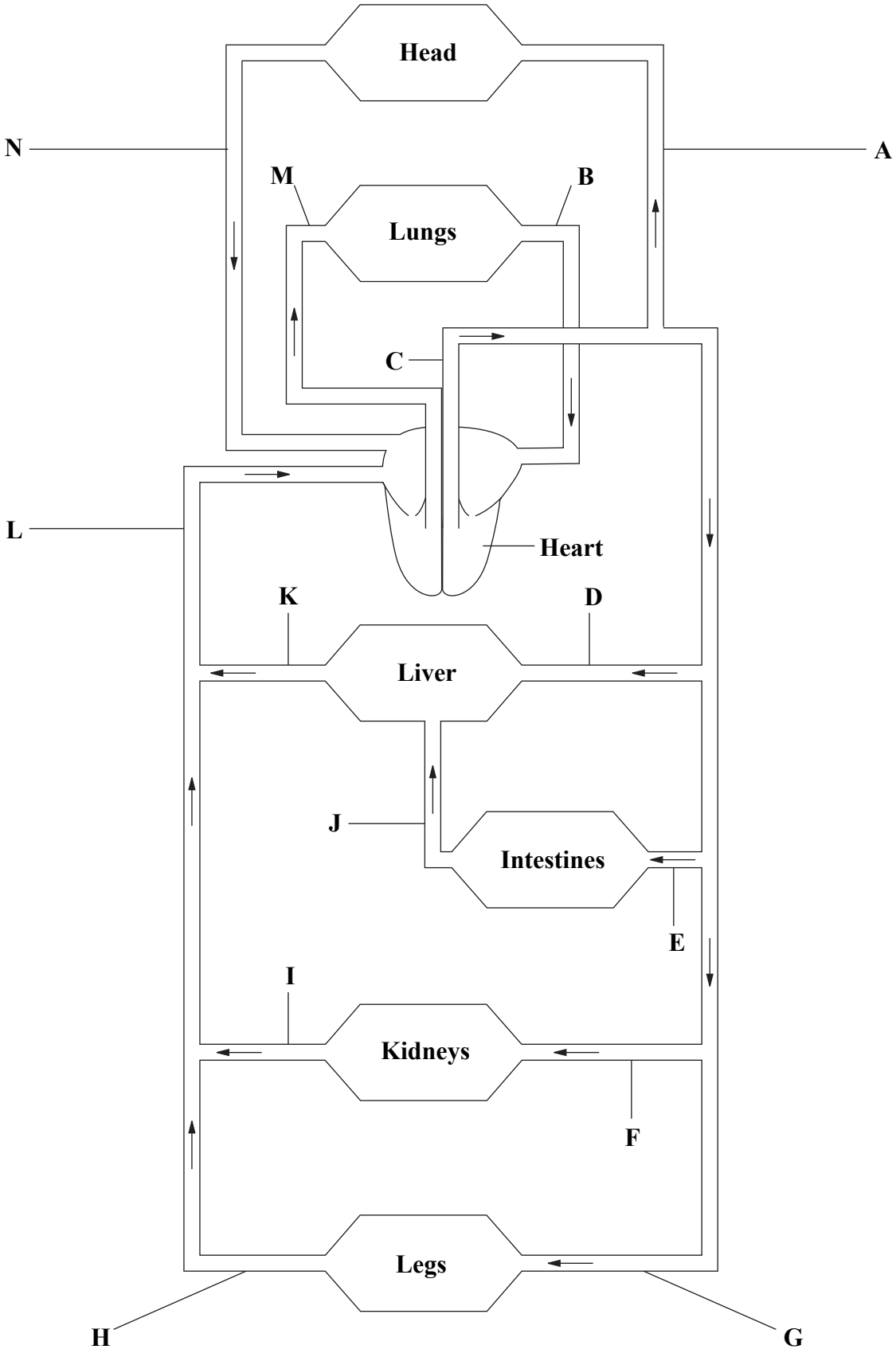
Leave blank

Q15

Turn over

16. The diagram below shows a plan of the circulatory system. The blood vessels are labelled with letters.

Leave blank



Use the letters on the diagram to complete the sentences in the table below.

Leave blank

The first one has been done for you.

Sentence	Letter
The blood vessel named the vena cava is	**L**
The blood vessel named the pulmonary artery is	
The blood vessel carrying blood with the **most** oxygen is	
The blood vessel carrying blood with the **most** glucose after a meal is	
The blood vessel carrying blood with the **least** urea is	
The blood vessel containing blood at the **highest** pressure is	

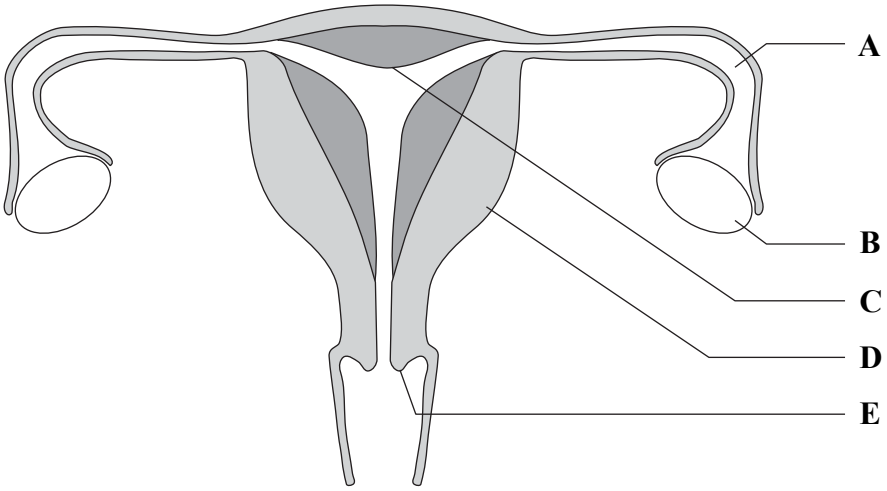
Q16

(Total 5 marks)

Turn over

17. The diagram below shows the female reproductive system.

Leave blank



The table below lists some events that occur in the female reproductive system.

Complete the table using letters from the diagram to show the part where each event occurs. Write **one** letter only in each box. A letter may be used once, more than once, or not at all.

Event	Letter
Eggs produced	
Fertilisation occurs	
Placenta forms	
Progesterone secreted	

Q17

(Total 4 marks)

TOTAL FOR PAPER: 100 MARKS

END

Centre No.						Paper Reference						Surname	Initial(s)
Candidate No.						4	3	2	5	/	2	H	Signature

Paper Reference(s)

4325/2H

London Examinations IGCSE

Biology

Paper 2H

Higher Tier

Specimen Paper

Time: 2 hours

Examiner's use only

Team Leader's use only

Question Number	Leave Blank
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Total	

Materials required for examination
Nil

Items included with question papers
Nil

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Show all the steps in any calculations and state the units.

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Leave blank

1. (a) Lipase is an enzyme that helps the digestion of lipids (fats and oils).

(i) What is meant by the term **digestion**?

.....

.....

.....

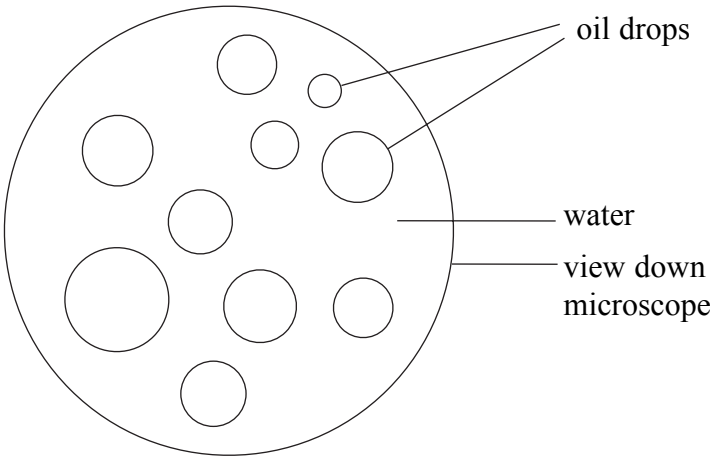
(2)

(ii) Name **one** substance produced when lipase digests fat.

.....

(1)

(b) The diagram below shows a mixture of cooking oil and water as seen under a microscope.



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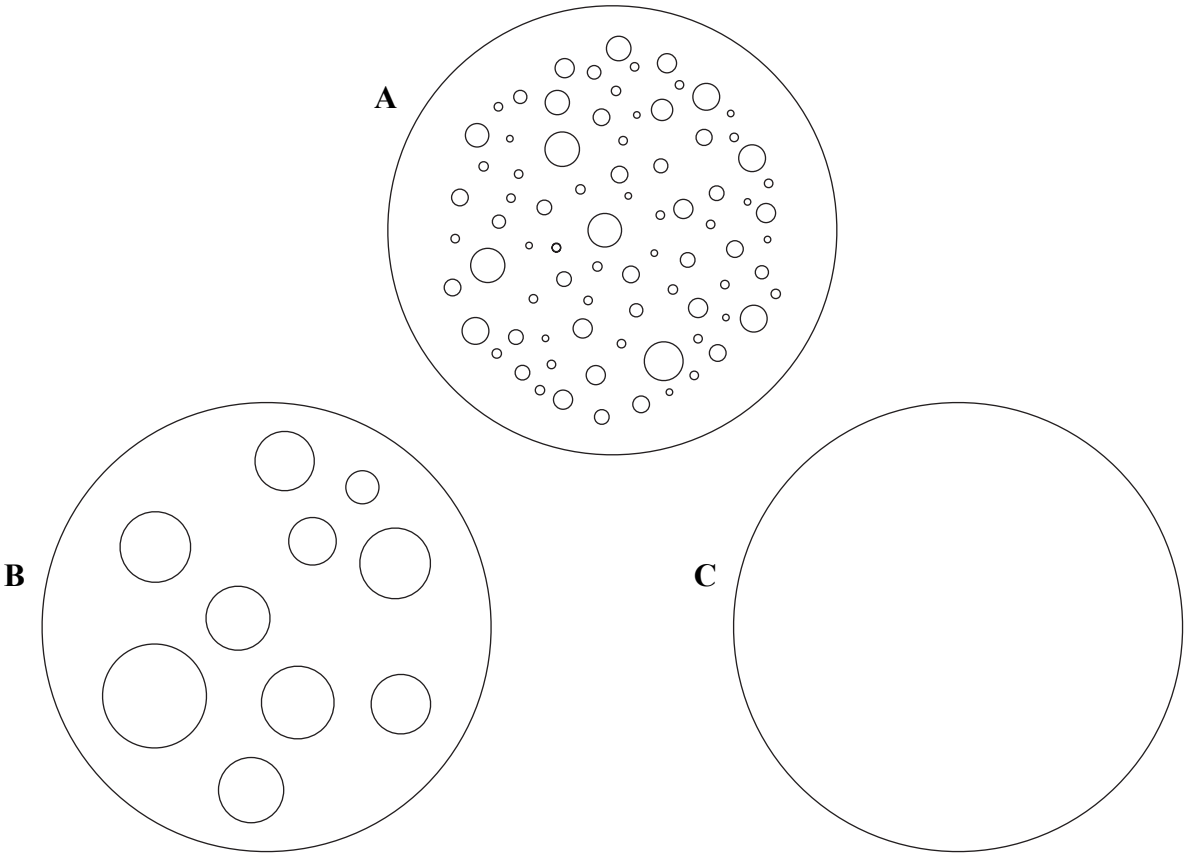

