

Please write clearly in block capitals.

Centre number

Candidate number

Surname \_\_\_\_\_

Forename(s) \_\_\_\_\_

Candidate signature \_\_\_\_\_

# GCSE SCIENCE A BIOLOGY

# F

Foundation Tier Unit Biology B1

Tuesday 16 May 2017

Afternoon

Time allowed: 1 hour

### Materials

For this paper you must have:

- a ruler.
- You may use a calculator.

### Instructions

- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.

### Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 60.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.
- Question 9(b) should be answered in continuous prose. In this question you will be marked on your ability to:
  - use good English
  - organise information clearly
  - use specialist vocabulary where appropriate.

### Advice

- In all calculations, show clearly how you work out your answer.

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
8	
9	
<b>TOTAL</b>	



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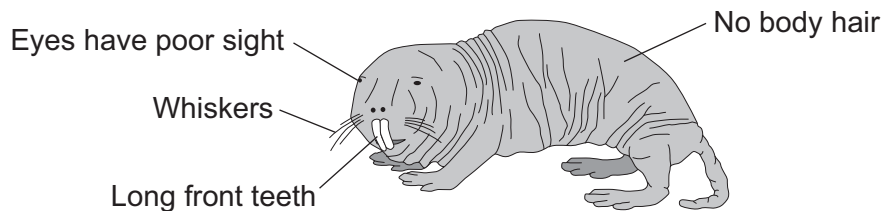
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ANSWER IN THE SPACES PROVIDED**



Answer **all** questions in the spaces provided.

- 1 **Figure 1** shows a mole rat. Some of the mole rat's features are labelled.

**Figure 1**



Mole rats dig burrows underground and live in the burrows.

The body temperature of mole rats increases and decreases as the temperature of the burrows changes.

Draw **one** line from each feature of the mole rat to the best reason for the feature.

Do not use any reason or feature more than once.

**[4 marks]**

**Feature**

**Reason for feature**

Eyes have poor  
sight

Body temperature does not  
need to be controlled

Whiskers

Underground burrows are  
completely dark

Long front teeth

Underground burrows have  
low levels of oxygen

No body hair

Help to judge the width of the  
burrow

Used for digging burrows

4

Turn over ►



2 Genes control some of the characteristics of an organism.

2 (a) Write the words from the box in the correct size order, starting with the smallest structure.

[3 marks]

cell	chromosome	gene	nucleus
------	------------	------	---------

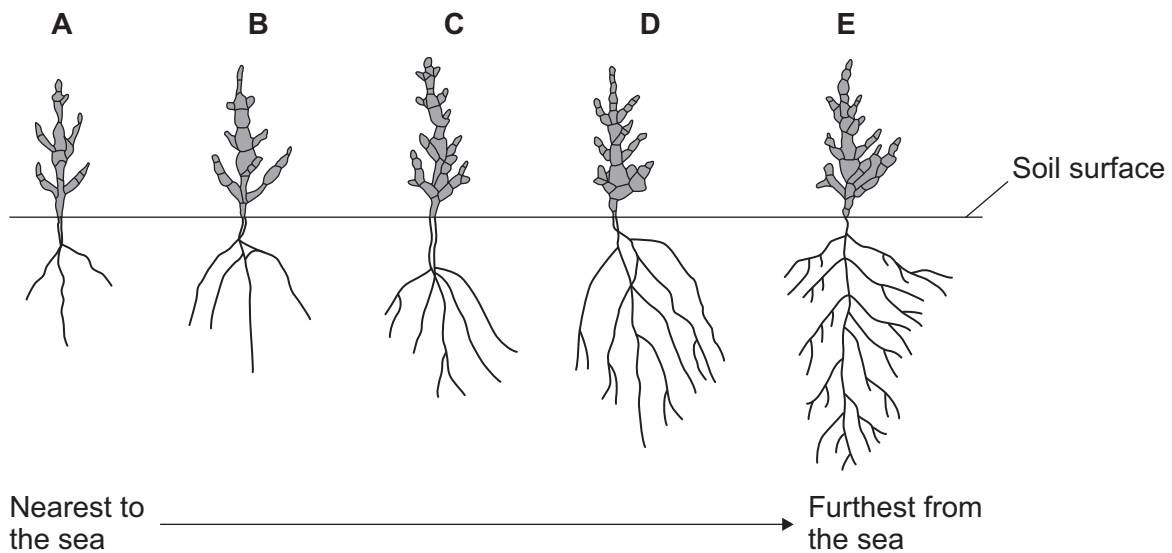
Smallest structure \_\_\_\_\_  
 ↓  
 Largest structure \_\_\_\_\_

2 (b) Glasswort is a plant that grows on seashores.

