Rewarding Learning

Centre Number

71	

Candidate Number

General Certificate of Secondary Education
2014

Double Award Science: Biology

Unit B2

Foundation Tier

[GSD41]

ML

FRIDAY 6 JUNE 2014, AFTERNOON

TIME

1 hour 15 minutes, plus your additional time allowance.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
Write your answers in the spaces provided in this question paper.
Answer **all ten** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is **90**.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
Quality of written communication will be assessed in **question 8(b)**.

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
Total Marks	

Examiner Only	
Marks	Remark

1 Diseases can be caused by three types of microorganism; bacteria, fungi and viruses.

(a) Look at the lists below.

Draw lines from each type of microorganism to the disease that it causes.

Type of microorganism	Disease
Bacteria	Athlete's foot
Virus	Mumps
Fungus	Salmonella

[2]

Use the list above to answer questions (b) and (c).

(b) Write down the name of the **disease** caused by eating undercooked chicken.

_____ [1]

(c) Write down the name of the **type of microorganism** that can be treated by an antibiotic such as penicillin.

_____ [1]

(d) How can the spread of athlete's foot be prevented?

_____ [1]

Examiner Only	
Marks	Remark

2 Tobacco smoke contains substances that cause harmful effects on the body.

(a) Write down the name of three of these substances.

1. _____

2. _____

3. _____ [3]

(b) Choose one of these substances. Write about **two** harmful effects it has on the body.

Substance _____

Harmful effects on the body _____

_____

_____

_____ [2]

Cannabis is an illegal drug.

(c) Write about **one** harmful effect that taking cannabis has on a person.

_____

Write about **one** harmful effect that taking cannabis has on society.

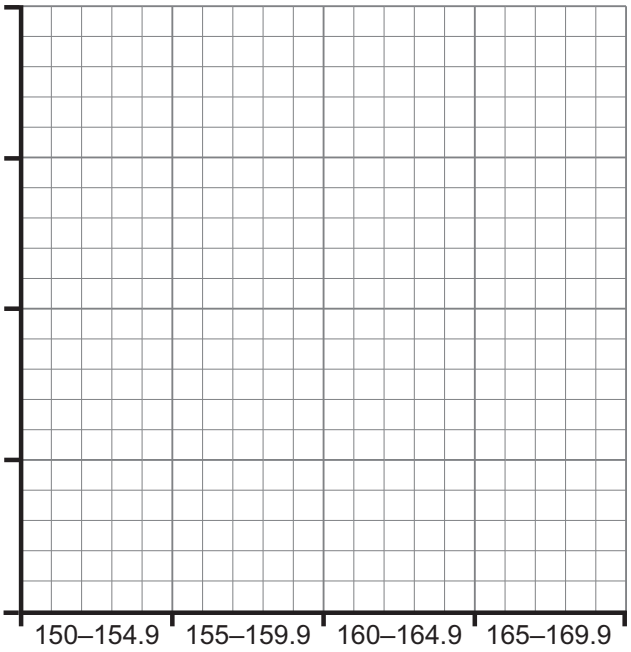
_____ [2]

Examiner Only	
Marks	Remark

3 **(a)** Twenty girls had their height measured on their sixteenth birthday. The number of girls in each height range is given in the table below.

Height range /cm	Number of girls
150–154.9	2
155–159.9	6
160–164.9	8
165–169.9	4

(i) On the grid below, plot a histogram using the data in the table.
Add a label and a scale to the y-axis.



[4]

(ii) Which height range is the most common for these girls?

_____ cm [1]

(iii) The difference in height is an example of variation.
Write down the two factors that cause variation in height.

1. _____

2. _____ [2]

(b) The same twenty girls were tested to see if they could roll their tongues.

The photograph shows a girl who can roll her tongue.

© Herve Conge, ISM / Science Photo Library

60% of the girls were able to roll their tongues.

(i) What **percentage** of the girls were **not** able to roll their tongues?