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Oil and water mixture plus lipase	C
Oil and water mixture plus boiled lipase	
Oil and water mixture plus bile	
Oil and water mixture plus amylase	

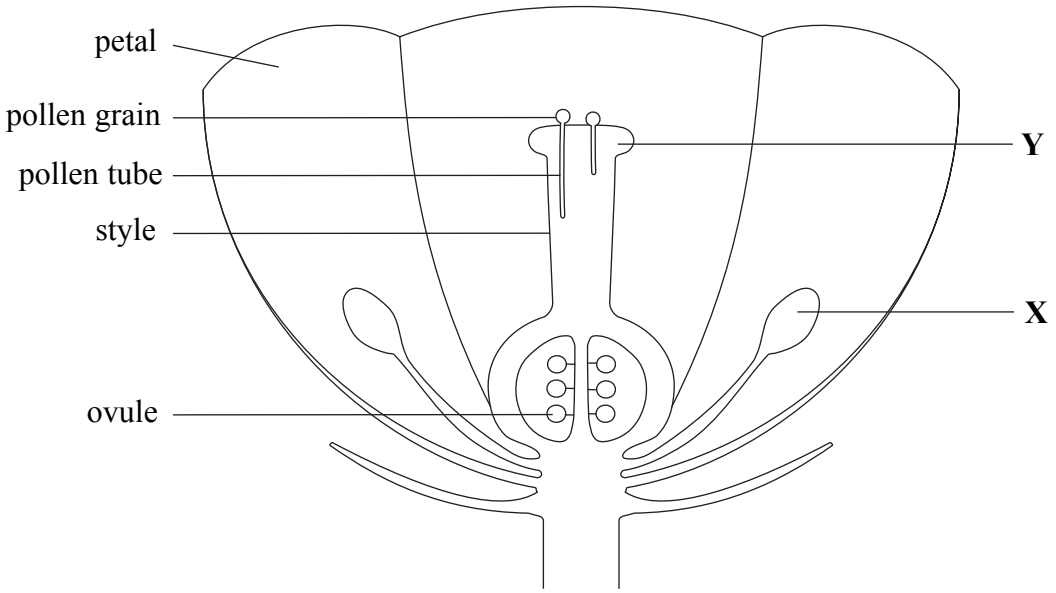
(3) **Q1**

(Total 6 marks)

Turn over

2. The diagram below shows a flower cut in half. Pollination occurs when pollen grains from part **X** land on part **Y**. Tubes from the pollen grains grow through the style.

Leave blank



(a) (i) Name part **X**.

.....

(1)

(ii) Name part **Y**.

.....

(1)

(b) Suggest how pollen is carried from part **X** to part **Y**.

.....

.....

(1)

(c) On the diagram continue the drawing of one of the pollen tubes to show where it would go.

(1)

Q2

(Total 4 marks)

3. The table below lists changes which take place in the human body.

Leave blank

Complete the table to show the organ in which each change takes place.

The first one has been done for you.

Change	Name of organ
Amino acids to urea	liver
Diploid cell to haploid cell	
Glycogen to glucose	
Haemoglobin to oxyhaemoglobin	
High level of urea in blood to low level of urea in blood	
Thick lining to a thin lining, once a month	

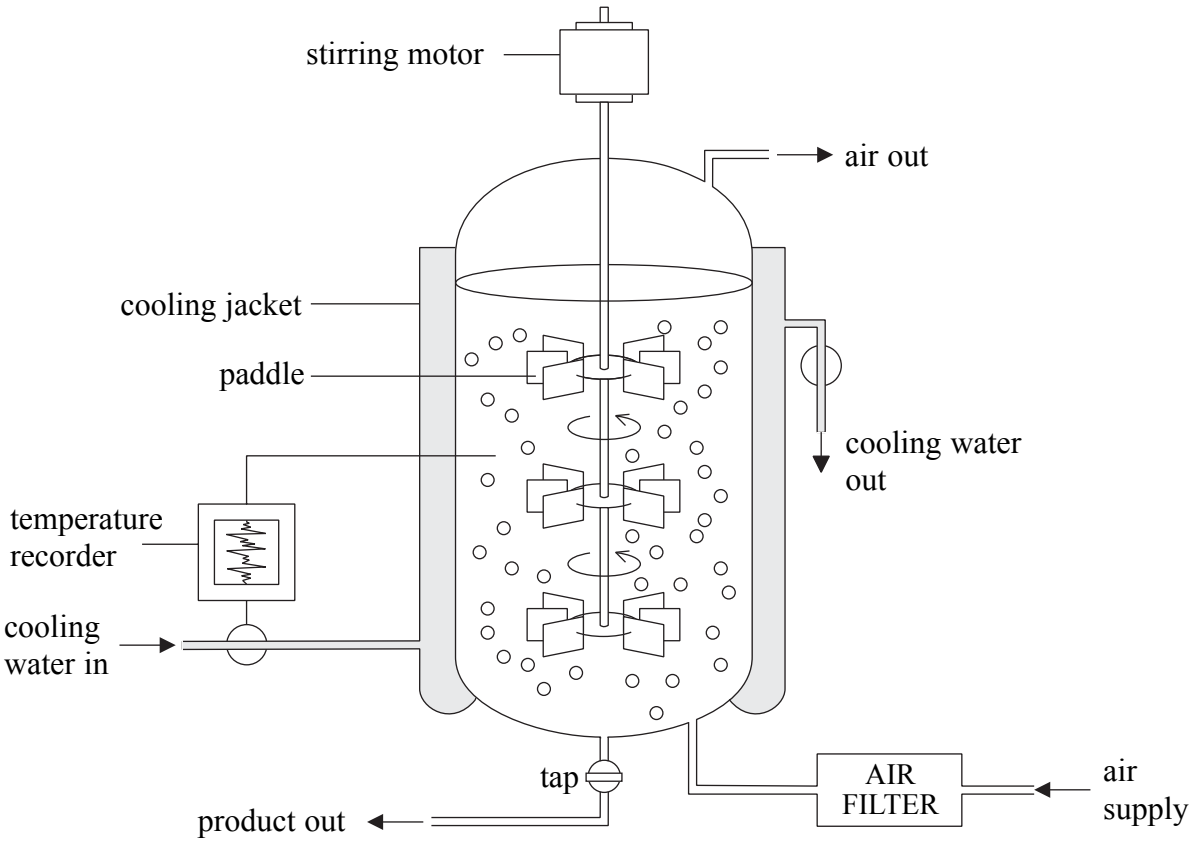
Q3

(Total 5 marks)

Turn over

4. The diagram below shows a fermenter used to grow microorganisms.

Leave blank



(a) (i) Describe how the temperature is kept constant in the fermenter.

.....

.....

.....

.....

(2)

(ii) Name **one** other factor that must be kept constant in the fermenter.

.....

(1)

(b) Explain why air is pumped into the fermenter.

Leave blank

.....

.....

.....

.....

(2)

(c) Explain what would happen to the growth of microorganisms in the fermenter if the paddles stopped working.

.....

.....

.....

.....

.....

.....

(3)

(d) Suggest why steam is used to sterilise the fermenter rather than disinfectants.

.....

.....

.....

.....

(2)

Q4

(Total 10 marks)

Turn over

5. The following advice is taken from the side of a cigarette packet.

Leave blank

STOPPING SMOKING REDUCES
THE RISK OF SERIOUS DISEASES
Health Departments' Chief Medical Officers

Describe how smoking can affect the health of your lungs.

.....

.....

.....

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.....

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.....

.....

Q5

(Total 5 marks)

Specimen Papers and Mark Schemes – London Examinations IGCSE in Biology (4325) Publication code: UG013058
Issue 1, November 2003

6. The table gives possible features of three different types of organism.

Leave blank

Complete the table by putting a tick into the box if the organism has the feature.

Each row has **one** tick only. The first one has been done for you.

Feature	Type of organism		
	plant	**fungus**	**virus**
They are all parasites			✓
They store carbohydrate as starch			
They can only reproduce inside living cells			
They grow by producing a mycelium			
They feed by extracellular secretion of enzymes onto food			

