Rewarding Learning

Centre Number

71	

Candidate Number

General Certificate of Secondary Education
2014

Double Award Science: Biology

Unit B2

Foundation Tier

[GSD41]

GSD41

FRIDAY 6 JUNE 2014, AFTERNOON

TIME

1 hour 15 minutes.

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 to link each type of microorganism to the disease that it causes.

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

[2]

(b) Which one of the diseases, in the list above, could be caused by eating undercooked chicken?

_____ [1]

(c) Name the type of microorganism, in the list above, that can be treated by an antibiotic such as penicillin.

_____ [1]

(d) Suggest how the spread of athlete's foot can be prevented.

_____ [1]

Examiner Only	
Marks	Remark

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

(a) Name three of these substances.

1. _____

2. _____

3. _____ [3]

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

Substance _____

Harmful effects on the body _____

_____

_____

_____ [2]

Cannabis is an illegal drug.

(c) Suggest **one** harmful effect on the individual and **one** harmful effect on society of using cannabis.

Individual _____

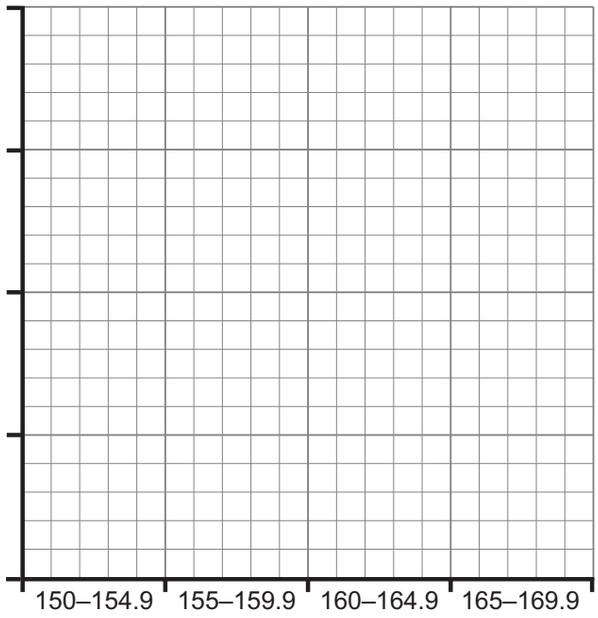
Society _____ [2]

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.
Give 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?

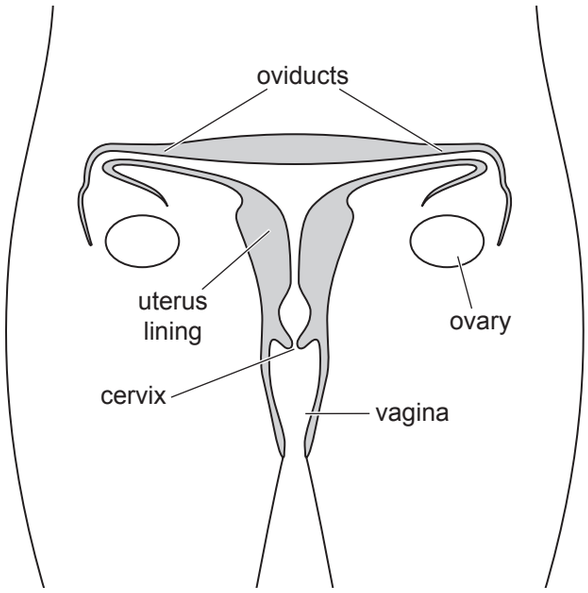
Underline the correct answer from the list below.

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

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

4 **(a)** The diagram below 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) Name the process that occurs 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) Name the type of cell division which occurs to form a ball of cells.

_____ [1]

Development of a ball of cells is followed by implantation.

(iv) Name the structure, labelled on the diagram, where implantation occurs.

_____ [1]

Examiner Only	
Marks	Remark

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) Name 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) Suggest **one** harmful effect of alcohol on the development of the foetus.

_____ [1]

(vii) Suggest **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.