_____% [1]

(ii) How **many** of the twenty girls were **not** able to roll their tongues?

Show your working.

_____ [2]

(c) What type of variation is shown by the girls being able or not able to roll their tongues?

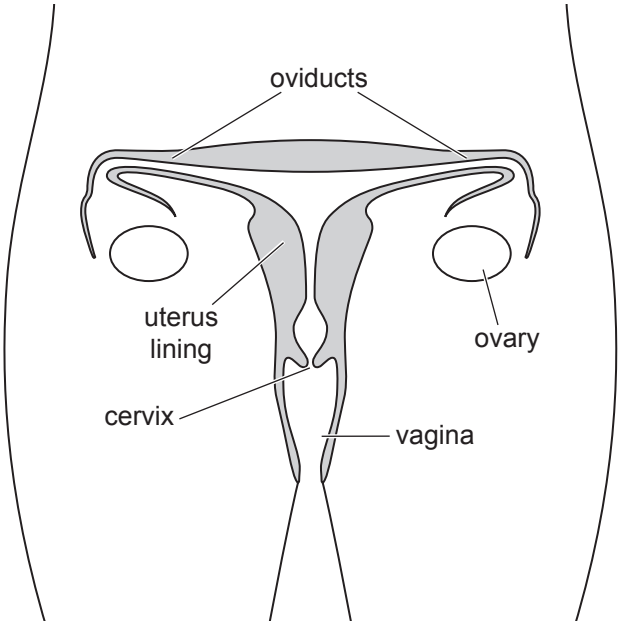
Underline the correct answer from the list below.

continuous **normal** **discontinuous** [1]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

4 **(a)** Look at the diagram below. It shows part of the female reproductive system.



(i) On the diagram, draw an X to show where a sperm nucleus fuses with an egg nucleus. [1]

(ii) Write down the name of the process that happens when a sperm nucleus fuses with an egg nucleus.

_____ [1]

After a sperm nucleus fuses with an egg nucleus, a zygote is formed. This divides to form a ball of cells.

(iii) Write down the name of the type of cell division which happens to form a ball of cells.

_____ [1]

After the ball of cells has developed, implantation happens.

(iv) Write down the name of the part of the female reproductive system where implantation happens.
Use the diagram to help you.

_____ [1]

After implantation, the placenta develops. The placenta allows substances to pass across from the mother to the foetus and from the foetus to the mother.

(v) Write down the name of two substances, needed by the foetus, that pass across the placenta **from the mother** to the foetus.

1. _____

2. _____ [2]

Harmful substances like alcohol can also pass across the placenta from the mother to the foetus.

(vi) Write down **one** harmful effect of alcohol on the development of the foetus.

_____ [1]

(vii) Write about **one** way that the government could encourage pregnant women not to drink alcohol.

_____ [1]

(b) A sex hormone in females causes secondary sexual characteristics to develop.

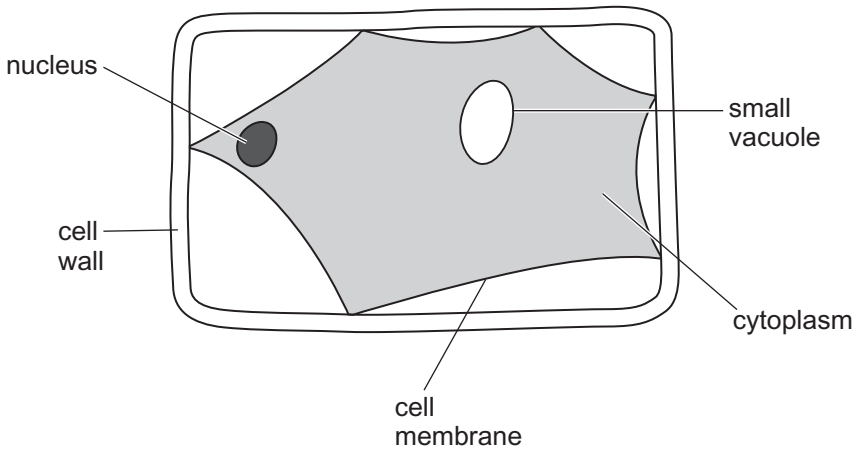
Fill in the table below.
Name the hormone and name the organ where the hormone is produced.
Write about and describe two secondary sexual characteristics that the hormone causes to develop.

