Rewarding Learning

Centre Number

71	

Candidate Number

General Certificate of Secondary Education
2013–2014

Science: Single Award

Unit 1 (Biology)

Foundation Tier

[GSS11]

GSS11

WEDNESDAY 13 NOVEMBER 2013, AFTERNOON

TIME

1 hour.

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 nine** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 60.
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 **9**.

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

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Examiner Only	
Marks	Remark

1 **(a)** Complete the following sentences about the voluntary and reflex actions of humans.

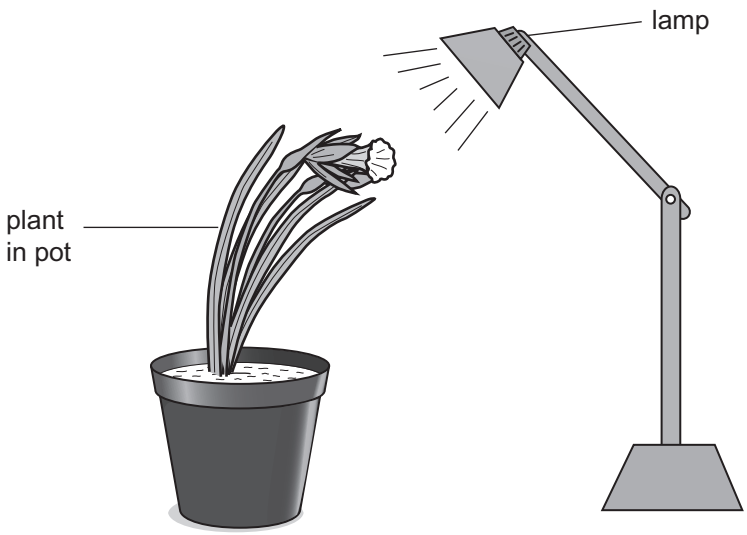
Choose from:

slow **hand** **brain** **fast**

Reflex actions are usually _____ and they help prevent injury. Unlike reflex actions, voluntary actions are controlled by the

_____ . [2]

(b) The diagram below shows a plant growing towards the light.



(i) What name is given to this response by the plant?

Choose from:

photosynthesis **phototropism** **respiration**

_____ [1]

(ii) Explain fully how this benefits the plant.

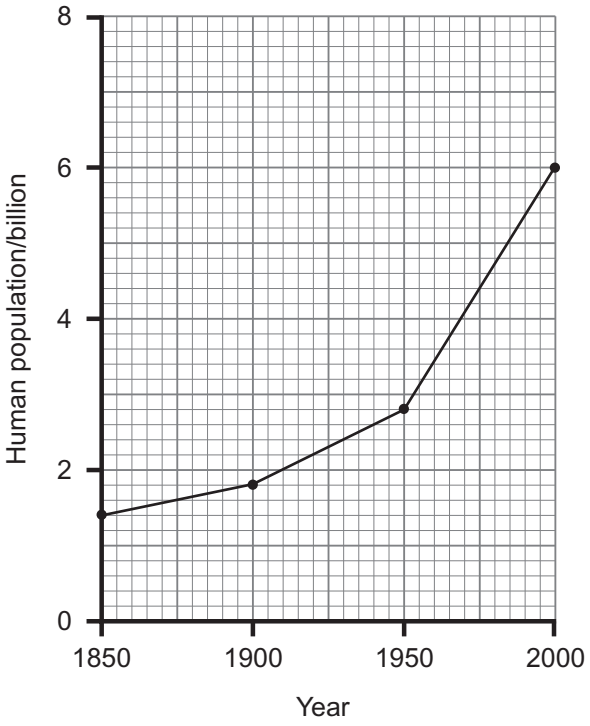
_____

_____

_____ [2]

Examiner Only	
Marks	Remark

2 **(a)** The following graph shows the change in human population between the years 1850 and 2000.



(i) Calculate the change in population from 1850 to 2000.

(Show your working out.)

_____ billion [2]

(ii) Describe the trend shown by the graph.

_____

_____ [1]

(b) Suggest **two** reasons to explain the change in human population size after 1850.

1. _____

2. _____ [2]

(c) Given below are two examples of pollution caused by humans. Using lines, link each example of pollution to **one** method of reducing its effect.

Example of pollution	Method to reduce effect
acid rain	better storage of slurry
nitrate in water	using renewable fuels
	planting more trees

[2]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

3 **(a)** The table below gives information about some food tests.

(i) Complete the table by giving the correct food group for each test.

Choose from:

starch **fat** **sugar** **protein**

Food group	Test	Result if food group is present
	Benedict's	changes from blue to red when heated
	Biuret	changes from blue to lilac
	emulsion	a white emulsion when shaken with water

[3]

(ii) What is the function of water in our body?