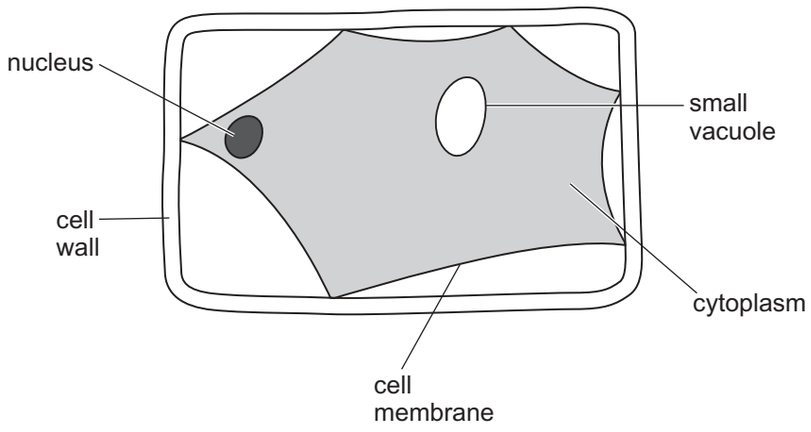
Complete the table by naming this hormone, naming the organ where it is produced and describing two secondary sexual characteristics that it causes to develop.

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

[4]

Examiner Only	
Marks	Remark

5 The diagram below shows a plant cell as seen under a microscope.
The cell had been left in strong sugar solution for 30 minutes.



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

_____ [1]

(b) Redraw the cell, **to the same scale**, as it would appear 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 raised 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, in the list above, best describes catching a disease and then recovering from the disease?

_____ [1]

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

_____ [1]

(b) The photograph below shows the type of mosquito which 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.

Suggest 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 received the MMR vaccine in 2011, in the different regions of the United Kingdom.

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

(i) Calculate the difference in the percentage of the population who received 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) Suggest **one** reason why there were fewer cases of measles in Northern Ireland than in England, in 2011.

_____

_____ [1]

(iii) Name the scientist who developed the first vaccine.

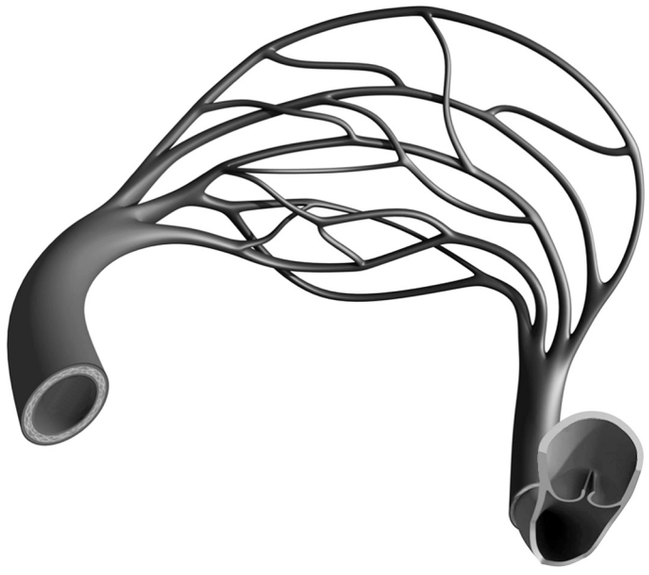
_____ [1]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

7 **(a)** The diagram below 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) Give two differences between blood flowing in an artery and a vein.

1. _____

2. _____ [2]

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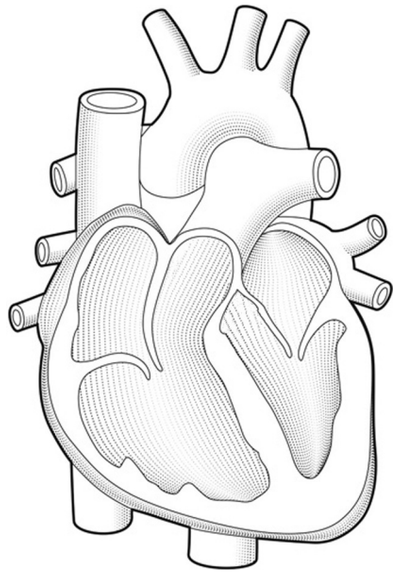
(Question 7 continues overleaf)