Name of female sex hormone	Organ where produced	Secondary sexual characteristics developed
		1.
		2.

[4]

Examiner Only	
Marks	Remark

5 Look at the diagram below. It shows a plant cell as it would look under a microscope. The cell had been left in strong sugar solution for 30 minutes.



(a) What term describes the cell as it looks in the diagram?

_____ [1]

(b) Redraw the cell, **to the same scale**, as it would look after being left in water for 30 minutes.
Label the **cell wall**, **cell membrane** and **vacuole** on your drawing.

[4]

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(Questions continue overleaf)

Examiner Only	
Marks	Remark

6 **(a)** Immunity to disease is produced by increased antibody levels in the blood.

The four types of immunity are listed below.

- **Natural innate**
- **Natural acquired**
- **Artificial active**
- **Artificial passive.**

(i) Which type of immunity, from the list above, best describes getting a disease and then recovering from the disease?

_____ [1]

(ii) Which type of immunity, from the list above, best describes a person getting ready-made antibodies against a disease such as tetanus?

_____ [1]

(b) Look at photograph below. It shows the type of mosquito that can carry the virus that causes the disease yellow fever. When a person is bitten by this type of mosquito, the virus can be passed to that person. Approximately 7% of people who catch yellow fever die from it within three weeks.

© Sinclair Stammars/ Science Photo Library

Paul is planning to visit Africa and has been advised to be vaccinated against yellow fever before he travels.

Write down two reasons why Paul should be vaccinated before he travels.

1. _____

2. _____ [2]

(c) The MMR vaccine gives immunity against measles, mumps and rubella.

The table below shows the percentage of the population who got the MMR vaccine in 2011, in the different regions of the United Kingdom.

Region of United Kingdom	Percentage of the population who got the MMR vaccine
England	89.1
Wales	91.5
Scotland	93.2
Northern Ireland	92.9

(i) Work out the difference in the percentage of the population who got the MMR vaccine in Northern Ireland compared to England.

_____ % [1]

In 2011, there were fewer cases of measles in Northern Ireland than in England.

(ii) Write down **one** reason why there were fewer cases of measles in Northern Ireland than in England, in 2011.

_____

_____ [1]

(iii) Write down the name of the scientist who developed the first vaccine.

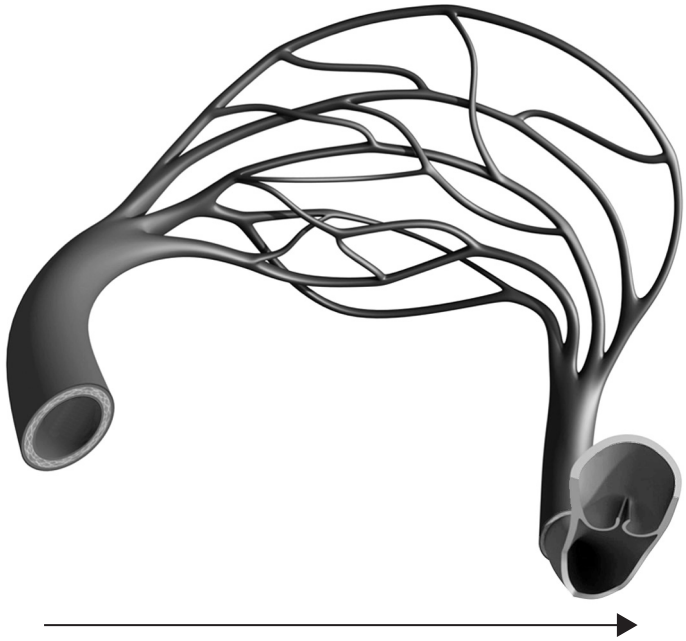
_____ [1]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

7 **(a)** Look at the diagram below. It shows an artery and a vein connected by capillaries. Veins have valves. Arteries and capillaries do not have valves.



direction of blood flow

(i) Using the information given and your knowledge, label the vein on the diagram. [1]

(ii) What is the function of valves in a vein?