Figure 2 shows five glasswort plants, A, B, C, D and E.

The glasswort plants live on different parts of the same seashore.

Figure 2



**2 (b) (i)** Describe **two** effects of increasing distance from the sea on the growth of **roots** in glasswort plants.

[2 marks]

1 \_\_\_\_\_

\_\_\_\_\_

2 \_\_\_\_\_

\_\_\_\_\_

**2 (b) (ii)** In an investigation, plant **A** was dug up and replanted next to plant **E**.

One month later, the roots of plant **A** were the same as the roots of plant **E**.

Use the correct answer from the box to complete the sentence.

[1 mark]

genes only

the environment only

genes and the environment

The change in the growth of the roots in plant **A** after replanting is due to

\_\_\_\_\_ .

6

**Turn over for the next question**

**Turn over ►**

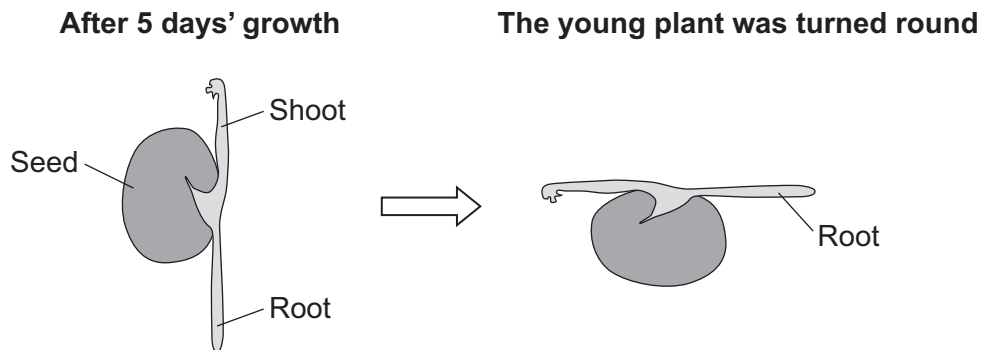


3 A student investigated growth in plants.

The student:

- planted a seed in moist soil
- left the seed to grow for 5 days
- dug up the young plant, turned it round and replanted it, as shown in **Figure 3**.

**Figure 3**

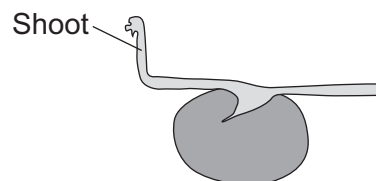


3 (a) (i) Three days later the student dug up the young plant again.

Complete **Figure 4** to show what the root would look like after these 3 days.

[1 mark]

**Figure 4**



3 (a) (ii) The shoots of plants grow upwards.

Give **two** reasons why shoots grow upwards.

[2 marks]

Tick (✓) **two** boxes.

Shoots grow towards moisture.

Shoots grow towards light.

Shoots grow in the direction of the force of gravity.

Shoots grow against the force of gravity.

Shoots grow away from light.

3 (b) Hormones control the direction of growth in roots and shoots.

3 (b) (i) Name **one** plant hormone.

[1 mark]

Draw a ring around the correct answer.

**auxin**

**LH**

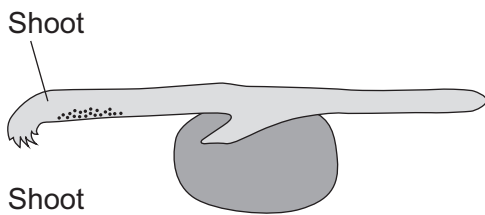
**statin**

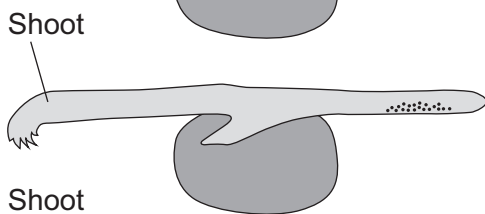
3 (b) (ii) In plant shoots, where there is more plant hormone the cells grow faster.

