



General Certificate of Secondary Education  
2017–2018

Centre Number

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Candidate Number

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# Science: Single Award

Unit 1 (Biology)  
Higher Tier



[GSS12]

**WEDNESDAY 21 FEBRUARY 2018, MORNING**

## 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

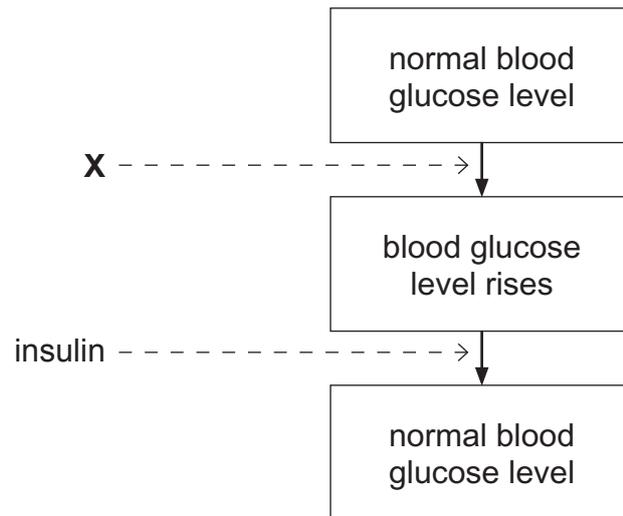
The total mark for this paper is 75.

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 Questions **4** and **10**.

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

- 1 (a) The flow diagram below summarises the action of insulin in a person.



- (i) Explain fully what this person must have done at **X**.

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[2]

- (ii) Complete the following sentences about insulin.

Insulin changes glucose into \_\_\_\_\_.

This is then stored by the body in the \_\_\_\_\_. [2]

Examiner Only	
Marks	Remark

- (b) People with Type 1 diabetes have to inject themselves with insulin every day for life. They are advised to take regular exercise and eat a balanced diet.

They have to monitor their blood glucose regularly using special instruments so they know how much insulin to inject.

People who have had diabetes for many years or those who have not controlled their blood glucose well are at risk of complications.

Around 10% of the NHS budget is spent on diabetes.

- (i) Using the information provided and your knowledge, suggest **two** reasons why the treatment of diabetes is so expensive.

1. \_\_\_\_\_

2. \_\_\_\_\_ [2]

- (ii) State **one** long-term effect (complication) of diabetes.

\_\_\_\_\_ [1]

- (iii) Give **one** difference between Type 1 and Type 2 diabetes.

\_\_\_\_\_

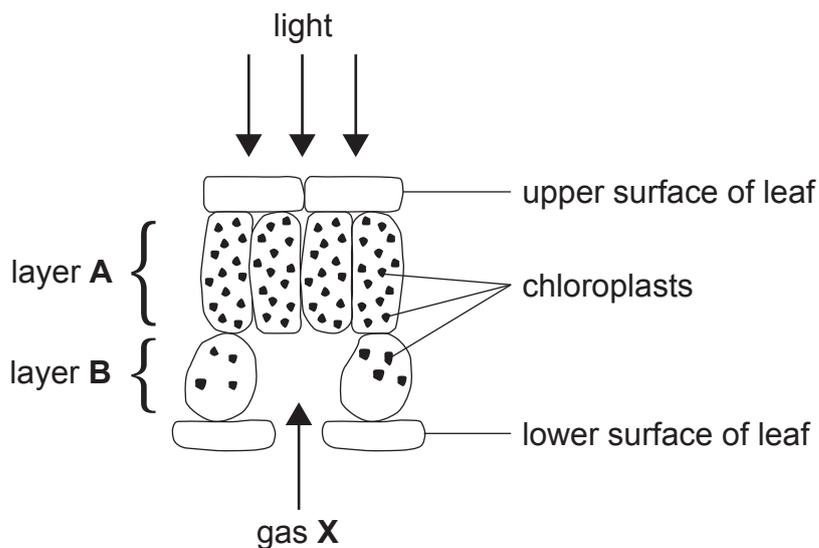
\_\_\_\_\_ [1]

Examiner Only

Marks

Remark

- 2 (a) The diagram below represents a section through a plant leaf during the day. Photosynthesis takes place in chloroplasts.



