Surname		Other Names	
Centre Number			Candidate Number	
Candidate Signature			

Leave blank

General Certificate of Secondary Education
June 2005

ASSESSMENT and QUALIFICATIONS ALLIANCE

BIOLOGY (MODULAR) SPECIFICATION A 3413/F
FOUNDATION TIER

Monday 6 June 2005 1.30 pm to 3.00 pm

F

In addition to this paper you will require:
a ruler.
You may use a calculator.

Time allowed: 1 hour 30 minutes

Instructions
- Use blue or black ink or ball-point pen. Pencil should only be used for drawing.
- Fill in the boxes at the top of this page.
- Answer **all** questions in the spaces provided.
- Do all rough work in this book. Cross through any work you do not want marked.

Information
- The maximum mark for this paper is 90.
- Mark allocations are shown in brackets.
- You are reminded of the need for good English and clear presentation in your answers.

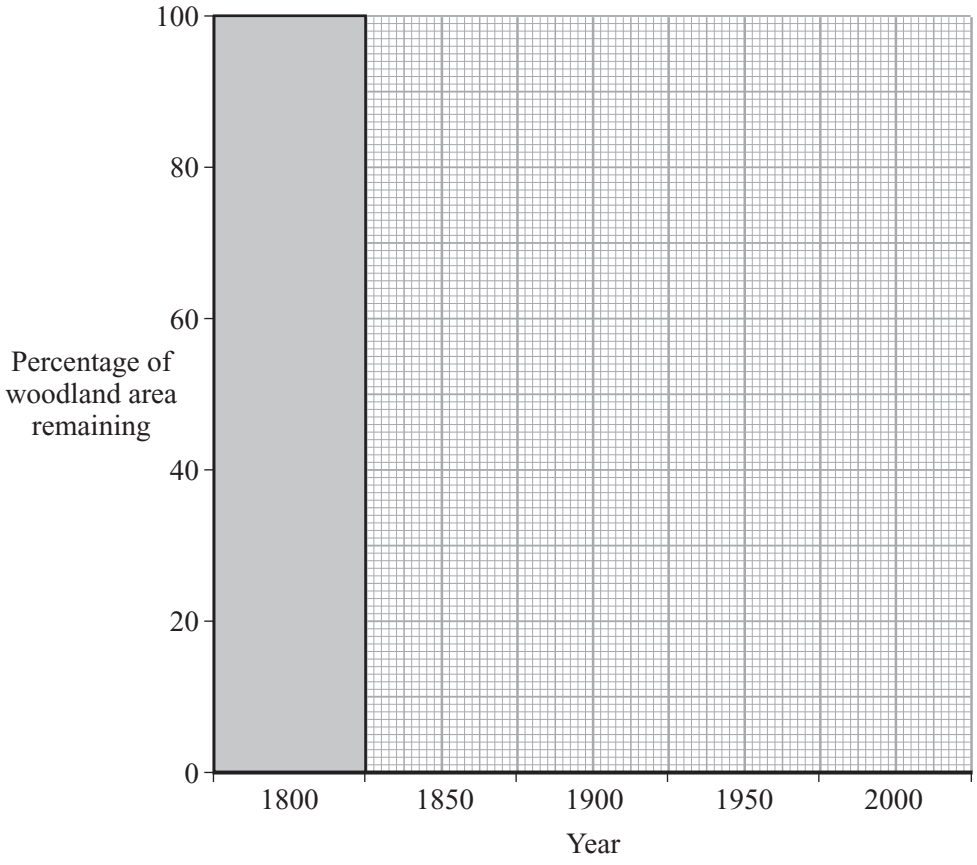
For Examiner's Use			
Number	Mark	Number	Mark
1		9	
2		10	
3		11	
4		12	
5		13	
6		14	
7		15	
8		16	
Total (Column 1) →			
Total (Column 2) →			
TOTAL			
Examiner's Initials			

ENVIRONMENT

1 The table shows how an area of woodland in Great Britain has changed in the last 200 years.

Year	Percentage of woodland remaining
1800	100
1850	70
1900	65
1950	45
2000	40

(a) Draw a bar chart to show this information. The first bar has been drawn for you.