_____

_____ [1]

(iii) Write down two differences between blood flowing in an artery and blood flowing in a vein.

1. _____

2. _____ [2]

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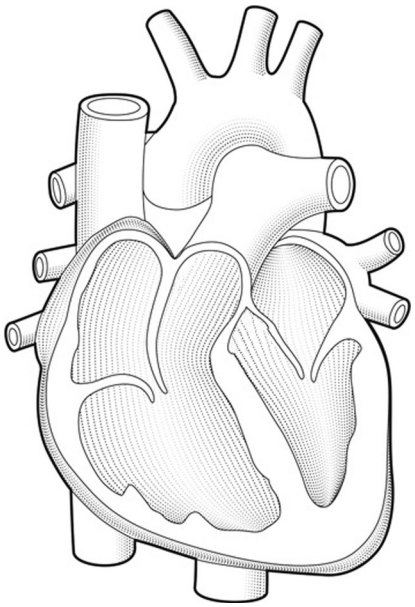
(Question 7 continues overleaf)

Examiner Only	
Marks	Remark

(b) The heart pumps blood around the body.

The diagram below shows a section through the heart.



© Paul Wootton/ Science Photo Library

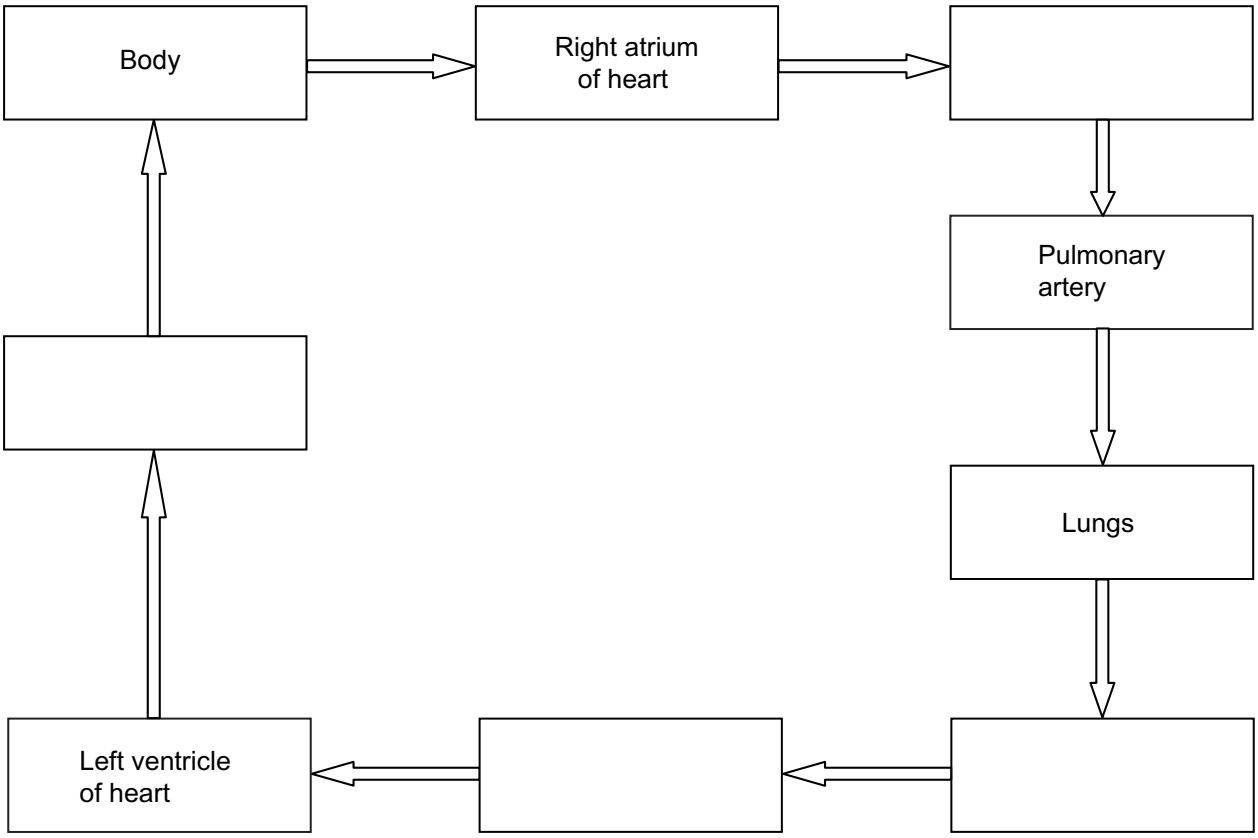
(i) On the diagram, label the left ventricle and the pulmonary artery. [2]