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- (i) Using the information given, suggest **two** reasons why more photosynthesis takes place in layer **A** than layer **B**.

1. \_\_\_\_\_
2. \_\_\_\_\_ [2]

- (ii) Name the gas labelled **X** that is used in photosynthesis.

\_\_\_\_\_ [1]

- (b) Name the **two** products of photosynthesis.

1. \_\_\_\_\_
2. \_\_\_\_\_ [2]

Examiner Only	
Marks	Remark

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**(Questions continue overleaf)**

3 (a) Vaccinations involve injecting dead or modified microorganisms into people. Normally the vaccination makes individuals immune to the disease that the microorganism causes.

(i) Why must the microorganisms in the vaccination be dead or modified?

\_\_\_\_\_  
\_\_\_\_\_ [1]

(ii) Explain fully how a vaccination helps provide immunity.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ [3]

(b) Colds and flu are caused by viruses. There are many different types of flu and cold viruses. Catching the flu can make people feel very unwell whereas a cold usually has much less of an effect. Elderly people and people with conditions such as diabetes are offered a flu vaccination each year.

(i) Suggest why elderly people are offered a flu vaccination each year.

\_\_\_\_\_  
\_\_\_\_\_ [1]

(ii) Use the information provided to suggest **one** reason why a vaccination to protect against colds has not been developed.

\_\_\_\_\_  
\_\_\_\_\_ [1]

Examiner Only

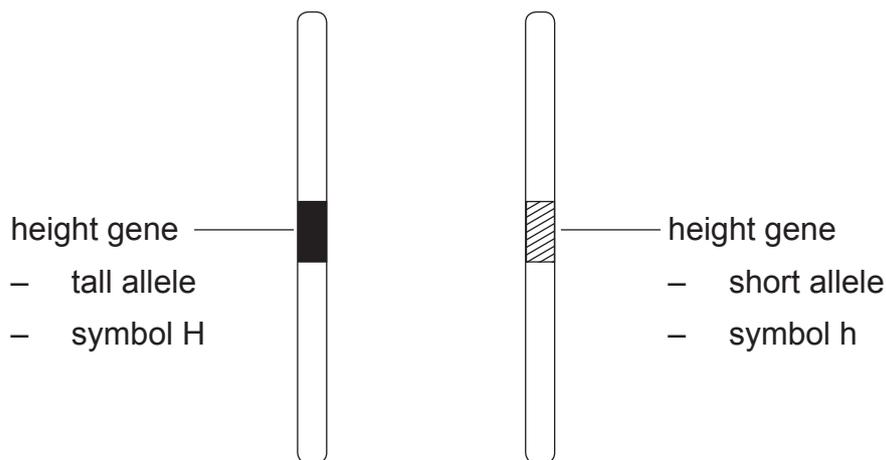
Marks Remark





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5 The diagram below represents a pair of chromosomes showing the genes for height.



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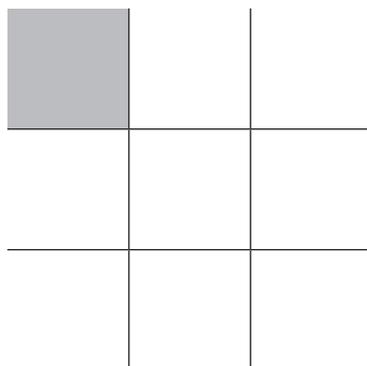
One chromosome carries the allele for tall (H) and the other the allele for short (h). The allele H is dominant to the allele h.

(a) What term is used to describe two different alleles for one gene on a pair of chromosomes?

\_\_\_\_\_

[1]

(b) (i) Using the Punnett square below, show the offspring produced by crossing the genotype shown in the diagram above with the genotype hh.