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

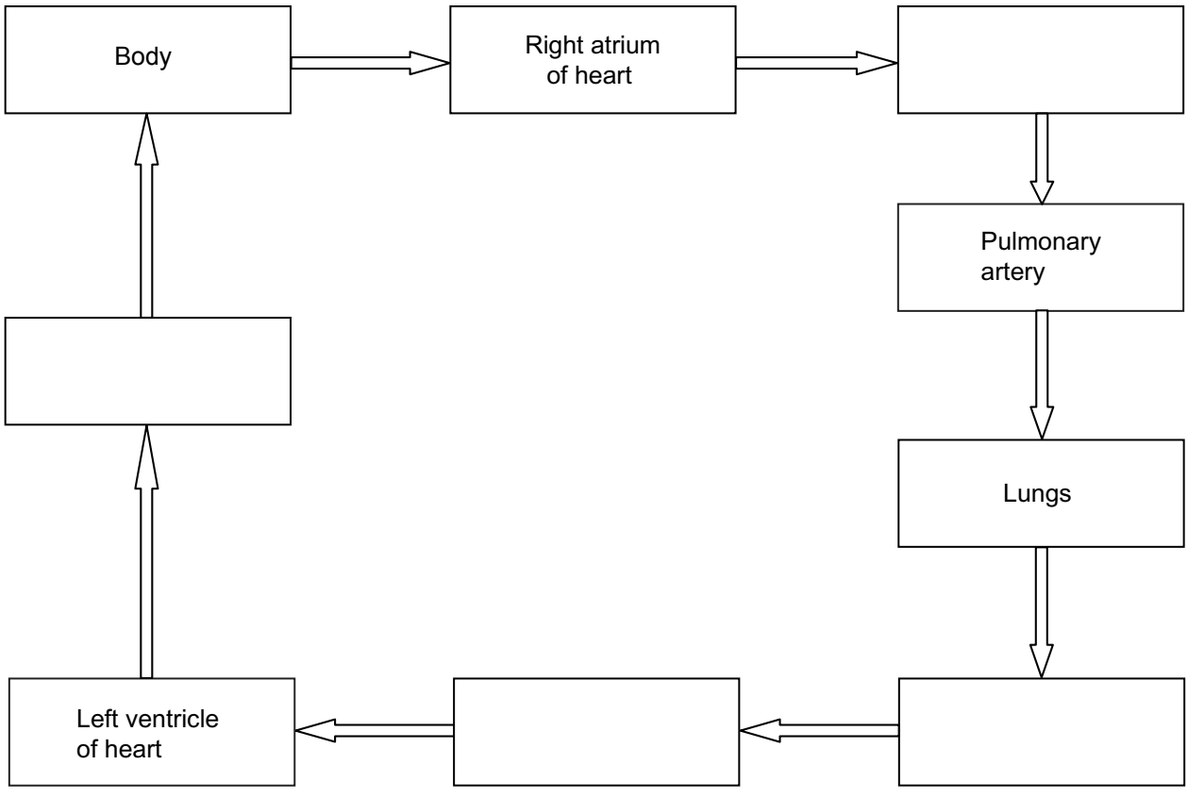
(i) On the diagram, label the left ventricle and the pulmonary artery. [2]

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

(ii) What term is used to describe 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 represent heart chambers or blood vessels.



[4]

(iv) Name the blood vessel which brings oxygenated blood to the liver.