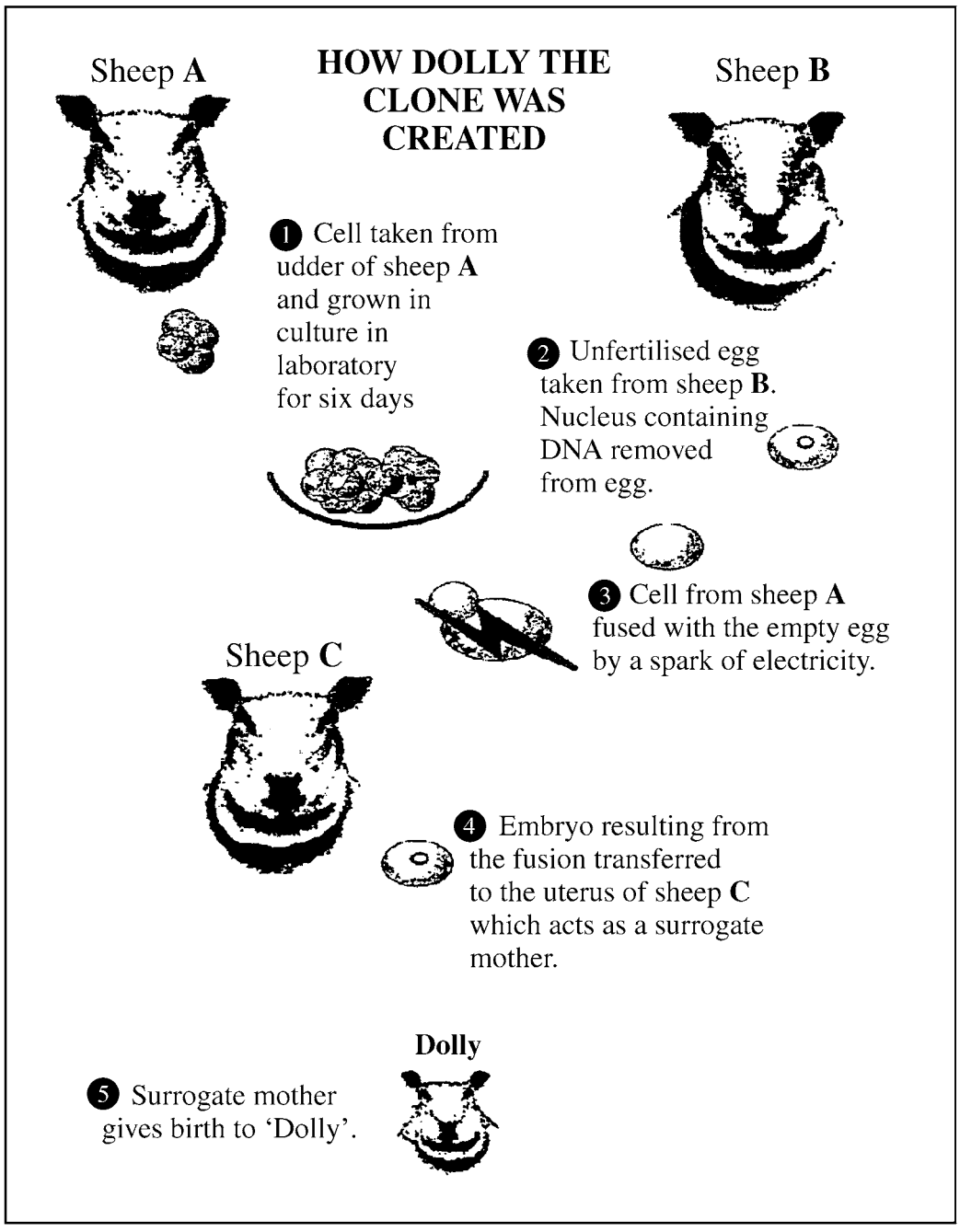
Q6

(Total 4 marks)

Turn over

7. The diagram shows how scientists produced Dolly the sheep.

Leave blank



(a) (i) Dolly was produced with the help of an unfertilised egg.
Where did the scientists get the DNA from to put into this egg?

.....

(1)

(ii) How does the nucleus in a cell from the embryo differ from the nucleus removed from the egg?

.....

.....

(1)

(iii) Dolly is genetically identical to another sheep in the diagram. Which one?

.....

(1)

(b) Give **two** ways in which this method is different from the normal method of sheep reproduction.

1. .....

.....

2. .....

.....

(2)

(c) Suggest **two** advantages of producing animal clones.

1. .....

2. .....

(2)

(Total 7 marks)

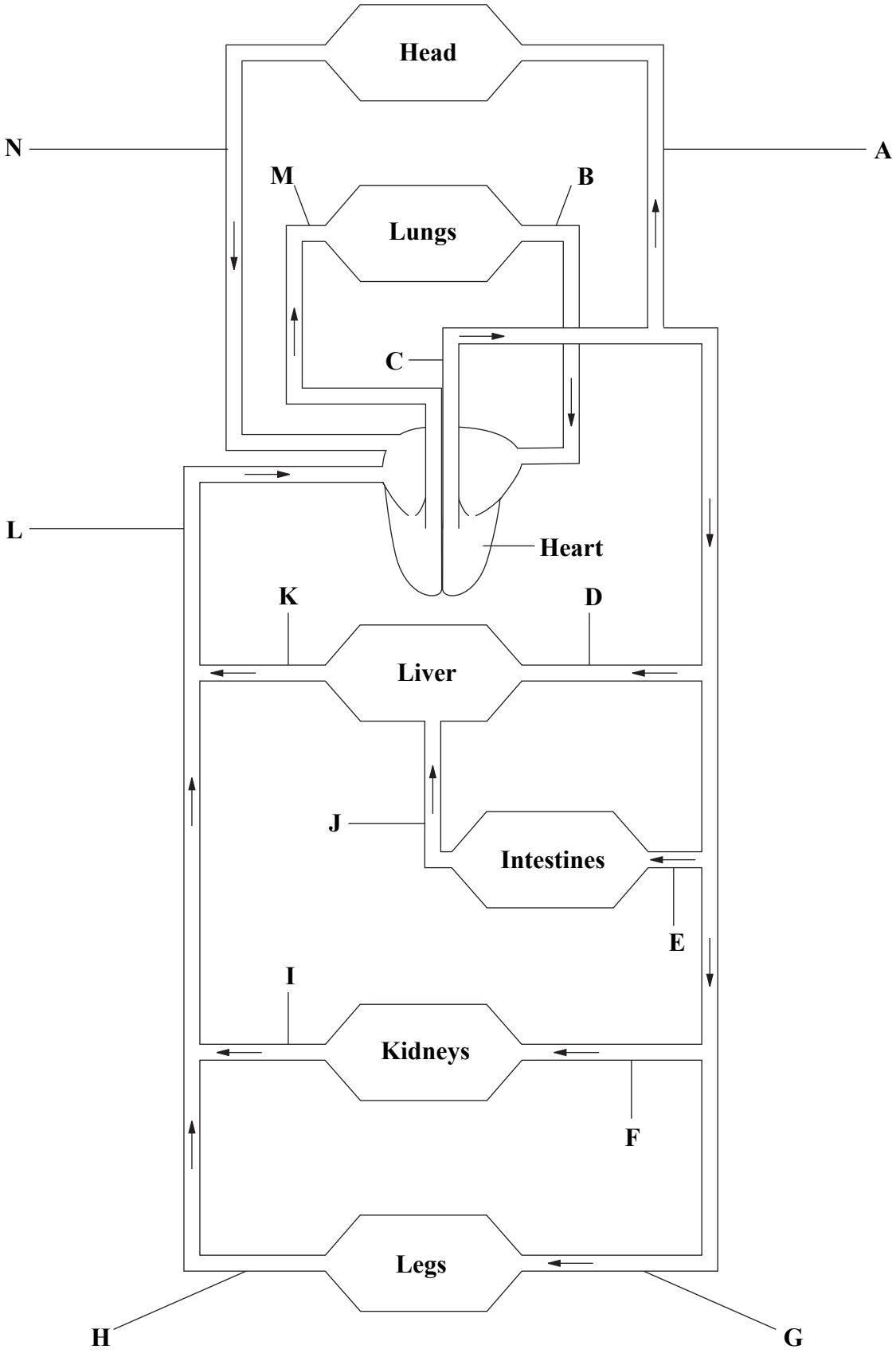
Leave blank

Q7

Turn over

8. The diagram below shows a plan of the circulatory system. The blood vessels are labelled with letters.

Leave blank



Use the letters on the diagram to complete the sentences in the table below.

Leave blank

The first one has been done for you.

Sentence	Letter
The blood vessel named the vena cava is	**L**
The blood vessel named the pulmonary artery is	
The blood vessel carrying blood with the **most** oxygen is	
The blood vessel carrying blood with the **most** glucose after a meal is	
The blood vessel carrying blood with the **least** urea is	
The blood vessel containing blood at the **highest** pressure is	

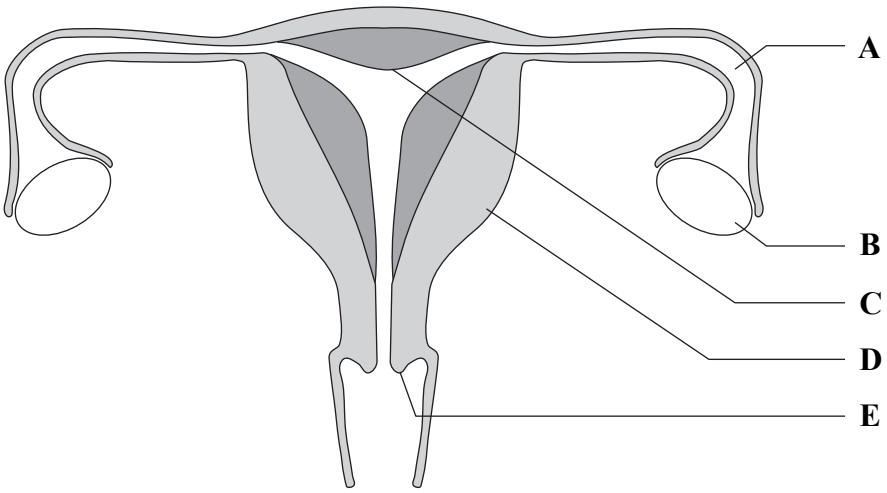
Q8

(Total 5 marks)

Turn over

9. The diagram below shows the female reproductive system.

Leave blank



The table below lists some events that occur in the female reproductive system.

Complete the table using letters from the diagram to show the part where each event occurs. Write **one** letter only in each box. A letter may be used once, more than once, or not at all.

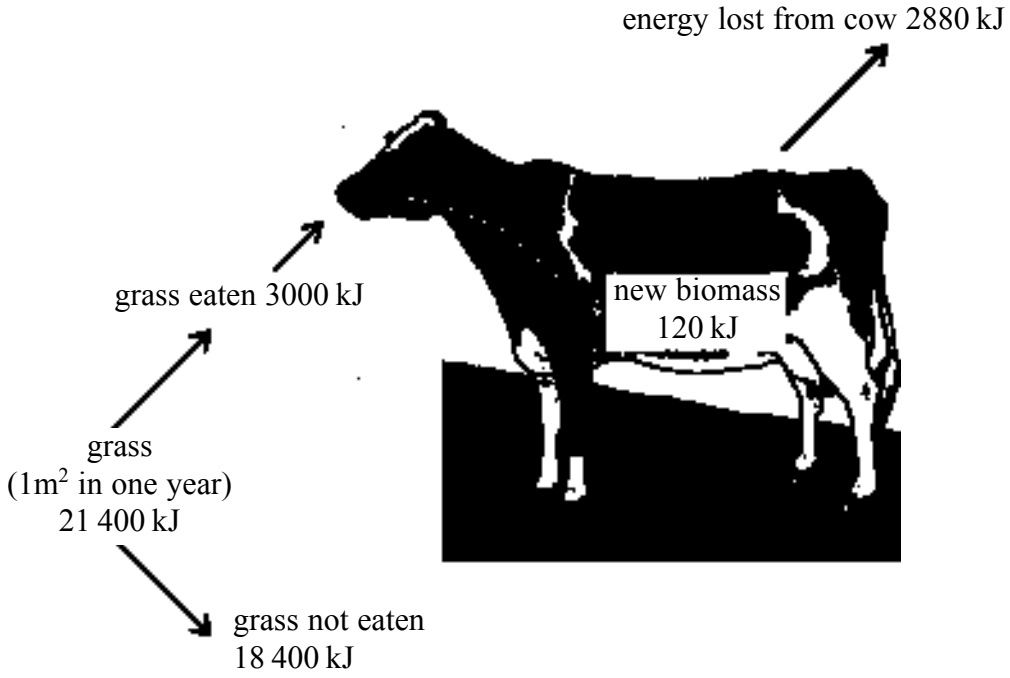
Event	Letter
Eggs produced	
Fertilisation occurs	
Placenta forms	
Progesterone secreted	

Q9

(Total 4 marks)

Leave blank

10. One year's growth of 1 m^2 of grass contains 21 400 kJ of energy.
The diagram shows how this energy is transferred when one cow feeds on the grass.