Blood passes through the heart twice during one complete circuit of the body.

(ii) What name describes the passage of blood twice through the heart during one complete circuit of the body?

_____ [1]

(iii) In the diagram below, fill in the empty boxes to show the passage of blood through the heart and around the body.
The empty boxes show heart chambers or blood vessels.



[4]

(iv) Write the name of the blood vessel which brings oxygenated blood to the liver.

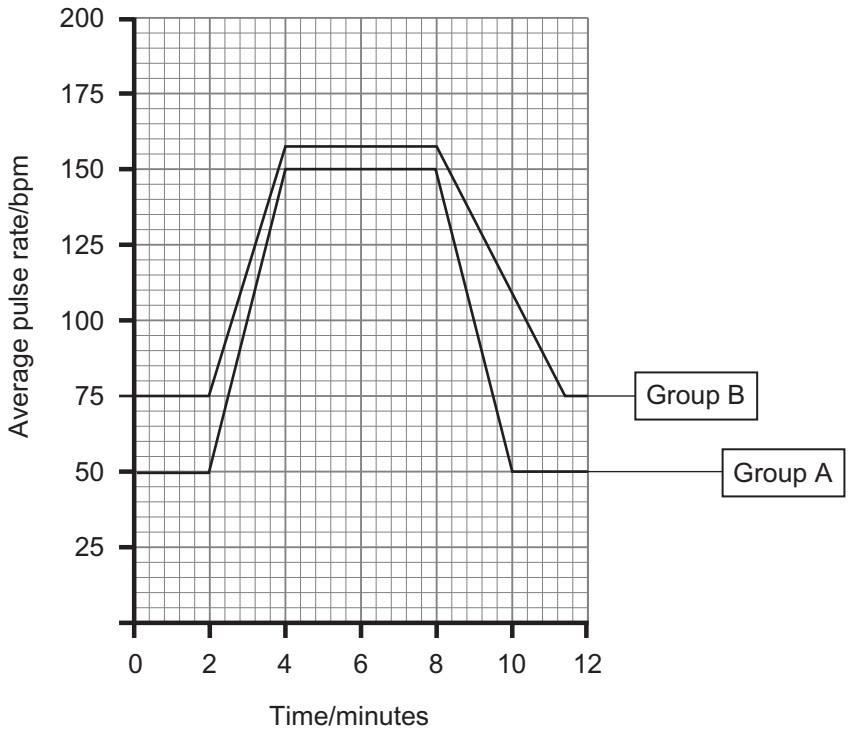
_____ [1]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

8 **(a)** Look at the graph below. It shows the average pulse (heart) rates of two groups of students before exercise, during exercise and after exercise.

The pulse rates are measured in beats per minute (bpm).



(i) When did the students start to exercise?
Use the graph to answer this question.

_____ min [1]

(ii) Write down three differences in the average pulse rates between Group A and Group B.
Use the graph to answer this question.