_____ [1]

(b) A change in lifestyle can reduce the risk of having a heart attack, for example by taking more exercise.

(i) Why does increased exercise help prevent heart disease?

Circle **two** correct answers.

reduces salt levels

prevents obesity

produces more energy

reduces the amount of fat in blood

[2]

(ii) State **one** other lifestyle change that can reduce the risk of having a heart attack.

_____ [1]

(iii) Suggest **one** reason why the cost of treating heart disease in the United Kingdom is so expensive.

_____

_____ [1]

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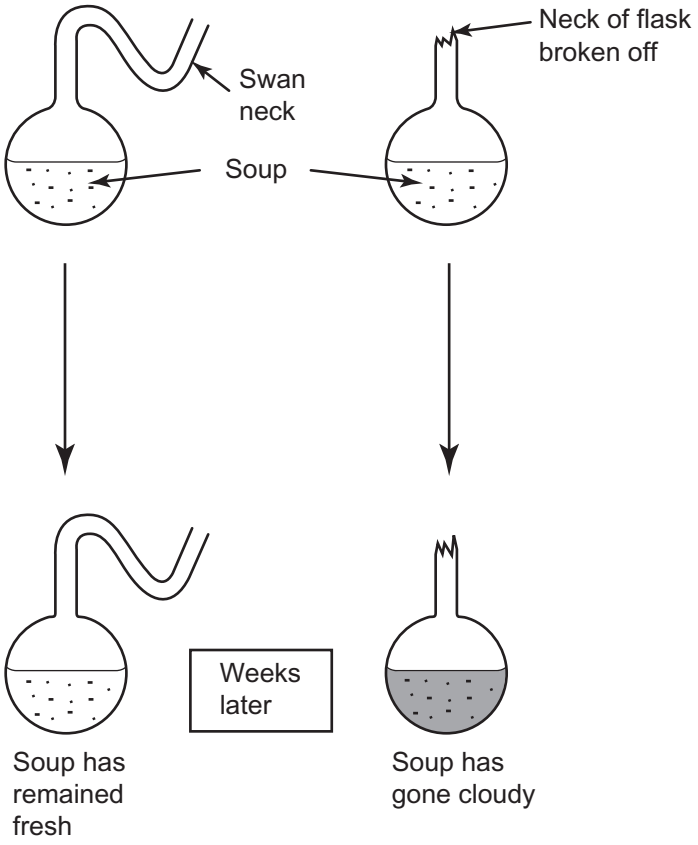
(Questions continue overleaf)

Examiner Only	
Marks	Remark

4 **(a)** The following diagram shows Louis Pasteur's experiment to find if microorganisms are the cause of food contamination.



Describe and explain the results of Pasteur's experiment.

_____

_____

_____ [2]

Microorganisms can cause harm to humans if they gain entry to the body.

(b) Describe how mucous membranes and blood clotting reduce the harm caused by microorganisms.

Mucous membranes _____

_____

Blood clotting _____

_____ [2]

(c) Sophie has a severe bacterial infection in her foot that needs treatment.
She thinks her doctor should give her either a vaccination or an antibiotic.
Vaccinations provide immunity but it can take weeks or months to make enough antibodies.

Should the doctor give Sophie a vaccination or an antibiotic? Fully explain your answer.

_____

_____

_____

_____

_____ [3]

Examiner Only	
Marks	Remark

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Examiner Only	
Marks	Remark

5 The holly tree produces evergreen leaves (leaves that remain on the tree all year). The leaves also have sharp protective spikes at their edges as shown in the photograph below.

Source: Photo: Chief Examiner

(a) Suggest **one** advantage to the holly tree in having:

(i) evergreen leaves. _____

_____ [1]

(ii) sharp spikes. _____

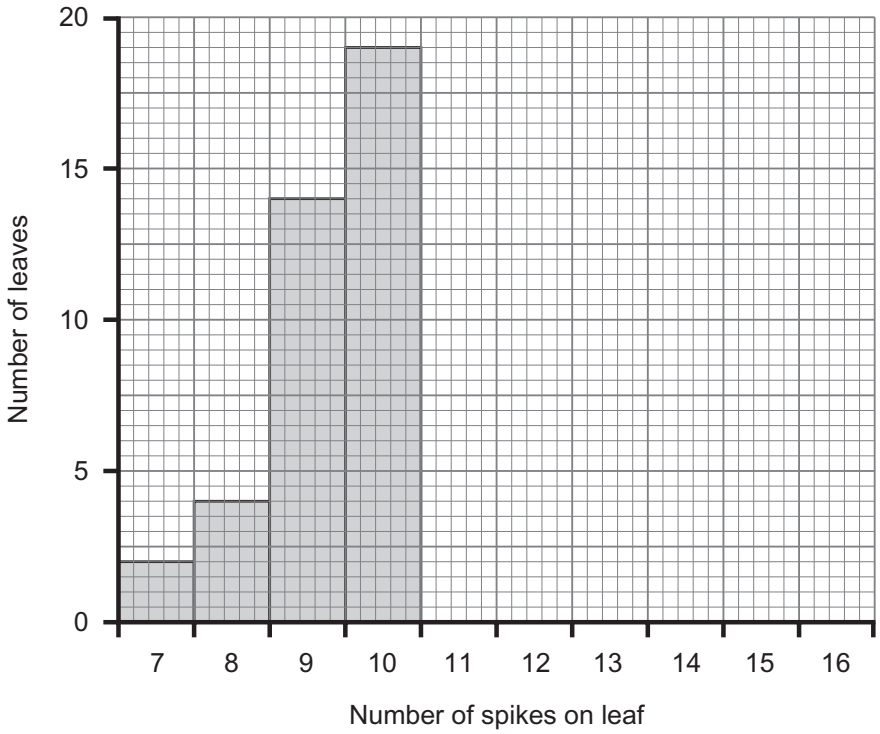
_____ [1]

Examiner Only	
Marks	Remark

(b) Pupils in a class collected a sample of leaves from a holly tree and counted the number of spikes on each leaf. Their results are shown in the table below.

Number of spikes on leaf	Number of leaves
7	2
8	4
9	14
10	19
11	12
12	14
13	10
14	6
15	3
16	2

(i) Use the information in the table to complete the histogram (graph) below.



[2]

(ii) How many leaves did the pupils collect?

_____ [1]

(iii) What is the most common number of spikes on the holly leaves?

_____ [1]

(iv) The variation shown by the holly leaves is discontinuous.
Describe what discontinuous variation is.

_____

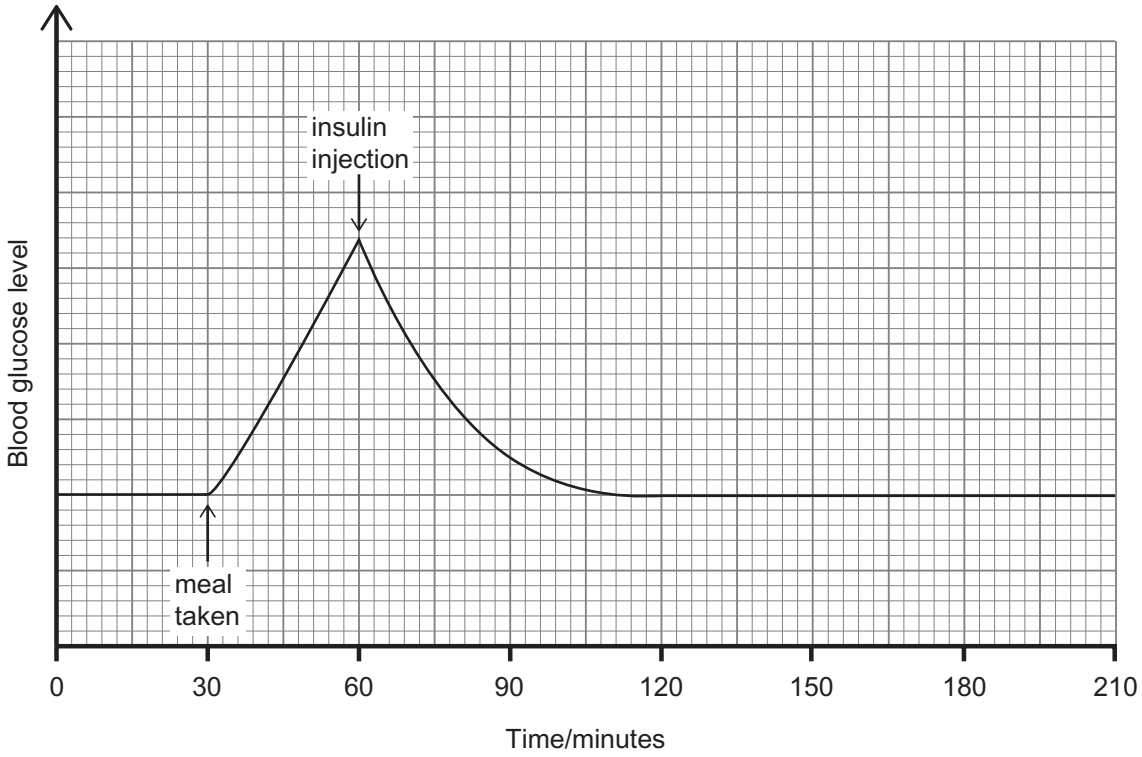
_____ [1]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

6 Hormones such as insulin are produced by the body. However, sometimes insulin is injected if a person has diabetes.

(a) The graph below shows how the blood glucose level in a person with diabetes changes because of a meal and an insulin injection.