(a) (i) The cow eats 3000 kJ in the grass. How much of this energy is lost from the cow?

Answer ..... kJ
(1)

(ii) Give **one** way in which energy would be lost from the cow.

.....
(1)

(b) The energy efficiency of the cow is a measure of how much of the energy available to the cow becomes part of its biomass.

The equation below shows how to calculate energy efficiency.

$$\text{energy efficiency (\%)} = \frac{\text{energy that becomes part of biomass}}{\text{energy available}} \times 100$$

In the grass eaten, 3000 kJ of energy is available to the cow.
What is the energy efficiency of the cow?

.....
(1)

(c) Suggest what may happen to the 18 400 kJ of energy in the grass that was not eaten by the cow.

.....
(1)

Q10

(Total 4 marks)

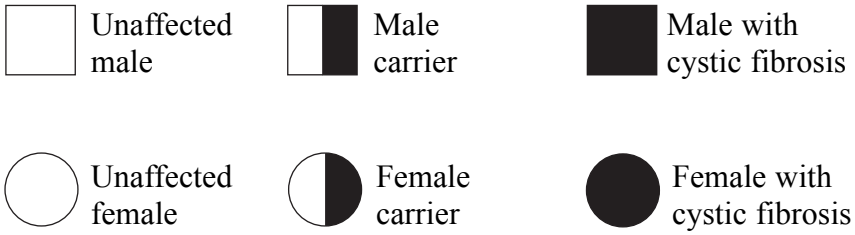
Turn over

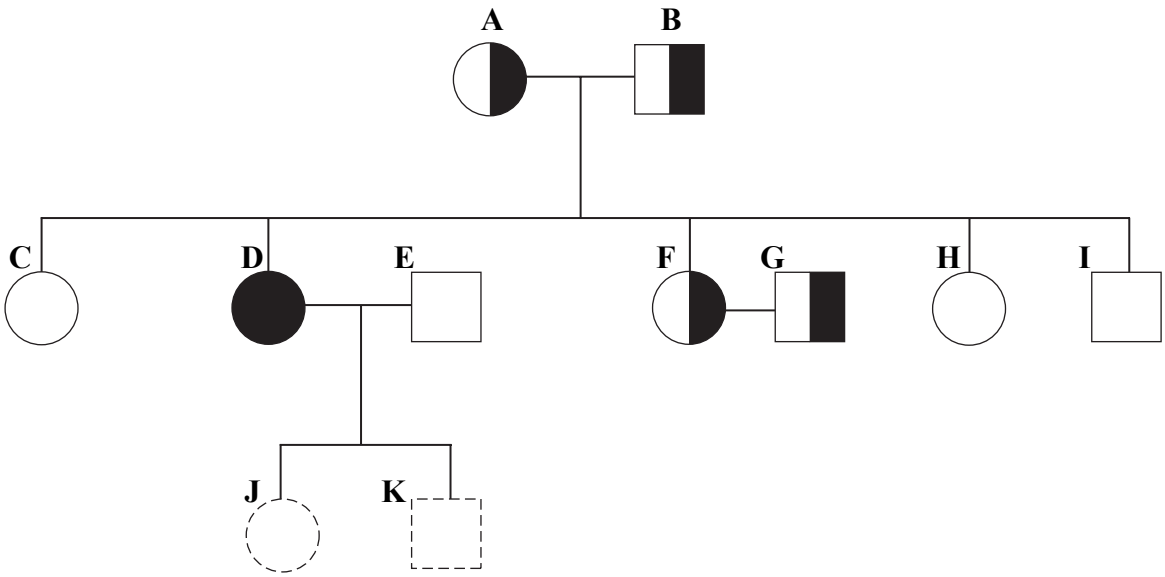
11. Cystic fibrosis is an inherited disease in which certain cells produce abnormal mucus. The allele for the disease is recessive.

Leave blank

The diagram shows how cystic fibrosis was inherited in one family.

Key





(a) Complete the diagram by correctly shading the symbols for person **J** and person **K**.

(1)

(b) Persons **A** and **B** are carriers.

What does this mean?

.....

.....

.....

.....

(2)

(c) How many of the children of **A** and **B** were homozygous dominant?

Leave blank

.....

(1)

(d) What is the phenotype of **D**?

.....

(1)

(e) What is the probability of **F** and **G** having a child with cystic fibrosis?

.....

(1)

(f) What is the probability of **F** and **G** having a male child with cystic fibrosis?

.....

(1)

Q11

(Total 7 marks)

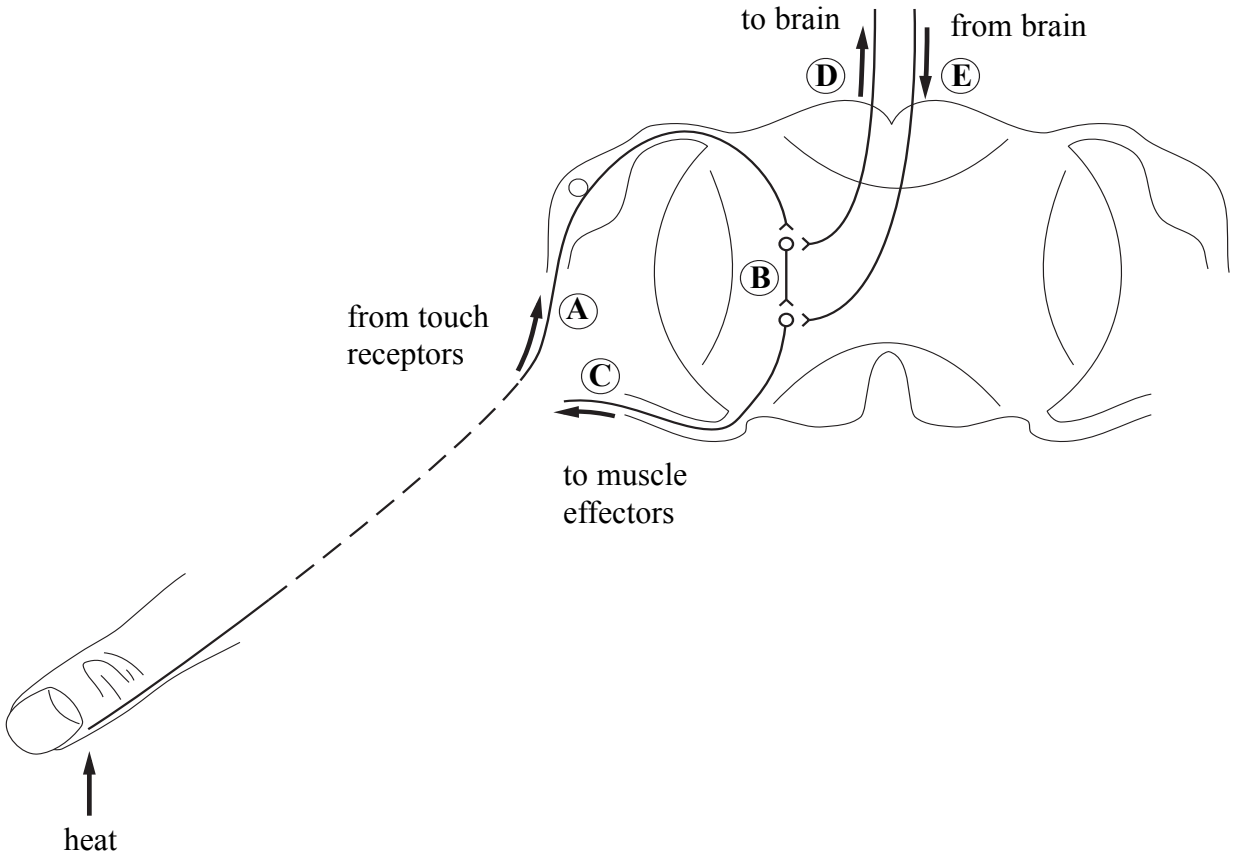
Turn over

12. The diagram shows a finger touching a hot object.

Leave blank

It also shows neurones **A**, **B** and **C**, which pass electrical impulses from touch receptors to muscle effectors.

Neurones **D** and **E** pass impulses to and from the brain.



(a) Name the neurone labelled **A**.

.....

(1)

(b) What name is given to the pathway of electrical impulses along neurones **A**, **B** and **C**.

.....

(1)

(c) Neurones **D** and **E** are **not** involved in the response of the muscle effectors.

What is the advantage of this?

.....

(1)

(d) If one of the neurones **A**, **B**, **C**, **D** or **E** is cut, it may affect the ability to respond if you touch a hot object, or the ability to know that you have touched it.

Leave blank

Complete the table by putting the correct letter in each box.

Information about neurone	Letter of neurone
If this neurone is cut, you can remove your finger from a hot object, but you will not know that you have touched it.	
If this neurone is cut, you cannot remove your finger from a hot object even though you know you have touched it.	
If this neurone is cut, you cannot remove your finger from a hot object, and you will not know that you have touched it.	