1. _____

2. _____

3. _____ [3]

(iii) Students in Group A exercise regularly.
Write down two ways that regular exercise helps the **circulatory system**.

1. _____

2. _____ [2]

(b) A person needs a balanced diet that is low in cholesterol to have a healthy heart.

Write about and explain how a diet that is high in cholesterol could cause a heart attack.

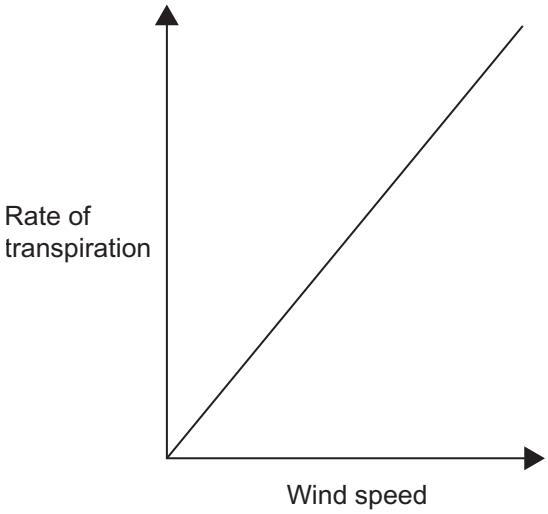
In this question you will be assessed on your written communication skills, including the use of specialist scientific terms.

[6]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

9 **(a)** Look at the graph below. It shows the effect of increasing wind speed on the rate of transpiration in plants.



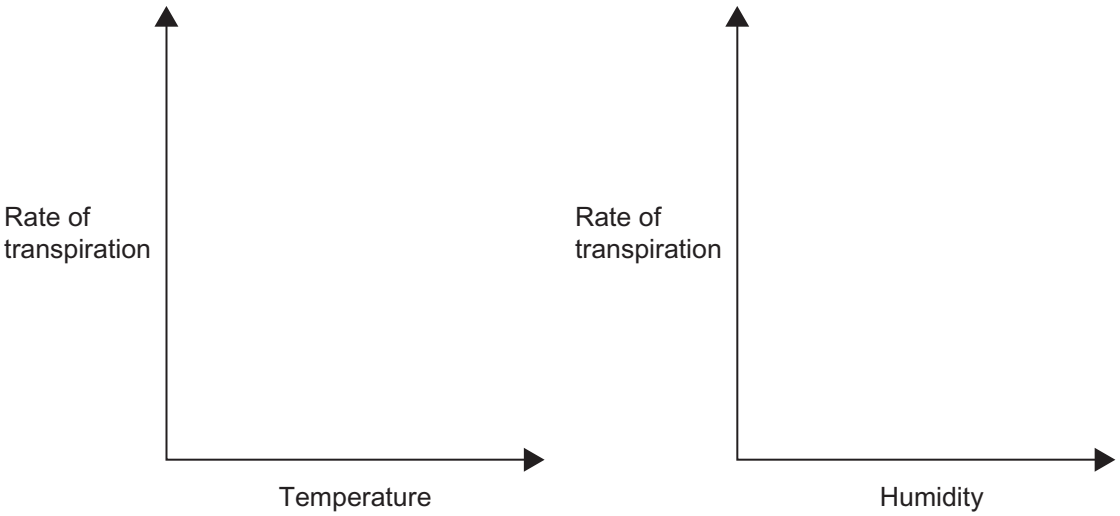
(i) Write about and describe the trend shown in the graph above.

_____

_____ [1]

Two other factors that affect the rate of transpiration in plants are temperature and humidity.