(2 marks)

(b) In which 50 year period was most woodland lost?

.....

(1 mark)

(c) Suggest **three** reasons why the woodland has been lost.

1 .....

2 .....

3 .....

(3 marks)

(d) Suggest **two** reasons why the number of wild animals living in the original area has decreased in the last 200 years.

1 .....

.....

2 .....

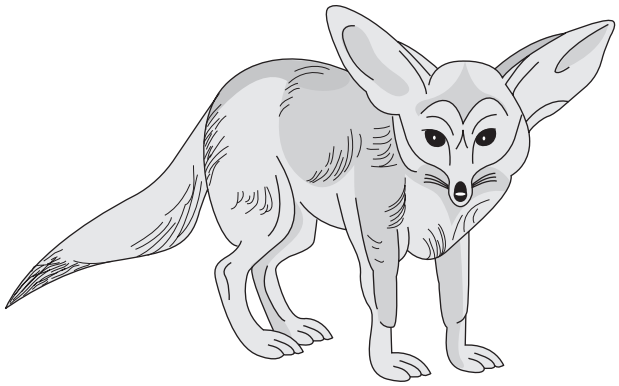
.....

(2 marks)

8

TURN OVER FOR THE NEXT QUESTION

2 The Fennec Fox is a light brown fox, which lives in hot desert areas. It is about 40 cm long and has large ears. In the daytime, it shelters in burrows in the sand. At night, it hunts small mammals, lizards and birds.



Use this information and your own knowledge to explain how the Fennec Fox is adapted to survive in hot desert conditions.

To gain full marks in this question you should write your ideas in good English. Put them into a sensible order and use the correct scientific words.

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.....

.....

(6 marks)

6

INHERITANCE AND SELECTION

3 (a) Complete each sentence by choosing the correct word from the box.

alleles	**asexual**	**cytoplasm**	**dominant**	**recessive**	**sexual**

In ..... reproduction, an egg and a sperm will fuse at fertilisation.

The child will have different characteristics from its parents because its cells contain different

..... .

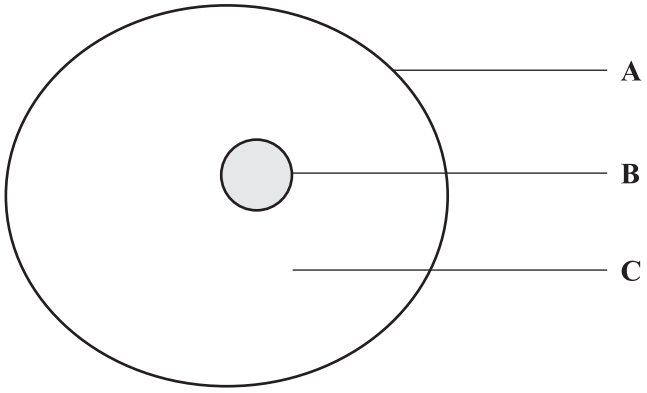
Sometimes, a child with cystic fibrosis can be born to parents without cystic fibrosis.

This is because cystic fibrosis is caused by a ..... allele.

The parents do not have cystic fibrosis because they also have the ..... allele.

(4 marks)

(b) The diagram shows a cell from a person with cystic fibrosis.



Give the letter of the part of the cell:

(i) which contains the gene for cystic fibrosis; .....

(ii) which is affected by the cystic fibrosis gene. .....

(2 marks)

6

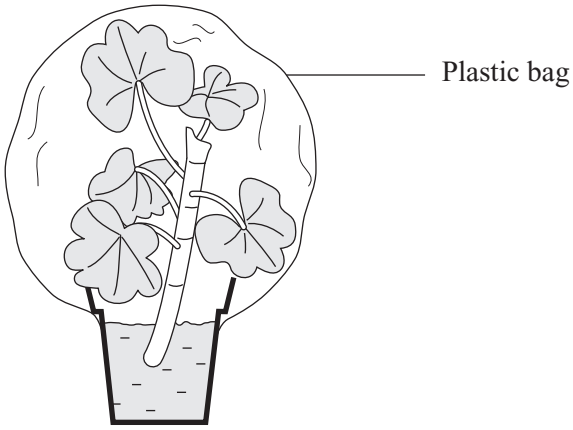
4 (a) Complete the following sentences.