(3)

Q12

(Total 6 marks)

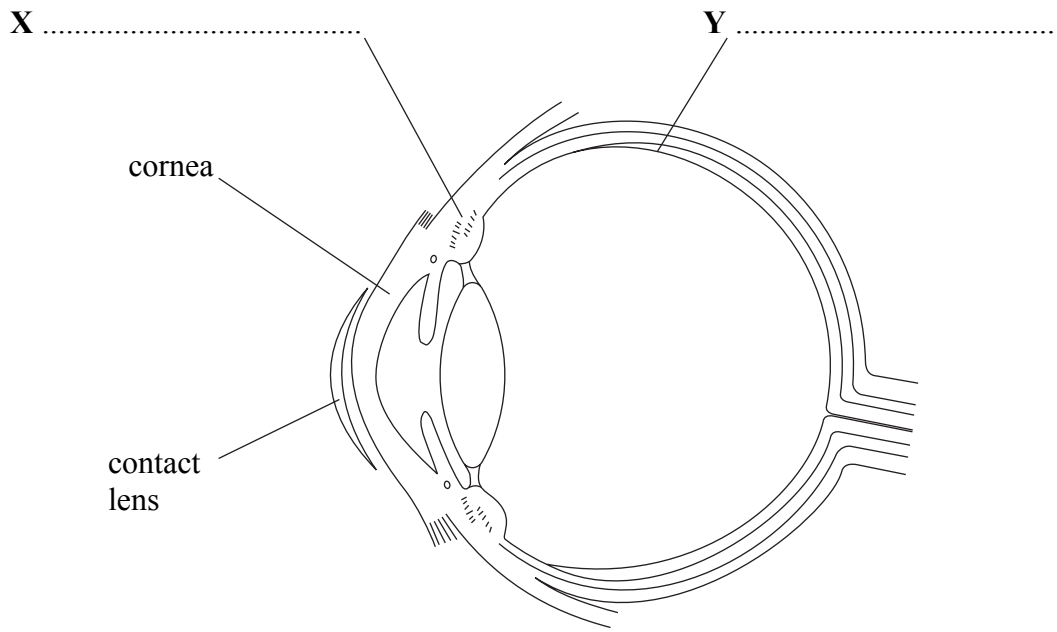
Turn over

13. Read the passage below and answer the questions which follow.

Leave blank

> The cornea of the human eye does not contain blood vessels but the cells of the cornea need oxygen for aerobic respiration. Contact lenses fit closely over the surface of the eye. These lenses improve sight but they can reduce the amount of oxygen reaching the cells of the cornea. The cells then respire without oxygen and the concentration of the waste product from respiration increases in the corneal tissue.
>
> Wearing contact lenses can also cause damage to the surface of the cornea. The cornea responds by increasing the normal rate of repair.

The diagram below shows a section of the human eye with a contact lens in front of the cornea.



(a) Name parts **X** and **Y** on the lines provided.

(2)

(b) (i) What is the function of the cornea?

.....

(1)

(ii) Suggest why it is important that the cornea does not contain blood vessels.

.....

(1)

(c) Suggest how the cells of the cornea obtain oxygen for aerobic respiration.

Leave blank

.....

.....

.....

.....

(2)

(d) Name the waste product formed when the cells of the cornea respire without oxygen.

.....

(1)

(e) Name the type of cell division which occurs during the repair of corneal tissue.

.....

(1)

(f) Increasing the rate of corneal repair reduces the amount of glycogen in the tissue. Explain why this happens.

.....

.....

.....

.....

(2)

Q13

(Total 10 marks)

Turn over

14. The article below appeared in a newspaper.

Leave blank

Ladybirds in Danger!

A genetically modified (GM) potato plant produces a natural insecticide against insects. In fields of these GM potato plants, insect numbers are 50% lower than in control fields. Farmers think that the decrease in insect population is not enough, so they are relying on ladybirds which are natural predators of insects.

There is a problem ahead. When ladybirds eat insects which have fed on the GM potato plants they are seriously affected. These ladybirds live half as long and lay fewer eggs each year. A quarter of these eggs fail to hatch.

Use the information in the article and your own knowledge to answer the following questions.

(a) Describe **one** method of biological pest control referred to in the article.

.....

.....

(1)

(b) What suggests that some insects are resistant to the natural insecticide?

.....

.....

(1)

(c) What is meant by **control fields**?

.....

.....

(1)

(d) Why might growing the GM potato plant lead to the new crop failing after several years?

.....

.....

(1)

(e) Describe a method that could have been used to produce genetically modified (GM) potato plants.

Leave blank

.....

.....

.....

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.....

.....

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(5)

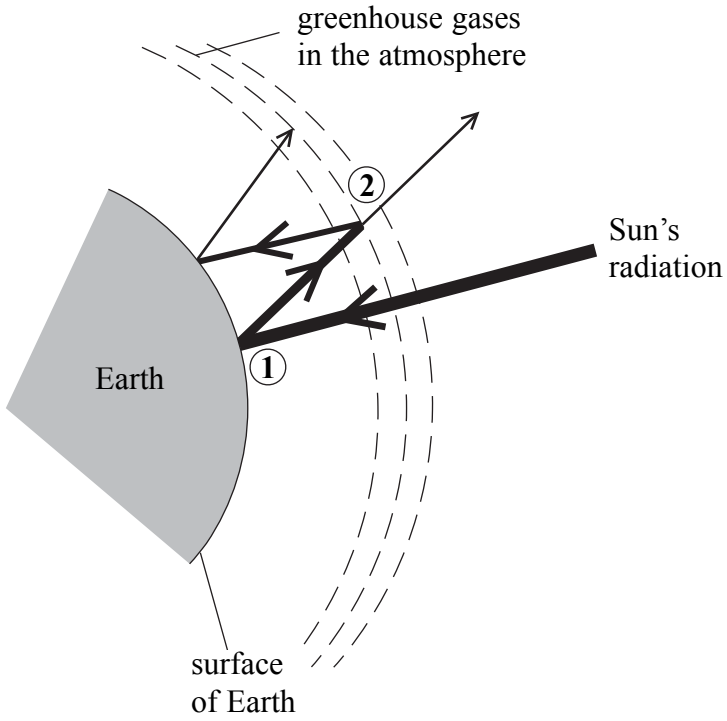
Q14

(Total 9 marks)

Turn over

15. Greenhouse gases form a layer in the atmosphere. The diagram shows what happens when radiation from the Sun reaches the Earth's atmosphere.

Leave blank



The arrows represent radiation from the Sun. The width of each arrow represents the amount of radiation.

(a) Use the diagram and your knowledge to answer the following questions.

(i) What is happening to the Sun's radiation at **1** (the surface of the Earth)?

.....

.....

.....

(2)

(ii) What is happening at **2** (the layer of greenhouse gases)?

.....

.....

.....

(2)

(b) Suggest possible consequences of an increase in greenhouse gases.

Leave blank

.....

.....

.....

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.....

.....

(3)

Q15

(Total 7 marks)

Turn over

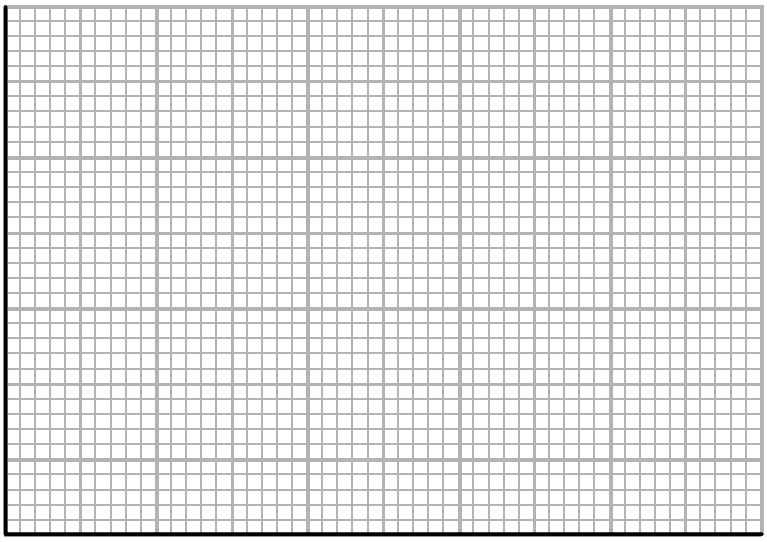
16. Farmers add nitrate fertiliser to their fields to increase wheat yield. The table gives the amount of wheat yield when different amounts of nitrate fertiliser were added.

Leave blank

Amount of fertiliser added in kg per hectare	Wheat yield in tonnes per hectare
0	2
50	12
100	21
150	30
200	30
250	30

(a) (i) Use the information in the table to draw a line graph on the grid below.

Wheat yield in tonnes per hectare



Amount of fertiliser added in kg per hectare

(4)

(ii) What is the least amount of fertiliser that needs to be added to obtain maximum yield?

.....

(1)

(b) Why is nitrate needed to help wheat plants grow?

.....

(1)

(c) Rain falling on the fields can wash the nitrate fertiliser into rivers. Explain the effects this could have on the river ecosystem.

Leave blank

.....

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.....

(5)

Q16

(Total 11 marks)

Turn over

17. When people dance, they tend to sweat a lot. This increase in sweat production leads to an increase in the amount of ADH released in the body.

Leave blank

(a) Explain why it is important that people sweat when dancing.

.....

.....

.....

.....

.....

(3)

(b) (i) Name the gland that releases ADH.

.....

(1)

(ii) Which organ does ADH target?

.....

(1)

(iii) How does ADH travel from where it is released to the organ it targets?

.....

(1)

(iv) Why is it important that people release more ADH when they sweat?

.....

.....

.....

(2)

Q17

(Total 8 marks)

18. (a) What name describes the evaporation of water from plant leaves?

Leave blank

.....

(1)

(b) Name the apparatus that is used to measure the rate of evaporation from plant leaves.

.....

(1)

(c) Complete the table below by explaining how each named factor can increase the rate of evaporation from plant leaves.

Factor	Explanation for increase in rate of evaporation
High air temperature	
High light intensity	

(2)

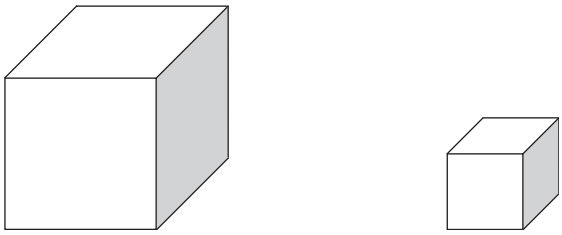
Q18

(Total 4 marks)

Turn over

19. The diagram shows two different-sized potato cubes, **X** and **Y**, that were placed in distilled water for one hour.

Leave blank



X **Y**

(a) Explain why both cubes gained in mass after one hour.

.....

.....

.....

.....

.....

.....

(3)

(b) Put a tick in the row of the table that correctly describes the change in mass for cube **X** compared to cube **Y**.