[2]

Examiner Only	
Marks	Remark

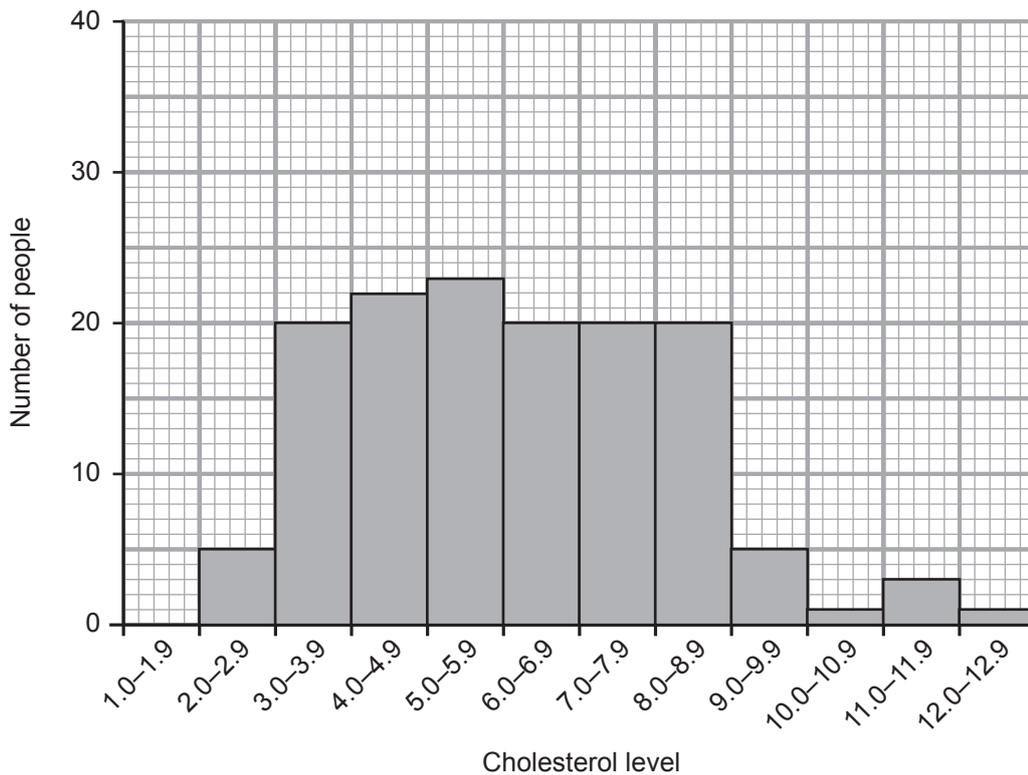
- (ii) Complete the table below to give the phenotype for each genotype in your Punnett square.

Genotype	Phenotype

[2]

Examiner Only	
Marks	Remark

- 6 (a) The graph below shows the cholesterol levels of 140 people who were tested at a clinic in one day.



© CCEA

It is recommended that adults have a cholesterol level of less than 6.

- (i) How many people had a cholesterol level higher than the recommended value?

Answer \_\_\_\_\_ [1]

- (ii) Name the type of variation shown by the data in the graph. Explain your answer.

Type of variation \_\_\_\_\_

Explanation \_\_\_\_\_

\_\_\_\_\_ [2]

Examiner Only	
Marks	Remark

(b) High cholesterol levels are regarded as a dietary risk factor for heart disease.

Explain how high cholesterol levels can result in a heart attack.

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[3]

Examiner Only	
Marks	Remark

7 Antibiotics are medicines that are used to stop or reduce bacterial infections.

(a) Describe how the first antibiotic was discovered.

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[3]

Lung infections are often spread by people sneezing and coughing. This sprays the disease-causing microorganisms into the air and these can then be breathed in by others. Lung infections are often treated with antibiotics and since their discovery the number of people infected has reduced.

(b) Using the information provided, explain how antibiotics have reduced the number of people getting lung infections.

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[2]

(c) Doctors are worried that changes to the DNA in the bacteria that cause lung infections could lead to pandemics in the future.

(i) What name is given to a change to DNA in a cell?

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[1]

(ii) Explain how changes to the DNA in disease-causing bacteria could lead to a pandemic.

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[2]

(iii) Describe how a pandemic differs from an epidemic.

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[1]

Examiner Only

Marks Remark

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- 8 (a) The proportion of the Earth's crops that are Genetically Modified (GM) has increased significantly in recent years. The USA, many South American countries and some European countries grow a wide range of GM crops.