Growing new plants from cuttings is a form of ..... reproduction.

A group of genetically identical individuals is known as a ..... .

(2 marks)

(b) The diagram shows a cutting from a *Pelargonium* plant.



(i) Why should the cutting be covered with a plastic bag?

.....

.....

(1 mark)

(ii) Explain **two** advantages of producing new plants in this way.

1 .....

.....

2 .....

.....

(2 marks)

5

NO QUESTIONS APPEAR ON THIS PAGE

TURN OVER FOR THE NEXT QUESTION

BIOLOGY IN ACTION

5 (a) Name the type of microbe used to make the following food and drink.
Choose the correct answer from the words in the box.

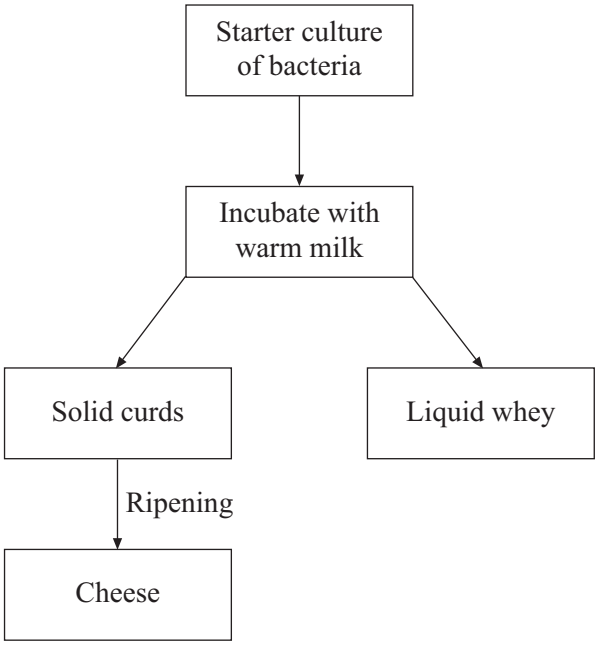
bacteria	**mould**	**virus**	**yeast**

(i) Beer .....

(ii) Yogurt .....

(2 marks)

(b) The diagram shows some of the stages in making cheese.



(i) Explain why the milk should be warm.

.....

(1 mark)

(ii) Explain why the pH of the milk changes during incubation.

.....

.....

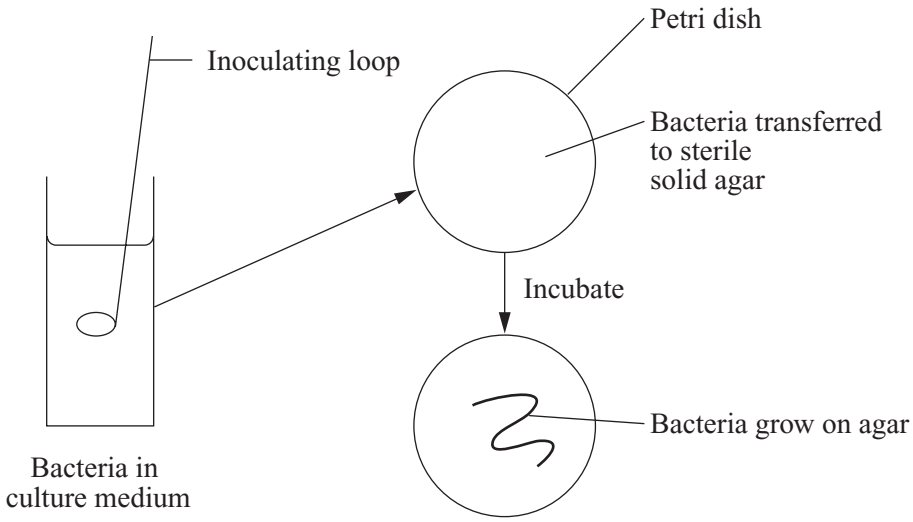
(1 mark)

(iii) Name a type of microbe which can be used to ripen cheese.