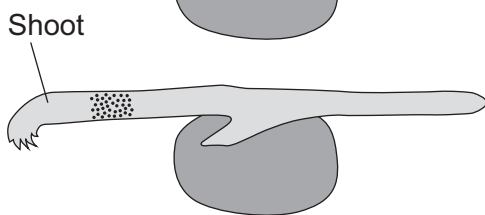
Which distribution of plant hormone would cause the shoot to grow upwards?

[1 mark]

Tick (✓) **one** box.








**Key**

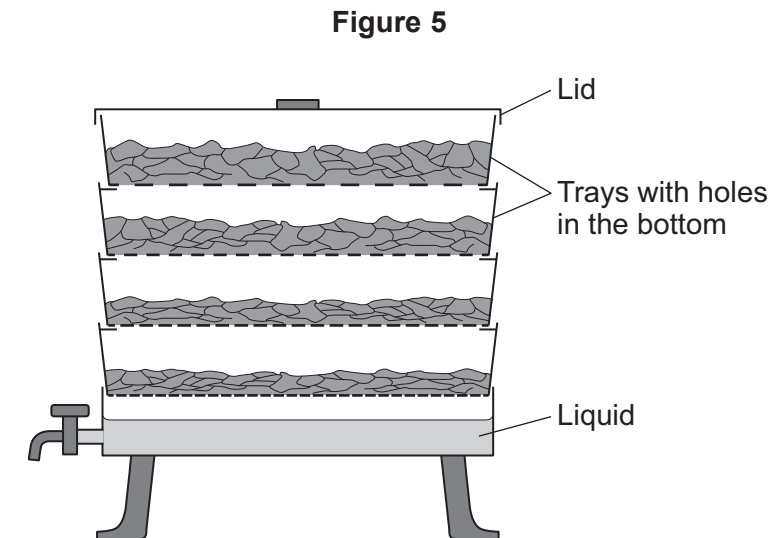
•••• Each dot represents one unit of plant hormone

5
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Turn over ►



4 **Figure 5** shows a garden composter.



- The composter has four trays, with holes in the bottom of each tray.
- Material to be composted is put into the top tray.
- As the material breaks down it drops through the holes.
- The holes get smaller from the top tray to the bottom tray.

4 (a) (i) Suggest **one** type of material that could be put into the composter.

[1 mark]

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4 (a) (ii) How will the size of the pieces of material in the bottom tray compare with the size of the pieces of material in the top tray?

[1 mark]

Tick (✓) **one** box.

The material in the bottom tray will be in smaller pieces.

The material in the bottom tray will be in larger pieces.

The material in the bottom tray and the top tray will be in the same size pieces.





**4 (a) (iii)** The material decomposes into soluble substances.

Name **one** type of organism that would decompose the material in the composter.

**[1 mark]**

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**4 (b)** Decomposition is more efficient if there is plenty of oxygen.

Suggest **one** way of changing the design of the composter to make sure that there is plenty of oxygen.

**[1 mark]**

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**Question 4 continues on the next page**

**Turn over ►**



**4 (c)** A gardener has two greenhouses, with 20 tomato plants in each greenhouse.

The gardener gives tap water to the tomato plants in one greenhouse.

The gardener gives the liquid that collects in the bottom of the composter to the tomato plants in the other greenhouse.

**Table 1** shows information about the tomatoes he picks from his tomato plants.

**Table 1**

What was given to the plants	Mean number of tomatoes per plant	Mean mass of each tomato in g	Mean yield per plant in g
Tap water	14	85	1190
Liquid from the composter	12	125	

**4 (c) (i)** Suggest **one** factor the gardener will need to control to make sure the results of the investigation are valid.

[1 mark]

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**4 (c) (ii)** Use data from **Table 1** to calculate the mean yield per plant of the tomatoes which were given the liquid from the composter.