Mass of water absorbed in g	Percentage increase in mass	Tick
More	Lower	
Less	Lower	
Less	Higher	
More	Higher	

(1)

Q19

(Total 4 marks)

TOTAL FOR PAPER: 120 MARKS

END

Centre No.						Paper Reference						Surname	Initial(s)
Candidate No.						4	3	2	5	/	0	3	Signature

Paper Reference(s)

4325/03

Examiner's use only

Team Leader's use only

London Examinations IGCSE

Biology

Paper 3 (Common in both tiers)

Specimen Paper

Time: 1 hour 15 minutes

Materials required for examination
Nil

Items included with question papers
Nil

Question Number	Leave Blank
1	
2	
3	
4	
5	
6	
Total	

Instructions to Candidates

In the boxes above, write your centre number and 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.

Information for Candidates

There are 14 pages in this question paper. All blank pages are indicated.
The total mark for this paper is 50. The marks for the various parts of questions are shown in round brackets: e.g. (**2**).

Advice to Candidates

You are reminded of the importance of clear English and careful presentation in your answers.

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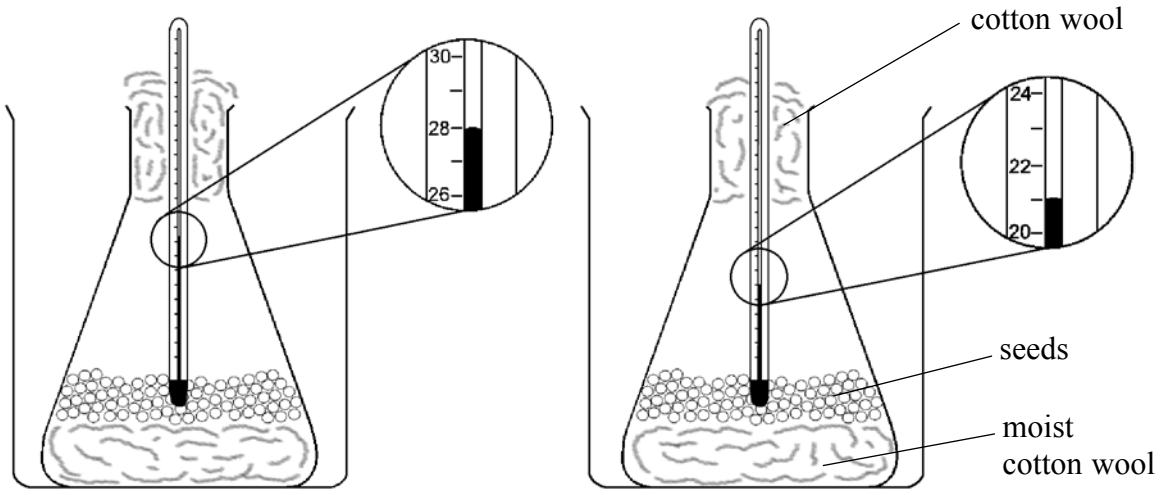
Turn over

London Examinations
from Edexcel International

1. The diagram below shows an experiment used to find out if living seeds release heat when they respire.

Leave blank

One flask contains living seeds and the other contains dead seeds.



(a) (i) On diagram **A** label the **beaker**.

(1)

(ii) On diagram **A** label the **flask**.

(1)

(b) Look carefully at the thermometers. In the spaces below write down the temperature reading for each.

A .....

B .....

(2)

(c) Which flask was set up with living seeds? Explain your answer.

.....

.....

.....

.....

(2)

Q1

(Total 6 marks)

2. The following steps describe the procedure used to show that a green leaf conatins starch.

Leave blank

The steps are **not** in the correct order.

- Add iodine solution
- Immerse in boiling water for 1 minute
- Heat leaf in boiling ethanol
- Place plant in bright sunshine for 12 hours
- Place plant in darkness for 24 hours
- Remove leaf from plant

(a) Fill in the table below to show these steps in the correct order. Then, in the table, give a reason why each step is carried out. Some parts of the table have been filled in for you.

Step	Reason why carried out
1. Place plant in darkness for 24 hours	
2.	Allows photosynthesis to occur
3. Remove leaf from plant	
4.	Kills leaf
5.	
6.	Shows the presence of starch

(7)

(b) In one of the steps the leaf is boiled in ethanol. Describe how you could carry this out safely.

.....

.....

(1)

Q2

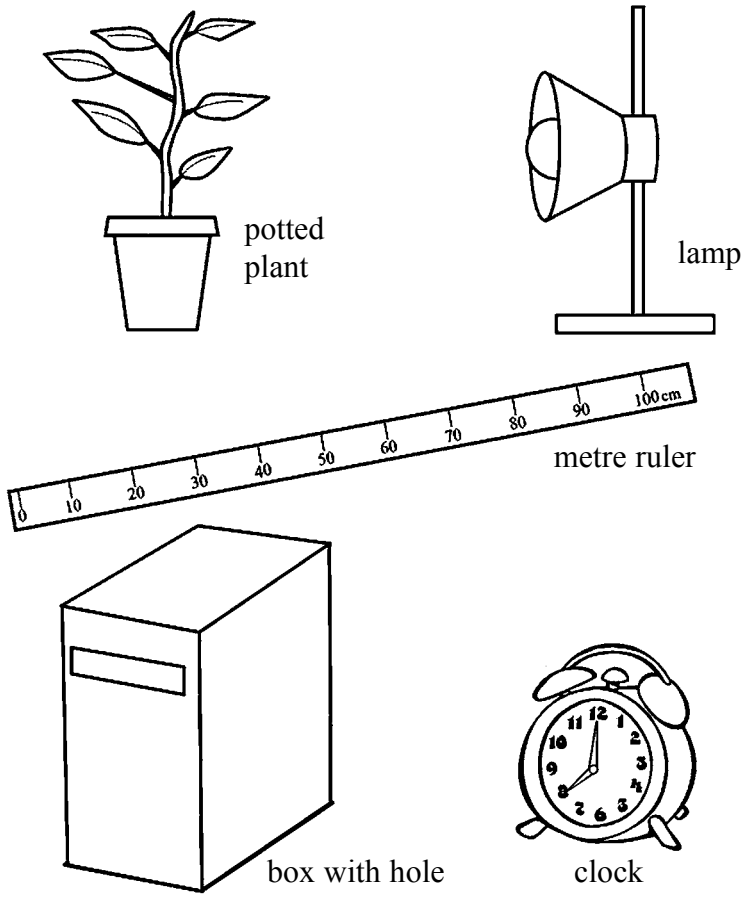
(Total 8 marks)

Turn over

3. (a) You are asked to do an experiment to show how light from one side affects the growth of a plant.

Leave blank

For this you are given the pieces of apparatus shown in the diagram below.



(i) Draw a diagram to show how you would set up this apparatus for your experiment.

(3)

(ii) Write a brief method to say what you would do.

Leave blank

.....

.....

(1)

(b) Describe how you could set up a control to make sure that the response of the plant was due to the light coming from one side.

.....

.....

(1)

Q3

(Total 5 marks)

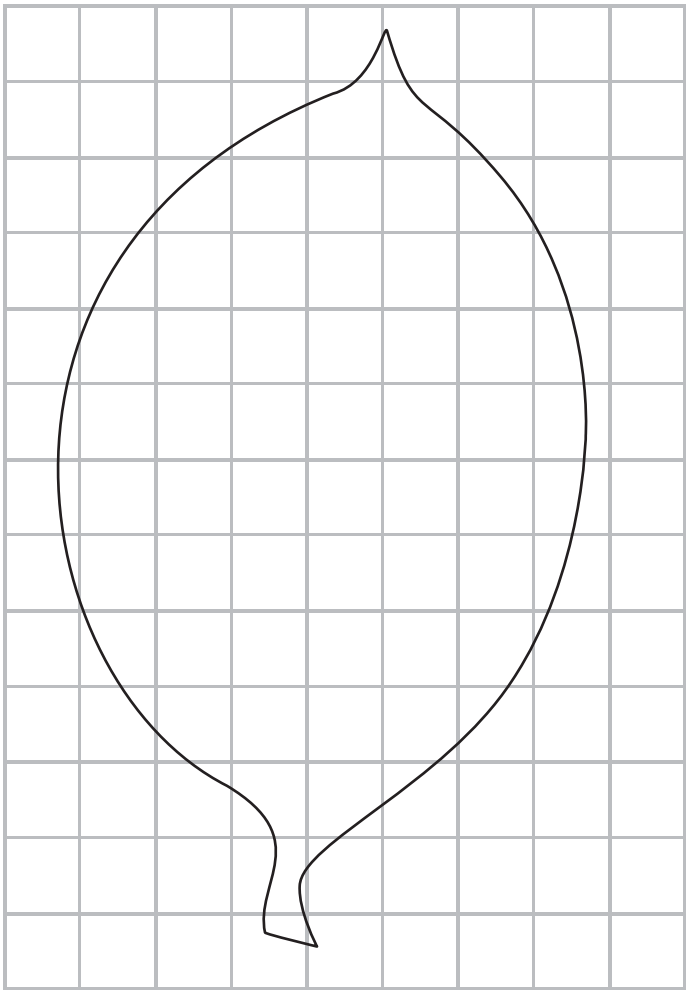
Turn over

Leave blank

4. A student looked at some leaves growing on plants in the light and in the shade. She wanted to investigate whether the leaves grow to different sizes in the light and the shade.

She collected 20 leaves from a plant growing in the shade and 20 from the same kind of plant growing in full sunlight.

To measure the area of a leaf she drew round it on squared paper, as shown below.



She then counted up the squares. The area of each square was 1cm^2.

(a) Estimate the area of this leaf using the same method. Show your working.

(2)

(b) She realised that this method would take a very long time if she used it for all her leaves. Her teacher suggested she use the following formula to estimate the area of the other leaves.

Leave blank

$$\text{Leaf area} = \tfrac{2}{3} \times (\text{maximum length} \times \text{maximum width})$$

Measure the length of the leaf shown.

Measure the width of the leaf shown.

Use the formula above to calculate the area of this leaf.

Show your working.

Write your results in the table below.

Length of leaf	cm
Width of leaf	cm
Area of leaf	cm^2

(3)

QUESTION 4 CONTINUES ON THE NEXT PAGE

(c) She decided to use this method and collected the following data.