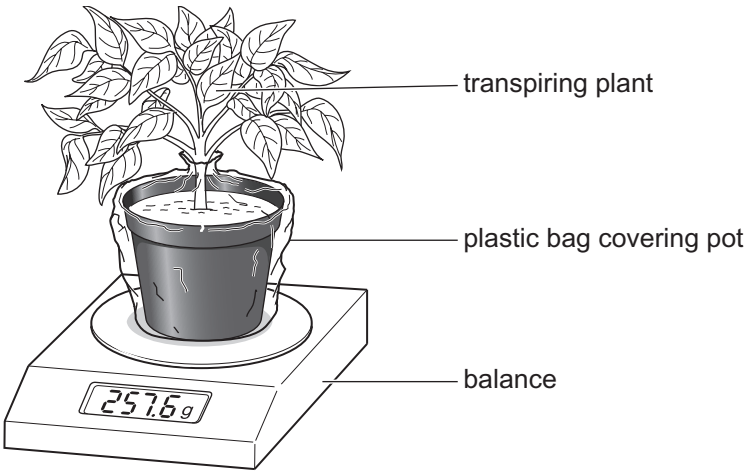
(ii) Draw a line to show the effect of increasing temperature on the rate of transpiration on the first axis below.
Draw a line to show the effect of increasing humidity on the rate of transpiration on the second axis below.



[2]

Examiner Only	
Marks	Remark

(b) Look at the diagram below. It shows apparatus used to investigate the effect of surface area of leaves on the rate of transpiration in a plant.



© CCEA

(i) Why was the pot covered with a plastic bag?

_____ [1]

The plant was weighed and left for **24 hours**. It was then reweighed.

The **rate** of transpiration was worked out as 3.8 g per hour.

Some leaves were removed from the plant and the experiment was repeated.

The table below shows the result for the second experiment.

Mass of plant at start /g	Mass of plant after 24 hours /g
257.6	185.6

(ii) Work out the rate of transpiration (in g per hour) in the second experiment.
Use the data in the table above to do this.

Show your working out.

_____ g per hour [2]

(iii) Write about and explain why the rate of transpiration is lower when some leaves were removed.

_____

_____ [2]

(iv) Plants use water in transpiration.

Write down two **other** ways that plants use water.

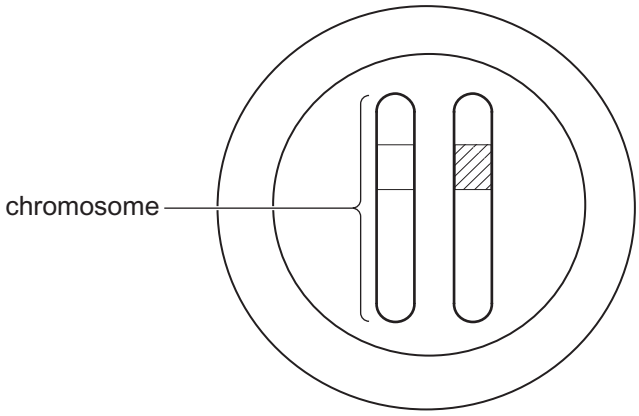
1. _____

2. _____ [2]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

10 **(a)** Look at the diagram below. It shows a cell that has a nucleus with two chromosomes.



(i) Write the name of the molecule that makes up chromosomes.

_____ [1]

(ii) Draw the cells and chromosomes that would be produced when this cell divides by **mitosis**. Do this in the space below.

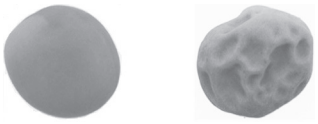
[3]

Examiner Only	
Marks	Remark

(b) Genes control characteristics in organisms.

Peas can be smooth or wrinkled.

This characteristic is shown in the photograph below.



smooth wrinkled

© Walter Eberhart, Visuals Unlimited/ Science Photo Library

Let H represent the allele for smooth peas.

Let h represent the allele for wrinkled peas.

(i) Using a Punnett square, show the possible offspring produced when a heterozygous, smooth pea plant is crossed with a wrinkled pea plant.

[4]

(ii) Using your Punnett square, write down the ratio of smooth pea plants to wrinkled pea plants.

_____

[1]

THIS IS THE END OF THE QUESTION PAPER

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