[2 marks]

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Mean yield per plant = \_\_\_\_\_ g

**4 (c) (iii)** The plants given the liquid from the composter produced a greater yield of tomatoes than the plants given tap water.

Suggest why.

[1 mark]

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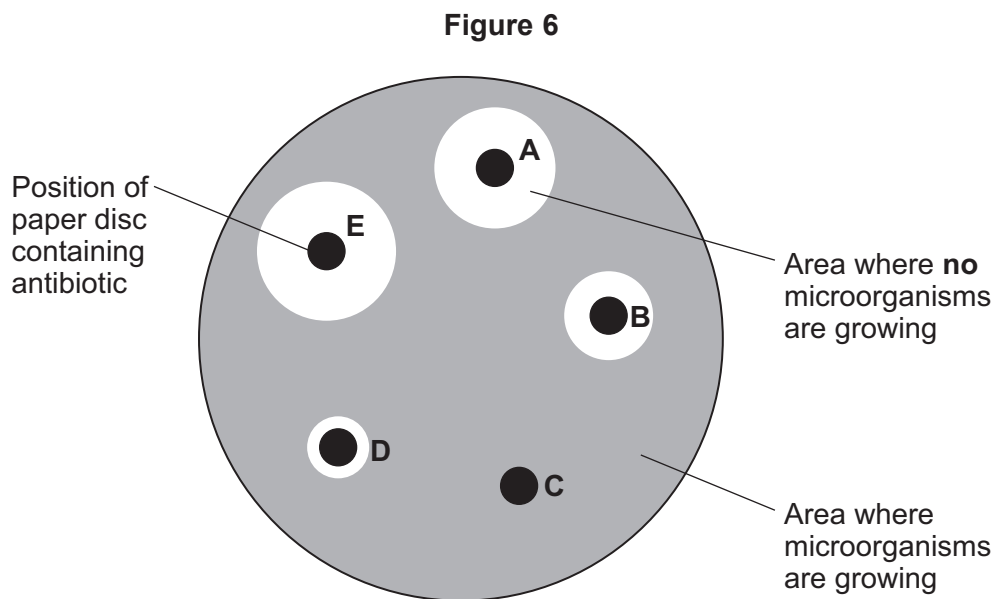


5 Some students investigated antibiotics.

The students:

- spread one type of microorganism on a sterile Petri dish containing an agar culture medium
- added five paper discs, each with one drop of a different antibiotic, **A**, **B**, **C**, **D** and **E**
- secured the lid on the dish with adhesive tape
- incubated the dish for 3 days at 25° C.

Figure 6 shows the Petri dish after the 3 days.



5 (a) Give **one** safety precaution that the students used in their investigation.

State why this safety precaution is needed.

[2 marks]

Safety precaution used \_\_\_\_\_

\_\_\_\_\_

Why the safety precaution is needed \_\_\_\_\_

\_\_\_\_\_



**5 (b)** One student made a conclusion:

‘Doctors should always give antibiotic **E** to get rid of any disease.’

**5 (b) (i)** Describe the evidence from **Figure 6** which supports the student’s conclusion.

[1 mark]

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**5 (b) (ii)** Suggest **one** reason why the student’s conclusion may **not** be correct.

[1 mark]

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**5 (c)** Antibiotics can be given to farm animals as well as to humans.

**Table 2** shows the mass of different antibiotics that have been given to farm animals and to humans.

**Table 2**

Antibiotic	Mass of antibiotic in kilograms	
	Given to farm animals	Given to humans
<b>A</b>	121 600	314 500
<b>B</b>	323 000	47 500
<b>C</b>	37 000	5 400
<b>D</b>	71 200	47 700
<b>E</b>	42 000	49 000

**5 (c) (i)** Write down **all** of the antibiotics, **A**, **B**, **C**, **D** or **E**, which have been used **more** for farm animals than for humans.

[1 mark]

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**Question 5 continues on the next page**

**Turn over ►**



**5 (c) (ii)** Farmers in some countries use antibiotics to prevent disease in farm animals. This prevents the animals becoming ill or dying.

Suggest **one** other advantage to the farmer of giving antibiotics to farm animals.