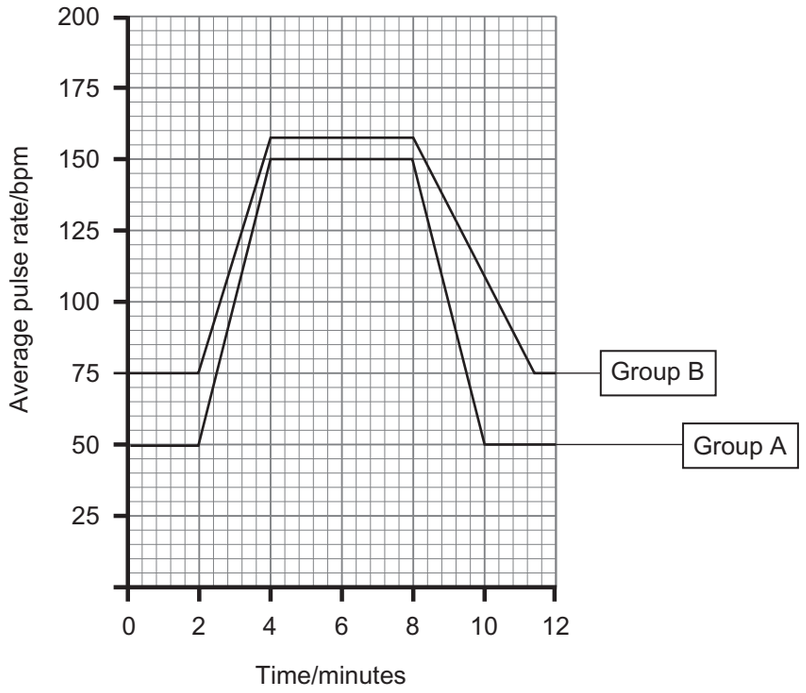
_____ [1]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

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

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



(i) Using the graph, give the time when the exercise started.

_____ min [1]

(ii) Using the graph, give three differences in the average pulse rates between Group A and Group B.

1. _____

2. _____

3. _____ [3]

(iii) Students in Group A take regular exercise.
Give two ways that the **circulatory system** benefits from regular exercise.

1. _____

2. _____ [2]

(b) To maintain a healthy heart, a person needs a balanced diet which is low in cholesterol.

Describe and explain how a diet which is high in cholesterol could lead to a heart attack.

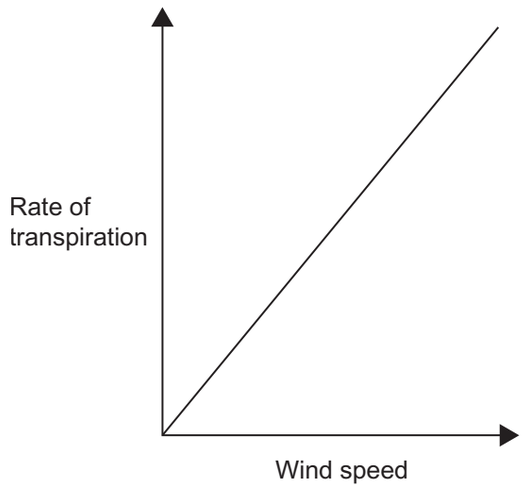
In this question you will be assessed on your written communication skills, including the use of specialist scientific terms.

[6]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

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



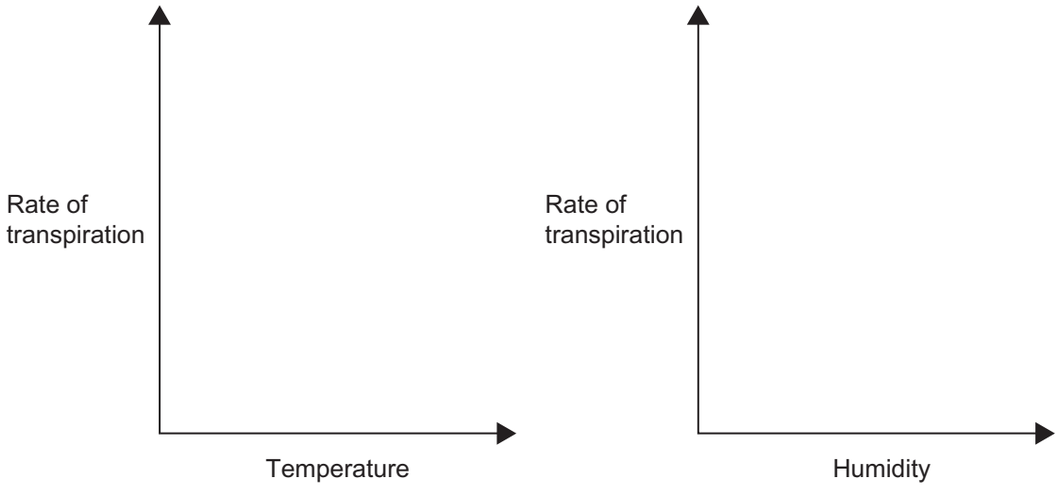
(i) Using the graph, describe the trend shown.