.....

(1 mark)

(c) When scientists are growing bacteria for the starter culture, they sometimes grow the bacteria on agar plates. The diagram shows one of the techniques they might use.



Describe **four** precautions that the scientists should take to make sure that no unwanted microbes grow on the agar.

1 .....

.....

2 .....

.....

3 .....

.....

4 .....

.....

(4 marks)

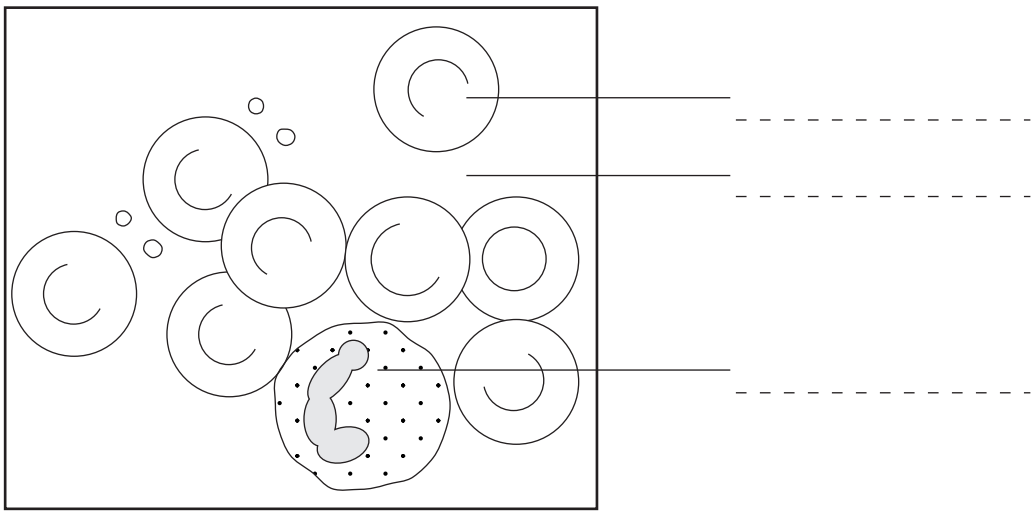
9

TURN OVER FOR THE NEXT QUESTION

LEAVE MARGIN BLANK

QUESTIONS RELATING TO PREVIOUSLY TESTED MODULES

6 A student looked at human blood through a microscope. The diagram shows what he saw.



(a) Choose words from the box to label the parts of the diagram.

capillary	**plasma**	**platelet**	**red blood cell**	**white blood cell**

(3 marks)

(b) Describe **one** function of:

(i) a red blood cell;

.....

(ii) plasma.

.....

(2 marks)

5

7 Birds are adapted for flight.
List **A** describes features of a bird. List **B** explains how these features help the bird to fly.

Draw a line from each feature in list **A** to the correct explanation in list **B**.

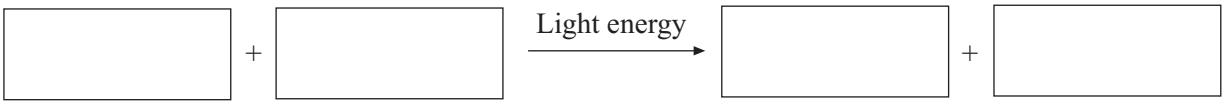
List A	**List B**
Streamlined body shape	Provide a large surface area to lift the bird up
Bones containing air spaces	Light but give strength
Large wings	Reduces air resistance

(3 marks)

3

TURN OVER FOR THE NEXT QUESTION

8 (a) Write the word equation for photosynthesis.



(2 marks)

(b) Some students investigated the conditions needed for photosynthesis to take place. They used a plant with leaves which were partly green and partly white.

- They covered part of a leaf with black paper, as shown in **Diagram 1**.
- They left the plant in a warm, sunny room for 8 hours.
- They removed the leaf and tested it for starch.

The results are shown in **Diagram 2**.