**[1 mark]**

Tick (✓) **one** box.

The antibiotics will be passed to people who consume the animals.

Healthy animals will produce a higher yield.

The antibiotics will build up in the animals.

**5 (c) (iii)** What is the possible effect of using too much antibiotic?

**[1 mark]**

Tick (✓) **one** box.

Animals become resistant to the antibiotic.

Microorganisms become resistant to the antibiotic.

People become immune to the antibiotic.

People become resistant to the antibiotic.

**5 (d)** The human body defends itself against pathogens using one type of blood cell.

**5 (d) (i)** Complete the sentence.

**[1 mark]**

Pathogens in the body can be killed by \_\_\_\_\_ blood cells.



**5 (d) (ii)** Give **two** ways in which the blood cells you have named in part **(d)(i)** protect the body from disease.

**[2 marks]**

Tick (✓) **two** boxes.

These blood cells produce antibiotics.

These blood cells produce antibodies.

These blood cells ingest pathogens.

These blood cells reproduce pathogens.

These blood cells produce toxins.

10

**Turn over for the next question**

**Turn over ►**



**6** **Figure 7** is an article about performance-enhancing drugs in sport.

**Figure 7**

Athletes who win Olympic medals may be paid large amounts of money to use a particular company's equipment.

A study of more than 1000 athletes in the Olympic Games showed that 1.6% of athletes tested positive for banned drugs.

A member of the World Anti-Doping Agency said that drug cheats were often one step ahead of the testing agency as they find new ways to cover up a drug in an athlete's body.

Athletes who are found to have used banned drugs are not allowed to compete for a minimum of 2 years and have to give back any medals they have won.

**6 (a)** What is the advantage of having more than 1000 athletes in the study?

**[1 mark]**

Use the correct answer from the box to complete the sentence.

**precise**

**systematic**

**valid**

Having more than 1000 athletes in the study means that the study is \_\_\_\_\_.

**6 (b)** Use information from **Figure 7** and your own knowledge to answer parts **(b)(i)** and **(b)(ii)**.

**6 (b) (i)** Suggest **two** reasons why athletes should **not** use performance-enhancing drugs.

**[2 marks]**

1 \_\_\_\_\_

\_\_\_\_\_

2 \_\_\_\_\_

\_\_\_\_\_

**6 (b) (ii)** Some athletes use performance-enhancing drugs to stimulate muscle growth.

Suggest **one** other reason why some athletes use performance-enhancing drugs.

**[1 mark]**

\_\_\_\_\_

\_\_\_\_\_





**6 (b) (iii)** Name the type of drug used to stimulate muscle growth.

**[1 mark]**

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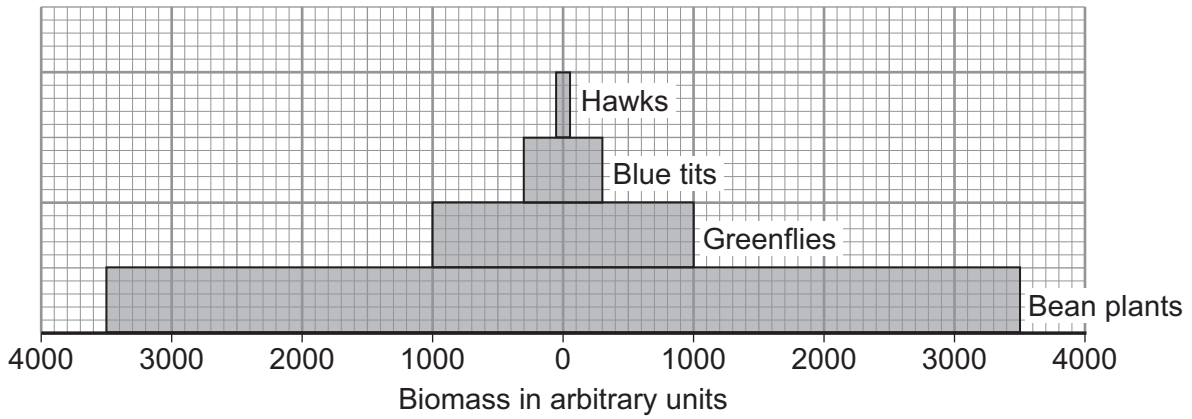
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7 **Figure 8** shows a pyramid of biomass for a food chain.