_____

_____ [1]

Temperature and humidity are two other factors that have an effect on the rate of transpiration in plants.

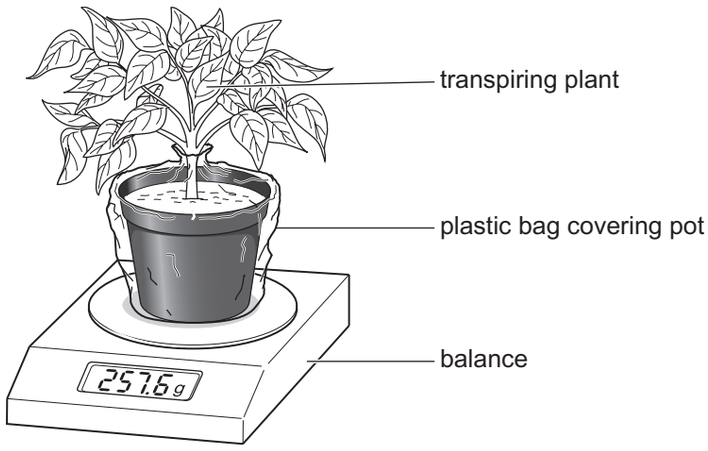
(ii) On the axes below, draw a line to show the effect of increasing temperature and a line to show the effect of increasing humidity on the rate of transpiration.



[2]

Examiner Only	
Marks	Remark

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



(i) Suggest why the pot was covered with a plastic bag.

_____ [1]

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

The **rate** of transpiration was calculated 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) Using the data in the table above, calculate the rate of transpiration (in g per hour) in the second experiment.

Show your working.

_____ g per hour [2]

(iii) Explain why the rate of transpiration is lower when some leaves were removed.

_____

_____ [2]

(iv) Plants use water in transpiration.

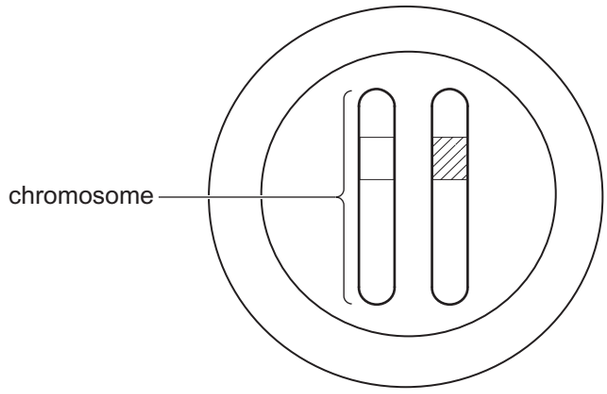
Give two **other** uses of water by a plant.

1. _____

2. _____ [2]

Examiner Only	
Marks	Remark

10 (a) The diagram below shows a cell containing a nucleus with two chromosomes.



(i) Name the molecule that makes up chromosomes.

_____ [1]

(ii) In the space below, draw the cells and chromosomes that would be produced when this cell divides by **mitosis**.

[3]

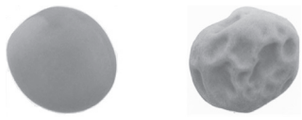
Examiner Only	
Marks	Remark

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, give the ratio of smooth pea plants to wrinkled pea plants.

_____ [1]

THIS IS THE END OF THE QUESTION PAPER

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