Diagram 1

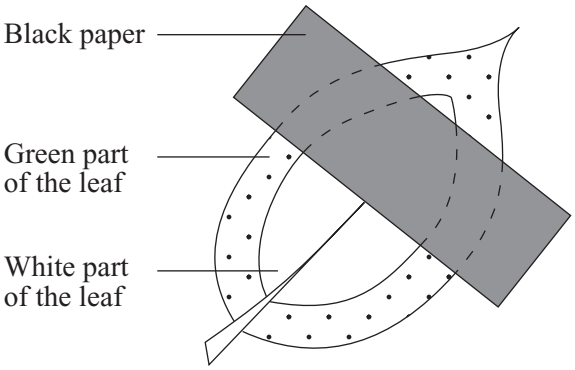
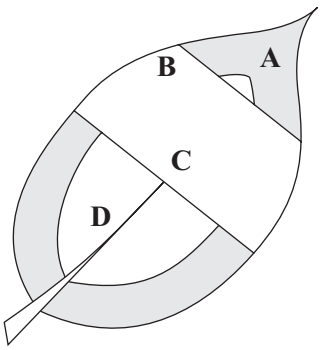
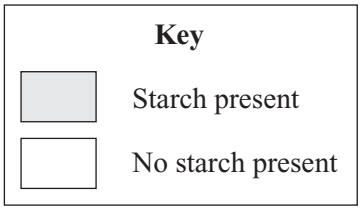


Diagram 2





The students found that starch was present in area **A** but **not** in areas **B**, **C** or **D**.

List 1 refers to the areas of the leaf. **List 2** gives reasons why no starch was found.

Draw a line from each area in **List 1** to the best explanation for the result in **List 2**.

List 1 **Area of Leaf**	**List 2** **Explanation**
B	No light **and** no chlorophyll present
C	Chlorophyll present but no light
D	Light but no chlorophyll present

(3 marks)

5

TURN OVER FOR THE NEXT QUESTION

LEAVE MARGIN BLANK

ENVIRONMENT

9 In 1991, the body of a man was found in melting ice in the Alps. The body was over 5000 years old and had been trapped in the ice since the man died.

(a) Explain why the body did **not** decay.

.....

.....

(2 marks)

(b) Scientists suggested that the ice had melted because the earth was getting warmer. Increased amounts of methane and carbon dioxide in the atmosphere may be causing this rise in temperature.

Explain why the amounts of methane and carbon dioxide are increasing.

(i) Methane

.....

.....

(1 mark)

(ii) Carbon dioxide

.....

.....

(1 mark)

(c) In some parts of the world the amount of sulphur dioxide gas has also increased.

How does sulphur dioxide affect the environment?

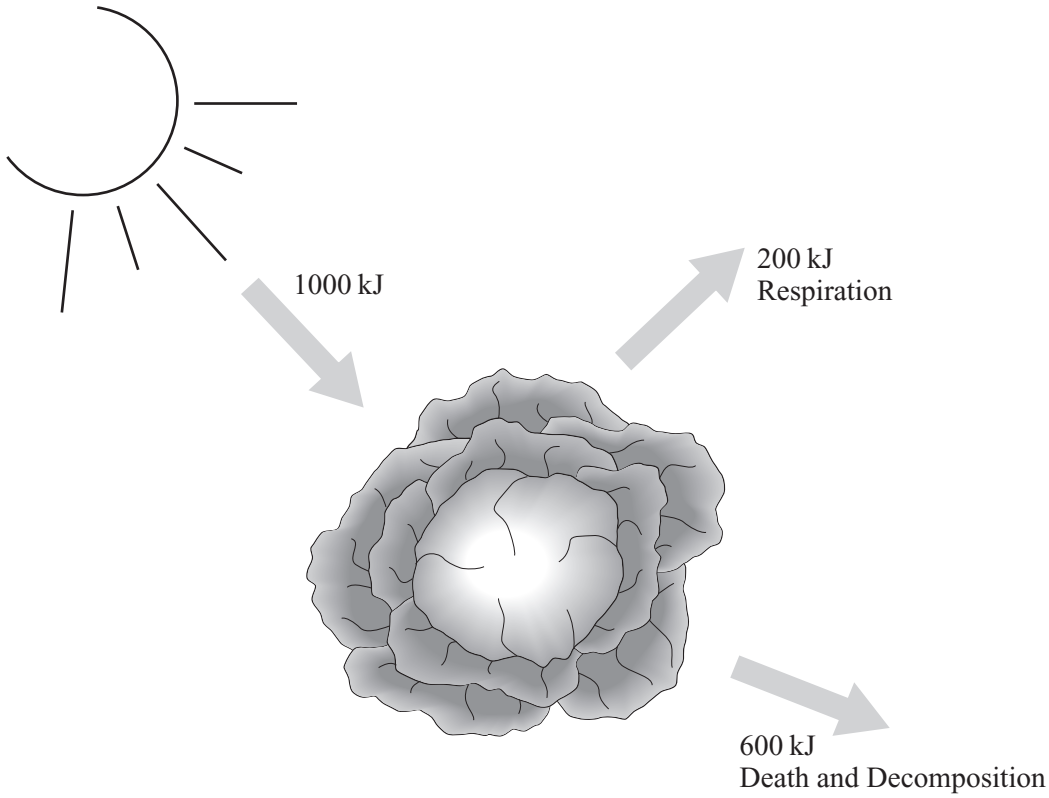
.....