(i) Describe and explain the effect of the insulin on blood glucose level.

_____

_____

_____ [2]

(ii) Use the information provided to suggest which type of diabetes (Type 1 or Type 2) this person has. Explain your answer.

_____

_____ [1]

(b) Insulin, like all medical drugs, had to be tested in trials before it could be used on humans. Testing involves clinical, in-vitro and animal trials.

Examiner Only

Marks	Remark

(i) Put these trials (**clinical, in-vitro** and **animal**) in the order they take place.

_____ _____ _____ [1]

(ii) Describe what in-vitro testing is and suggest why it is a very expensive process.

_____

_____

_____ [2]

Examiner Only	
Marks	Remark

7 The red squirrel is at risk of extinction in Ireland. There are many reasons for its decline but a major factor has been the introduction of the grey squirrel (a competitive invasive species) into Ireland from North America. In comparison to the red squirrel, grey squirrels are a common woodland animal and their numbers are increasing rapidly.

The table below includes some information about red and grey squirrels.

Feature	Red squirrel	Grey squirrel
Average body length	21 cm	26 cm
Average body mass	290 g	600 g
Habitat	coniferous (e.g. pine) forest	all types of forest
Feeding area	in the trees	in the trees and on the ground
Diet	ripe berries, nuts and seeds	ripe and unripe berries, nuts and seeds
Response to poxvirus	not immune to virus	immune to virus (but can carry it and spread it to other squirrels)

(a) Use the information provided to answer parts **(i)**, **(ii)** and **(iii)**.

(i) Suggest **three** reasons for the grey squirrel being able to outcompete the red squirrel.

1. _____

_____

2. _____

_____

3. _____

_____ [3]

(ii) Suggest **one** reason why grey squirrels are much more likely to be killed by motor vehicles than red squirrels.

_____ [1]

(iii) Suggest **one** thing that could be done to increase the number of red squirrels.

_____ [1]

(b) Give **two** things that all competitive invasive species have in common.

1. _____

_____

2. _____

_____ [2]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

8 **(a)** Cystic fibrosis is an inherited disease. Jack and Jill are heterozygous (carriers) for cystic fibrosis but do not have the condition.

(i) What is meant by the term inherited disease?

_____ [1]

(ii) Using the information provided, explain how you know the allele for cystic fibrosis is recessive.

_____

_____ [1]

(b) The following Punnett square shows how Jack and Jill could have a child with cystic fibrosis.

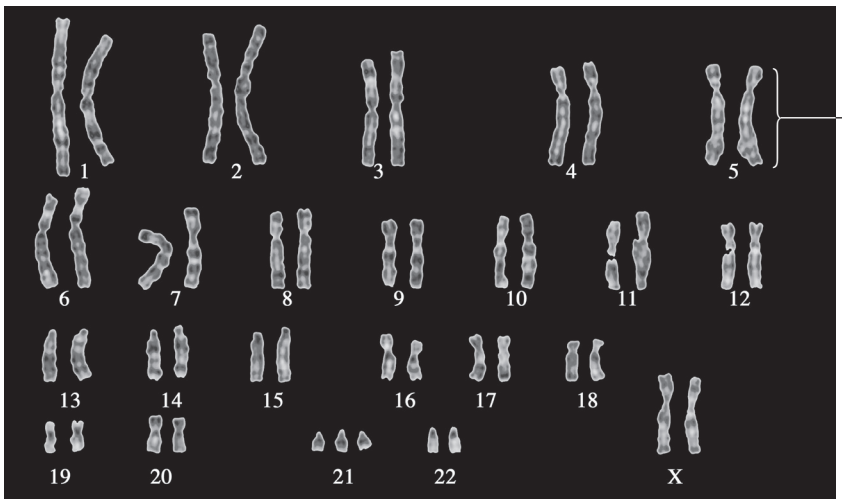
		Jack: C	Jack: c
Jill	C	CC	Cc
Jill	c	Cc	cc

(i) Circle the genotype for cystic fibrosis in the Punnett square. [1]

(ii) How many different genotypes are shown in the Punnett square?

_____ [1]

(c) The photograph below shows a human karyotype.



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(i) What does structure A represent?

_____ [1]

(ii) What genetic disorder is shown by this karyotype? Explain your answer.

_____

_____

_____ [2]

Examiner Only

Marks	Remark

9 Describe how you would carry out an investigation to show that light is needed for photosynthesis.

In your account you should describe:

- the experimental set-up
- the results you would expect
- how the results show that light is necessary.

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

[6]

Examiner Only	
Marks	Remark

THIS IS THE END OF THE QUESTION PAPER