**Figure 8**



**Key**



= 500 arbitrary units

7 (a) (i) Not all of the biomass of the bean plants is converted into the biomass of greenflies.

Calculate the biomass of bean plants that is **not** converted into the biomass of greenflies.

[2 marks]

Use information from **Figure 8**.

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Biomass = \_\_\_\_\_ arbitrary units



**7 (a) (ii)** For every 10 grams of biomass eaten by the hawks, more than 8 grams of biomass are lost.

Give **one** way in which the biomass eaten by hawks is lost from the food chain.

**[1 mark]**

Tick (✓) **one** box.

Hawks reproduce

Hawks produce faeces

Hawks grow

Hawks feed on other birds

**7 (b)** When the bean plants grow they gain biomass.

Complete the sentences.

**[2 marks]**

The bean plants gain biomass by the process of \_\_\_\_\_ .

In this process, the bean plants make a carbohydrate called \_\_\_\_\_ .

5

**Turn over for the next question**

**Turn over ►**



**8** Charles Darwin developed the theory of evolution by natural selection in the 1800s.

**8 (a)** Describe the process of evolution by natural selection.

**[3 marks]**

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**8 (b)** In the 1870s, cartoons of Darwin looking like a monkey were published in magazines.  
The cartoons were published after Darwin wrote a book about his theory of evolution.

**8 (b) (i)** Suggest **one** reason why cartoons of Darwin looking like a monkey were drawn.

**[1 mark]**

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**8 (b) (ii)** Give **two** reasons why Darwin's theory of evolution by natural selection was only gradually accepted.

**[2 marks]**

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6



**9** The human body responds to changes in internal conditions and external conditions.

**9 (a)** The water and ion content of the body must be controlled.

Ions are lost from the body in different liquids from different organs.

**9 (a) (i)** Complete **Table 3** to show **two** ways ions are lost from the body.

**[4 marks]**

**Table 3**

Liquid	Organ
_____	_____
_____	_____

**9 (a) (ii)** How are the ions which are lost from the body replaced?

**[1 mark]**

\_\_\_\_\_

\_\_\_\_\_

**Question 9 continues on the next page**

**Turn over ►**



9 (b) In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.

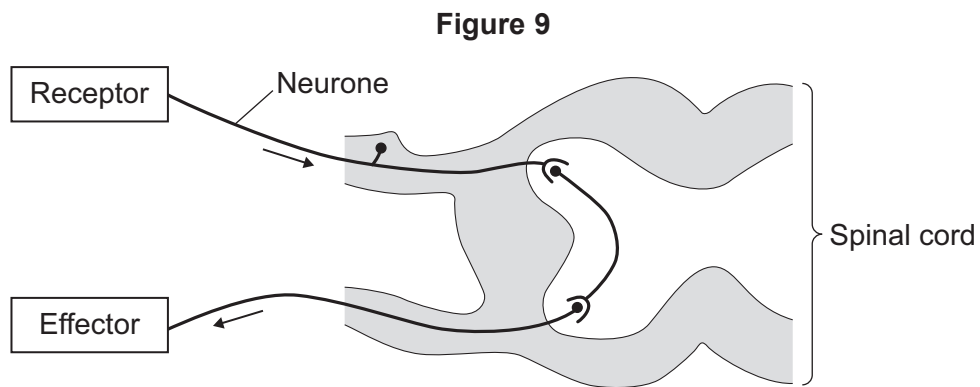
Reflexes allow humans to respond to stimuli (changes in the environment).

One example of a reflex is when a finger touches a hot kettle and the arm is pulled away.

Sense organs contain receptors that detect stimuli.

Effectors are muscles or glands which respond.

Figure 9 is a diagram of a simple reflex pathway.



Describe how a simple reflex works.

Your answer should include:

- one type of receptor and the stimulus that the receptor detects
- how information is passed from the receptor to the effector.

[6 marks]

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Extra space \_\_\_\_\_

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11

**END OF QUESTIONS**



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