.....

(1 mark)

5

10 The diagram shows some of the energy transfers in a lettuce plant.



(a) What percentage of the energy absorbed by the lettuce is available to the humans who eat it? Show your working.

.....

.....

.....

.....

..... %

(2 marks)

(b) Explain why humans do **not** use all of this energy in growth.

.....

.....

.....

(2 marks)

(c) Describe **two** ways in which hormones can be used when producing food from plants.

1 .....

2 .....

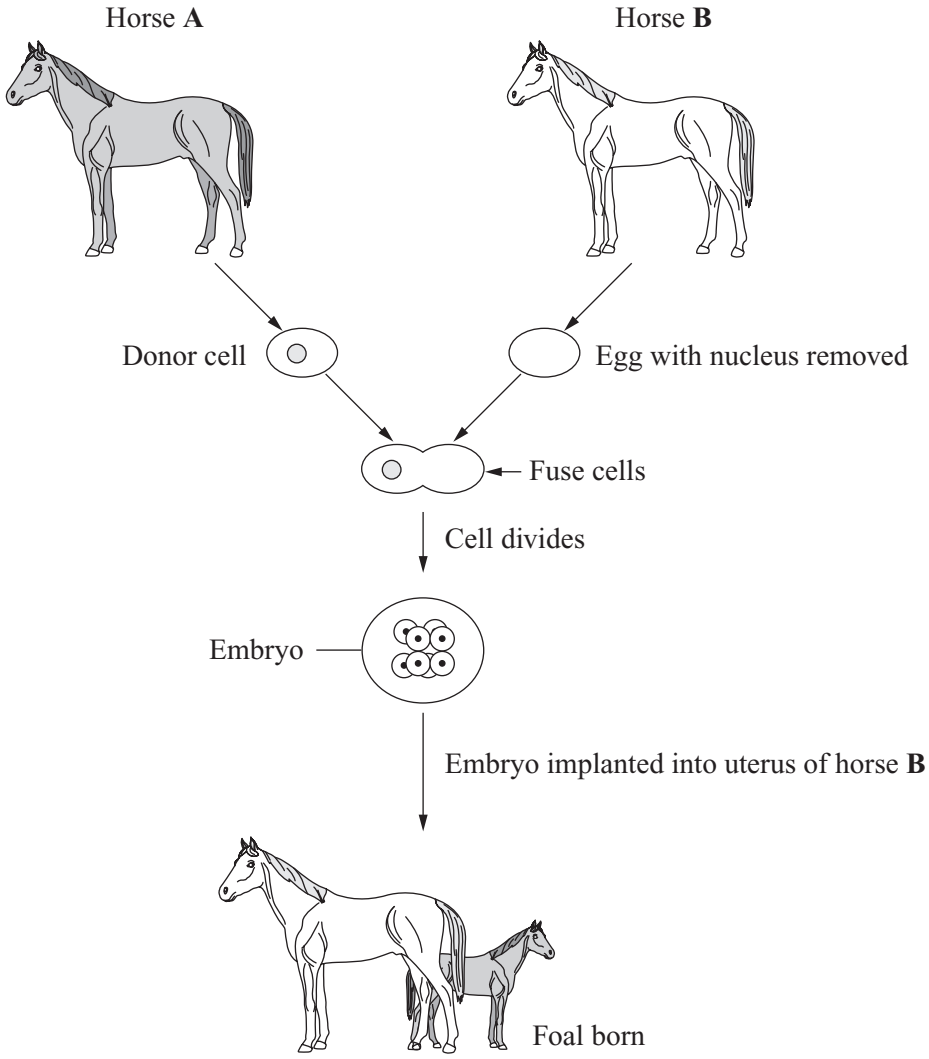
(2 marks)