Leave blank

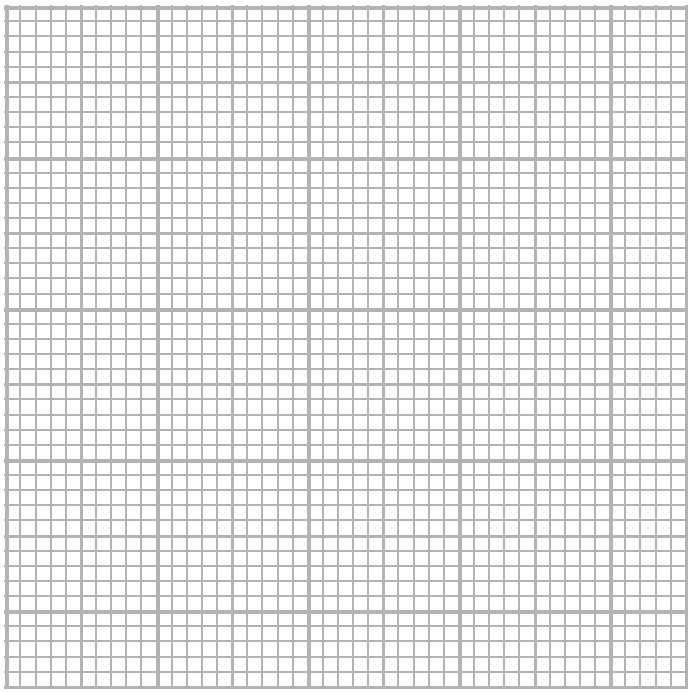
Area of leaves growing in the shade in cm^2.

11.2 22.0 76.5 51.6 29.6 32.7 46.6 53.9 69.5
66.1 53.5 55.7 38.8 43.9 32.8 42.0 49.8 46.4
43.8 46.1

She grouped the data for the shade leaves into categories and produced a tally chart.

Leaf area in cm^2	Tally	Total
11 to 20	/	1
21 to 30	//	2
31 to 40	///	3
41 to 50	///// //	7
51 to 60	////	4
61 to 70	//	2
71 to 80	/	1

(i) Plot a histogram on the grid provided to show the distribution of **shade** leaves.



(3)

(ii) From the histogram, what is the mode of these data?

.....

(1)

(d) She then examined the leaves she collected from full sunlight and estimated the following leaf areas. All data is given in cm^2.

Leave blank

Area of leaves growing in full sunlight, in cm^2.

17.6 18.2 11.0 22.0 26.1 43.1 22.0 18.6 29.2 61.1
72.2 43.0 34.0 44.6 57.0 33.0 63.0 41.0 38.0 24.3

(i) She again decided to produce a tally chart for these data. Complete the chart which has been started below.

Leaf area in cm^2	Tally	Total
11 to 20		

(5)

(ii) Do her data suggest that there is a difference in size between leaves from the shade and those from the light? Explain your answer.

.....

.....

.....

(2)

Q4

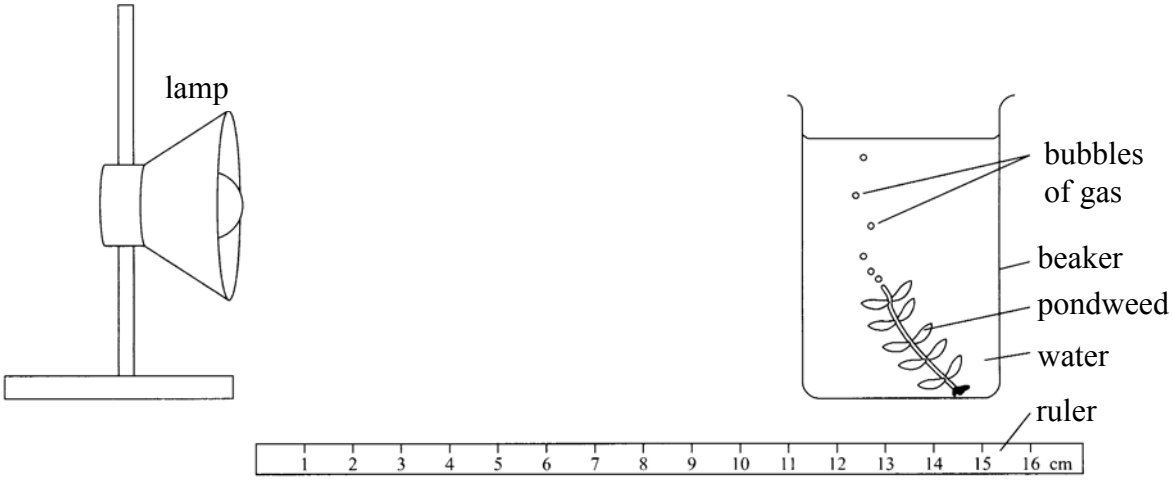
(Total 16 marks)

Turn over

Leave blank

5. Anna carried out an investigation into photosynthesis in which she varied the concentration of carbon dioxide available to a water plant. She added different masses of sodium hydrogencarbonate to the water. She was careful to control all other key factors that might affect the rate of photosynthesis. The apparatus she used is shown in the diagram below.

She predicted that increasing the carbon dioxide concentration would increase the rate of photosynthesis.



She observed the water plant and counted the bubbles coming off. She did this for 3 minutes for each concentration of sodium hydrogencarbonate.

Table 1

Number of bubbles of oxygen released each minute	**Mass of sodium hydrogencarbonate added to the beaker in g**				
	0	**1**	**1.5**	**2**	**2.5**
Minute 1	4	16	29	43	60
Minute 2	3	17	31	29	63
Minute 3	4	15	25	28	57

(a) She decided to calculate the average number of bubbles released for each mass of sodium hydrogencarbonate added.

She recorded her results for this calculation and these are given in table 2.

Table 2

Mass of sodium hydrogencarbonate in g	**Average number of bubbles released per minute**
0	3.67
1.0	16.00
1.5	28.33
2.0	
2.5	60.00

Calculate the average value for the 2.0 g data. Insert your value in the space in table 2.

(1)

(b) (i) Anna's experiment looked at the effect of different concentrations of carbon dioxide. Name **one** other key factor that could influence the rate of photosynthesis.

Leave blank

.....

(1)

(ii) For this factor state how Anna could ensure that it does not affect the rate of photosynthesis in her experiment.

.....

.....

(1)

(c) (i) Using information in table 2, write a suitable conclusion for Anna's experiment. You should include the effect of increasing hydrogencarbonate concentration on the number of bubbles released.

.....

.....

(1)

(ii) Give an explanation of these results using your scientific knowledge.

.....

.....

(1)

(iii) Relate the results to Anna's prediction.

.....

.....

(1)

QUESTION 5 CONTINUES ON THE NEXT PAGE

Turn over

(d) Comment on any unexpected results or pattern of results in table 1.

Leave blank

.....

.....

(1)

(e) (i) Suggest **one** way that this experiment could be modified to improve the reliability or accuracy of the results. Explain how your modification could improve the results.

Modification .....

.....

Explanation .....

.....

(2)

(ii) Suggest a further experiment that you could carry out and explain how it would provide more information on the effect of carbon dioxide on photosynthesis.

.....

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.....

.....

(2)

Q5

(Total 11 marks)

6. Describe an investigation you could carry out to find out what effect exercise has on breathing rate.

Leave blank

You should include full experimental details in your account.

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Q6

(Total 4 marks)

TOTAL FOR PAPER: 50 MARKS

END

Edexcel International

London Examinations

IGCSE

IGCSE Biology (4325)

Mark Schemes for Specimen Papers

Paper 1F (Foundation Tier)

Turn over

MARK SCHEME FOR
LONDON EXAMINATIONS IGCSE IN BIOLOGY (4325)
SPECIMEN PAPER 1F
FOUNDATION TIER

Symbols used in the Mark Scheme

; indicates separate mark points
/ indicates alternatives
eq allow for correct equivalent

1.	(a)	C;	
	(b)	B;	
	(c)	A;	
	(d)	C;	
	(e)	A;	
	(f)	B;	
	(g)	B;	
	(h)	B;	
	(i)	C;	
	(j)	B;	10
			(Total 10 marks)
2.	(a)(i)	smaller / eq;	1
	(ii)	reference to muscle; (iris) bigger / eq / (muscle) contracted;	2
	(b)	damage retina;	1
	(c)	testosterone; insulin; oestrogen; adrenaline;	4
			(Total 8 marks)
3.	(a)	arrow towards or through stomata;	1
	(b)(i)	absorb light / carry out photosynthesis / eq;	1
	(ii)	light is from above / eq;	1
	(c)	correctly labelled;;;;	4
			(Total 7 marks)
4.	(a)	all points correctly plotted;; / error lose 1 mark	2
	(b)(i)	(the amount of oxygen) fell / dropped / eq;	1
	(ii)	bacteria (in sewage); increase / use up oxygen / respire;	2
			(Total 5 marks)
5.	(a)	10;	1
	(b)	10;	1
	(c)	competition / eq;	1
			(Total 3 marks)

6.	(a)(i)	10;	1
	(ii)	3;	1
	(b)	glucose; oxygen; carbon dioxide; water;	4
			(Total 6 marks)
7.	(a)	whole;	1
	(b)	skimmed;	1
	(c)	less fat; less chance of blocking blood vessels / eq	2
	(d)	fibre / roughage;	1
			(Total 5 marks)
8.	(a)(i)	rabbit(s);	1
	(ii)	correct shape; correct labelling;	2
	(b)(i)	numbers decrease / eq;	1
	(ii)	no food / grass for rabbits / eq; no food / rabbits for foxes / eq;	2
			(Total 6 marks)
9.	(a)(i)	breakdown; large / insoluble (molecules) to small / soluble (molecules);	2
	(ii)	fatty acids / glycerol;	1
	(b)	B; A; B;	3
			(Total 6 marks)
10.	(a)(i)	anther;	1
	(ii)	stigma;	1
	(b)	insect;	1
	(c)	through style to touch ovule;	1
			(Total 4 marks)
11.		testis / ovary / gonads / eq; liver; lung / placenta; kidney; uterus / womb;	5
			(Total 5 marks)

12. (a)(i) reference to temperature recorder / eq;
cooling water; 2

(ii) pH / nutrient concentration / oxygen; 1

(b) oxygen;
respiration / energy; 2

(c) growth reduced / stopped / eq;
microorganisms settle at bottom / eq;
no oxygen / no nutrients;
anaerobic respiration;
build up of waste products / ethanol; max 3

(d) cools to water;
water not toxic / eq;
disinfectant kills microorganisms; max 2

(Total 10 marks)

13. Description could include reference to:
bronchitis;
ciliated cells stop working;
bacteria;
infection;
emphysema;
reduced surface area / fewer alveoli / eq;
white blood cells;
protease;
less gas exchange;
cancer;
mutation / eq;
blocked air tubes / eq; max 5

(Total 5 marks)

14.