Some types of tomato are produced using GM technology. Many varieties of GM tomatoes remain ripe for much longer than ordinary tomatoes. Some varieties are also seedless.

- (i) Define the term GM crop.

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 [2]

- (ii) Using the information provided, suggest **one** reason why the sale of GM tomatoes has increased over time. Explain your answer.

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 [2]

The image below shows two anti-GM crop campaigners dressed in protective clothing and holding GM tomatoes.



© Cristina Pedrazzini / Science Photo Library

- (iii) Suggest the message that campaigners are trying to give about GM crops.

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 [1]

Examiner Only	
Marks	Remark

- (b) Apart from the information provided, give **one** advantage and **one** disadvantage of GM crops.

Advantage \_\_\_\_\_

Disadvantage \_\_\_\_\_ [2]

- (c) Scientific understanding of GM crops and other developments in the area of gene technology have been the result of the collaborative nature of science.

Explain what is meant by the collaborative nature of science.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_ [2]

- (d) (i) Genetic screening is also a relatively recent technology. Define the term genetic screening.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_ [2]

- (ii) Suggest why many people are opposed to genetic screening.

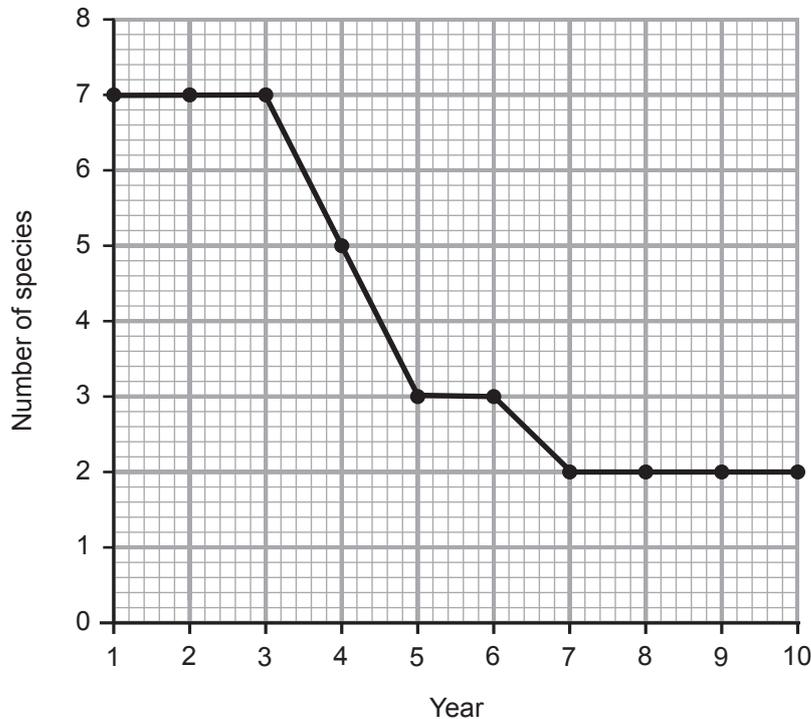
\_\_\_\_\_

\_\_\_\_\_ [1]

Examiner Only	
Marks	Remark

- 9 (a) Apart from grass, the only species of plants able to grow in regularly cut lawns are those that grow very close to the ground such as daisies and buttercups. 'Tall' plants get cut by lawnmowers and don't get a chance to grow.

The number of species found in one newly-sown lawn was counted every June for a ten-year period. The results are shown in the graph below.



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- (i) Describe fully the trend shown by these results.

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[2]

- (ii) During this ten-year period the house owner bought a new lawnmower that was able to cut much closer to the ground. Suggest when this may have happened.

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[1]

- (iii) Suggest why it was important to count the number of species at the same time each year.

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[1]

Examiner Only	
Marks	Remark

**(b)** Change in the number of species in an area is often the result of natural selection.  
In terms of natural selection, explain the change in species number in this lawn.

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[3]

**(c)** Explain the difference between an endangered and an extinct species.

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[2]

Examiner Only	
Marks	Remark









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