6

Turn over ▶

INHERITANCE AND SELECTION

11 The diagram shows how embryo transfer can be used in horse breeding.



(a) Explain why the foal has the same characteristics as horse **A**.

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.....

.....

(2 marks)

(b) This method of breeding horses decreases the number of alleles in the horse population. Explain why this might be a disadvantage.

.....

.....

.....

(2 marks)

4

12 A species of bacteria cannot grow when an antibiotic is in the culture medium.
A scientist exposed some of these bacteria to ionising radiation. She then transferred them to a culture medium containing the antibiotic.
Some of the bacteria were now able to grow and reproduce.

(a) Describe the effect of ionising radiation on these bacteria.

.....

.....

(1 mark)

(b) Many people with bacterial infections are treated with antibiotics such as penicillin. However, an increasing number of species of bacteria are becoming resistant to commonly used antibiotics.

Describe how the over-use of antibiotics can result in the evolution of resistant bacteria.

To gain full marks in this question you should write your ideas in good English. Put them into a sensible order and use the correct scientific words.

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(4 marks)

5

TURN OVER FOR THE NEXT QUESTION

BIOLOGY IN ACTION

13 In the nineteenth century, diphtheria was a common disease in children. It is caused by bacteria that infect the throat. The bacteria produce a toxin (poison) that can cause death. When an infected person coughs, the bacteria can be passed on.

Table 1: Information about diphtheria in a town in Britain.

Year	Number of people with diphtheria	Number of deaths from diphtheria
1860	2100	252
1910	1840	105
1940	1800	45
1970	2	0

(a) In 1860, 88 % of people with diphtheria recovered.

Calculate the recovery rate in 1940. Show your working.

.....

.....

.....

.....

.....%
(2 marks)

(b) **Table 2: Information about the treatment of diphtheria in Britain.**

Year	Information
1883	Bacteria that cause diphtheria were identified
1900–1950	Infected people were isolated in special hospitals
1921	Antitoxin against diphtheria becomes widely used
1942 onwards	Increased use of antibiotics
1941 onwards	Diphtheria vaccinations widely available

(i) Use the information given in **Table 2** to explain why the death rate changed between 1860 and 1940.

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.....

.....

.....

(2 marks)

(ii) By 1950, most isolation hospitals had closed.

Explain why these hospitals were no longer needed.

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.....

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(3 marks)

7

TURN OVER FOR THE NEXT QUESTION

14 Kidney disease may be treated using dialysis. A kidney transplant may be carried out as an alternative to dialysis.

What are the advantages and disadvantages of a kidney transplant to a patient with kidney disease?

Advantages: .....

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.....

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Disadvantages:.....

.....

.....

.....

.....