Feature	Type of organism		
	Plant	Fungus	Virus
They are all parasites			(✓)
Stores carbohydrate as starch	✓;		
They can only reproduce inside living cells			✓;
They grow by producing a mycelium		✓;	
They feed by extracellular secretion of enzymes		✓;	

4

(Total 4 marks)

15.	(a)(i)	sheep A / udder cell;	1
	(ii)	it is diploid / not haploid / contains more / twice the DNA / contains different DNA / genes;	1
	(iii)	sheep A;	1
	(b)	uses sorrogate mother; / does not need sperm; / eq;	2
	(c)	can be used to produce useful chemicals / eq; produce many / that are the same / animals with desired characteristics / eq;	2

(Total 7 marks)

16.	M; B; J; I; C;	5

(Total 5 marks)

17.	B; A; C; B;	4

(Total 4 marks)

TOTAL FOR PAPER: 100 MARKS

Edexcel International

London Examinations

IGCSE

IGCSE Biology (4325)

Mark Schemes for Specimen Papers

Paper 2H (Higher Tier)

Turn over

MARK SCHEME FOR
LONDON EXAMINATIONS IGCSE IN BIOLOGY (4325)
SPECIMEN PAPER 2H
HIGHER TIER

Symbols used in the Mark Scheme

; indicates separate mark points
/ indicates alternatives
eq allow for correct equivalent

1.	(a)(i)	breakdown; large / insoluble (molecules) to small / soluble(molecules);	2
	(ii)	fatty acids / glycerol;	1
	(b)	B; A; B;	3
			(Total 6 marks)
2.	(a)(i)	anther;	1
	(ii)	stigma;	1
	(b)	insect;	1
	(c)	through style to touch ovule;	1
			(Total 4 marks)
3.		testis / ovary / gonad / eq; liver; lung; kidney; uterus / womb;	5
			(Total 5 marks)
4.	(a)(i)	reference to temperature recorder / eq; cooling water;	2
	(ii)	pH / nutrient concentration / oxygen;	1
	(b)	oxygen; respiration / energy;	2
	(c)	growth reduced / stopped / eq; microorganisms settle at bottom / eq; no oxygen / no nutrients; anaerobic respiration; build up of waste products / ethanol;	max 3
	(e)	cools to water; water not toxic / eq; disinfectant kills microorganisms;	max 2
			(Total 10 marks)

5. Description could include reference to:
bronchitis;
ciliated cells stop working;
bacteria;
infection;
emphysema;
reduced surface area / fewer alveoli / eq;
white blood cells;
protease;
less gas exchange;
cancer;
mutation / eq;
blocked air tubes / eq; max 5

(Total 5 marks)

6.

Feature	Type of organism		
	Plant	Fungus	Virus
They are all parasites			(✓)
Stores carbohydrate as starch	✓;		
They can only reproduce inside living cells			✓;
They grow by producing a mycelium		✓;	
They feed by extracellular secretion of enzymes		✓;	

4

(Total 4 marks)

7. (a)(i) sheep A / udder cell; 1
(ii) it is diploid / not haploid / contains more / twice the DNA / contains different DNA / genes; 1
(iii) sheep A; 1
(b) uses sorrogate mother; / does not need sperm; / eq; 2
(c) can be used to produce useful chemicals / eq;
produce many / that are the same / animals with desired characteristics / eq; 2

(Total 7 marks)

8. M; B; J; I; C; 5

(Total 5 marks)

9. B; A; C; B; 4

(Total 4 marks)

Turn over

10. (a)(i) 2880 kJ; 1
(ii) respiration / heat / movement / urine / faeces / eq; 1
(b) 4%; 1
(c) eaten by other organisms / decomposed / broken down by other organisms / eq; 1

(Total 4 marks)

11. (a) both J and K half shaded; 1
(b) do not have cystic fibrosis / abnormal mucus / disease;
have the cystic / recessive allele;
can be passed on / eq; max 2
(c) 3; 1
(d) female with cystic fibrosis; 1
(e) 1 in 4 / $\frac{1}{4}$ / 0.25 / 25% / 1:3; (reject 1:4) 1
(f) 1 in 8 / 1/8 / 0.125 / 12.5% / 1:7; (reject 1:8) 1

(Total 7 marks)

12. (a) A – sensory; 1
(b) reflex / reflex arc; 1
(c) less time (to respond) / less distance / does not need to go to brain / no need to think / less damage / eq; 1
(d) D;
C / motor;
A / sensory; 3

(Total 6 marks)

13. (a) X – ciliary muscle / body;
Y – retina; 2
(b)(i) bend / refract light; 1
(ii) needs to be clear / transparent / to let light through / eq; 1
(c) diffusion;
from air / from aqueous humour; 2
(d) lactic acid; 1
(e) mitosis; 1
(f) converted to glucose;
for respiration; 2

(Total 10 marks)

14. (a) ladybirds eat insects / potato plants produce insecticide; 1
(b) not all killed / 50% survive / eq; 1
(c) fields that contain normal potato plants; 1
(d) resistant insects will increase in number / ladybird numbers will fall; 1
(e) potato DNA cut;
specific sites / eq;
restriction enzyme;
gene for (natural) insecticide;
inserted / put in / eq;
ligase;
vector / plasmid / virus; max 5
(Total 9 marks)

15. (a) 1. Earth / water absorbs (some) radiation or Earth / water heat up / eq;
(some) used in photosynthesis;
(some) reflected / eq; max 2
2. (some) radition escapes (into space) / eq;
(some) radiation reflected back to Earth / trapped / cannot escape / short waves cannot escape; max 2
(b) global warming / Earth warms up / air temp. rises / eq;
melting of ice caps / eq;
rise in sea level / flooding / eq;
changes in distribution of plants / animals as a result of climate change / eq;
desertification / drought / eq; max 3
(Total 7 marks)

16. (a)(i) scale – more than half of each axis used;
points – all plotted accurately;;
line – neatly drawn through all points / line of best fit; 4
(ii) 150 (kg per hectare); 1
(b) amino acids / protein; 1
(c) more / increased algae / (water) plants grow (at surface) / eq;
light blocked / eq;
plants lower cannot photosynthesise / no photosynthesis;
die / algae die / eq;
bacteria / decomposers / fungi rot them down / eq;
use oxygen / less oxygen (must be linked to bacteria or decay) / eq;
fish / animals die / suffocate / cannot breathe / respire / eq;
food chain consequences / eq;
eutrophication; max 5
(Total 11 marks)

Turn over

17. (a) dancing generates heat / eq;
heat transferred out of body / eq;
cools / prevents overheating / eq;
avoids enzyme denaturation / eq; max 3

(b)(i) pituitary; 1

(ii) kidney; 1

(iii) blood / plasma / bloodstream; 1

(iv) prevent dehydration;
water reabsorbed from collecting duct / in to the blood;
blood / plasma (very) concentrated; max 2

(Total 8 marks)

18. (a) transpiration; 1

(b) potometer; 1

(c) increased kinetic energy / molecules diffuse / move faster / eq;
stomata open; 2

(Total 4 marks)

19. (a) water entered;
by osmosis;
from high water concentration to low water concentration / eq; 3

(b)

Mass of water absorbed in g	Percentage increase in mass	Tick
More	Lower	✓;
Less	Lower	
Less	Higher	
More	Higher	

1

(Total 4 marks)

TOTAL FOR PAPER: 120 MARKS

Edexcel International

London Examinations

IGCSE

IGCSE Biology (4325)

Mark Schemes for Specimen Papers

Paper 3 (Common to both tiers)

MARK SCHEME FOR
LONDON EXAMINATION IGCSE IN BIOLOGY (4325)
SPECIMEN PAPER 3 (COMMON TO BOTH TIERS)

Symbols used in the Mark Scheme
; indicates separate mark points
/ indicates alternatives
eq allow for correct equivalent

1. (a) beaker correct;
flask correct; 2
(b) A=28 °C;
B=21 °C; 2
(c) Flask A;
respiration releases energy / releases heat; 2
(Total 6 marks)

2. (a)

Step		Why carried out
1	Place plant in dark for 24 hours	**Removes all starch present / destarches plant;**
2	**Place plant in bright sunshine for 12 hours;**	Photosynthesis can occur
3	Remove leaf from plant	**Allows starch test to be performed;**
4	**Immerse leaf in boiling water for 1 minute;**	Kills leaf
5	**Heat leaf in boiling ethanol;**	**Removes chlorophyll / green colour;**
6	**Add iodine solution;**	Shows presence of starch

7
(b) don't heat directly / use water bath at 70 °C; 1
(Total 8 marks)

3. (a) <u>show on diagram / described</u>
one plant inside box with hole;
lamp on same side as hole;
reference to time using clock;
named control variable test; 4 max
(b) box with no hole / plant in 'normal' light; 1
(Total 5 marks)

4. (a) counting squares and summing part squares;
leaf area = 48–52cm^2; 2

(b) length = 10 (if leaf stalk ignored) /
12 (if leaf stalk etc included); 1
width = 7; 1
estimate= 7x10x2/3=6.67 cm^2 / 7x12x2/3=56 cm^2; 1

(c)(i) points × 2;;
correct leaf areas; 3

(ii) mode = 41 to 50; 1

(d)(i)

Leaf area in cm^2	Tally	Total number of leaves
11 to 20	\\\\	4
21 to 30	\\\\\	**5**
31 to 40	\\\	**3**
41 to 50	\\\\	**4**
51 to 60	\	**1**
61 to 70	\\	**2**
71 to 80	\	**1**

all tallies correct = 3 marks (minus 1 for each error);;;
all leaf numbers match tallies = 2 marks (minus 1 for each error, but allow transfer error from incorrect tally count);; 5

(ii) yes, more smaller leaves in full sunlight;
ref to lower mode / mean / or range;
or
not possible to conclude;
samples too small / not enough leaves measured; 2 max

(Total 16 marks)

5. (a) 33.3; 1

(b)(i) temperature / light intensity; 1

(ii) water bath / keep beaker set distance from lamp; 1

(c)(i) as concentration of carbon dioxide increases so does rate of photosynthesis; 1

(ii) carbon dioxide required for photosynthesis; 1

(iii) the results confirm her prediction; 1

(d) the first minute's reading for 2 g of hydrogencarbonate / eq is higher than others; 1

(e)(i) use measuring cylinder / graduated tube to collect volume of gas evolved;
allows quantitative estimate of rate of photosynthesis; 2

(ii) e.g. continue to increase the amount of hydrogencarbonate / eq available;
to see if it is a limiting factor / eq; 2

(Total 11 marks)

Turn over

6. range of exercise levels;
people same size / sex / age;
several people used;
(how breathing measured) breaths per minute;
other variable(s) controlled e.g. temperature;

(Total 4 max marks)

TOTAL FOR PAPER: 50 MARKS

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Order Code UG013058 November 2003 Issue 1

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