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(5 marks)

5

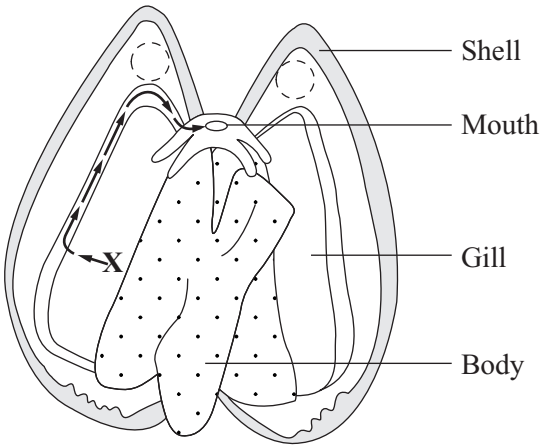
QUESTIONS RELATING TO PREVIOUSLY TESTED MODULES

15 (a) What does a mussel usually feed on?

.....

(1 mark)

(b) A group of students investigated feeding in mussels. They put some coloured starch grains on the gill at **X** and watched their movement. The results are shown in the diagram.



(i) Explain how the starch grains moved across the gill.

.....

.....

.....

.....

(2 marks)

(ii) The students repeated the experiment at a lower temperature. They saw that the starch grains moved more slowly.

Explain why the starch grains moved more slowly when the temperature was lower.

.....

.....

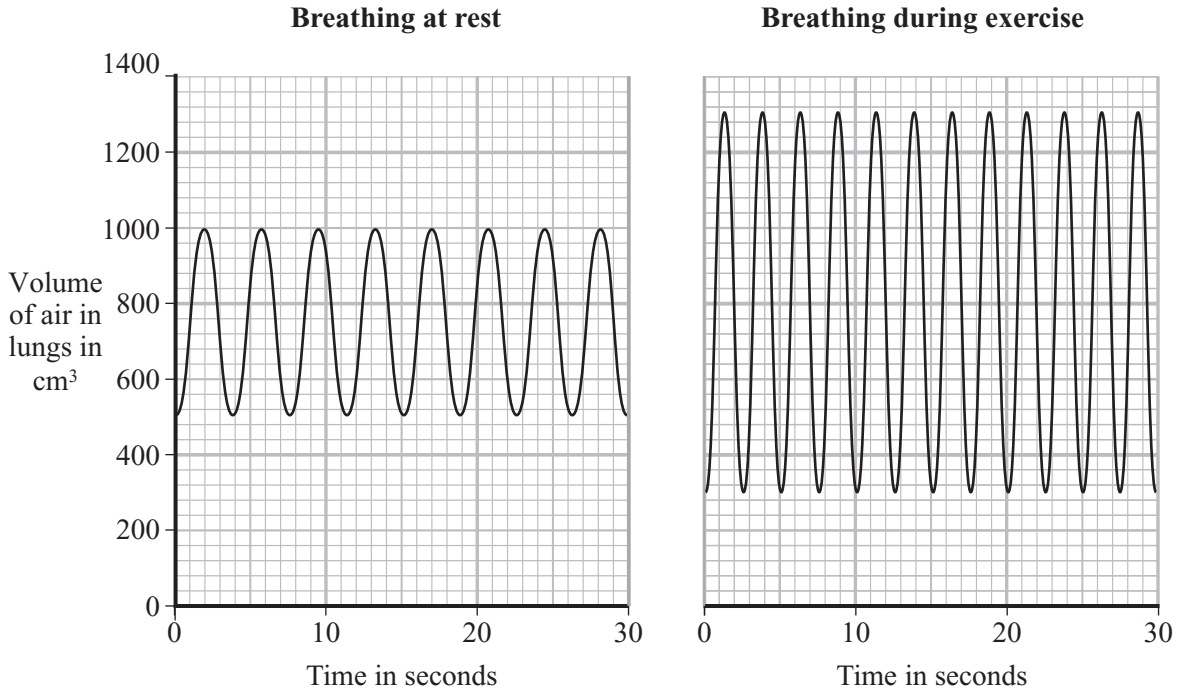
.....

.....

(2 marks)

5

16 The graphs show the effect of exercise on breathing.



(a) How does exercise affect breathing?

.....

.....

(2 marks)

(b) Explain why exercise affects breathing in this way.

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(2 marks)

(c) Calculate the breathing rate during exercise. Show your working.

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Breathing rate = ...breaths per minute
(2 marks)

6

END OF QUESTIONS

THERE ARE NO QUESTIONS PRINTED ON THIS PAGE