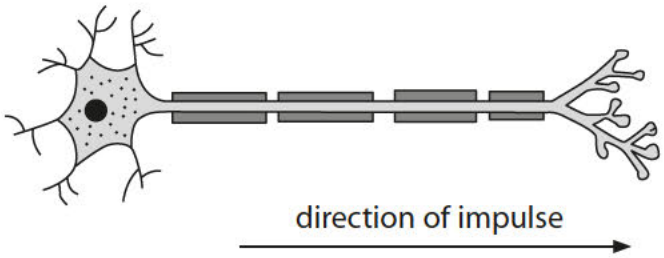
1 The diagram shows an animal cell called a neurone.



(a) Name the three structures found in a plant cell that are not found in a neurone.

(3)

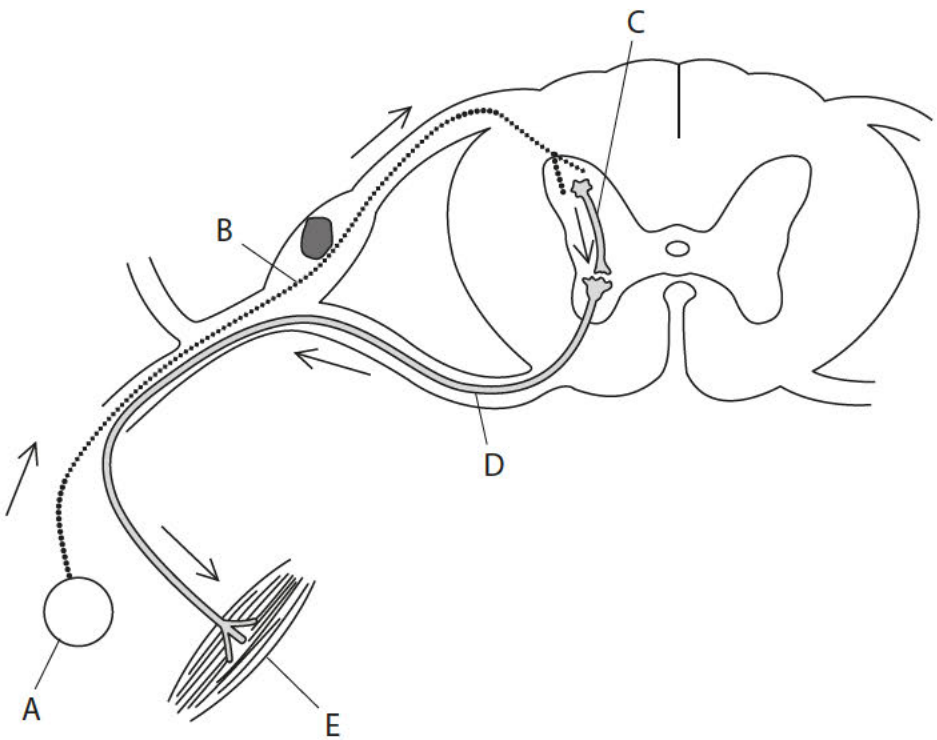
1 .....

2 .....

3 .....

(b) Neurones are involved in the reflex arc that helps humans respond to stimuli.

The diagram shows a reflex arc with parts labelled A, B, C, D and E.
The arrows show the direction of the nerve impulse.



(i) Complete the table by naming each part of the reflex arc.
One has been done for you.

(4)

Part	Name
A	
B	sensory neurone
C	
D	
E	

(ii) There is a small gap between neurone B and neurone C.

What is the name of the small gaps between neurones?

(1)

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(c) Nerve impulses can travel along neurones at 120 m/s.
The distance between the spinal cord and the foot of a human is 90 cm.

Calculate the time, in seconds, that it would take a nerve impulse to travel from the spinal cord to the foot of this human.
Show your working.

(2)

time = ... seconds

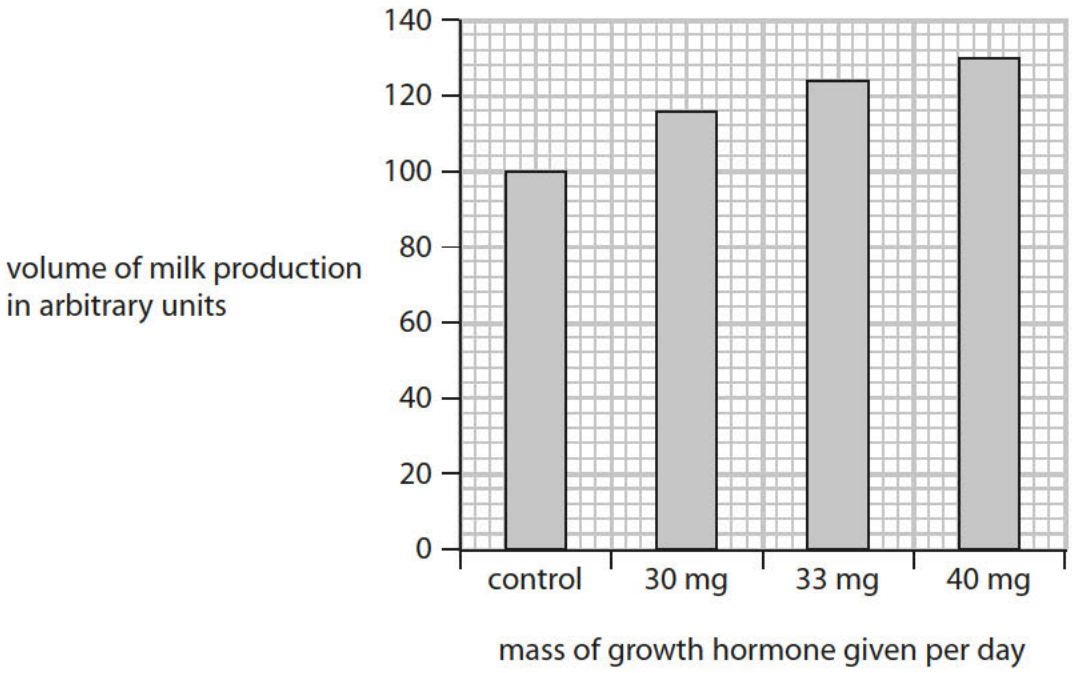
(Total for Question = 10 marks)

2 An investigation was carried out to find out the effect of a growth hormone on milk production.

Groups of cows were given different masses of a growth hormone.

The volume of milk the cows produced was then measured.

The graph shows the results.



(a) (i) How much growth hormone should have been given to the control group?

(1)

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(ii) Describe the effect of growth hormone on milk production.

(1)

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(b) Farmers want to make reliable comparisons about the effect of different doses of growth hormone.

(i) What was done in this investigation to make the results reliable?

(1)

.....

(ii) Many variables that affect milk production need to be kept the same for each group of cows. This allows a valid comparison to be made between each group.

Give two variables that need to be kept the same.

(2)

1 .....

2 .....

(c) Growth hormone is a protein.

It might be present in the milk produced by the cows and then be consumed by humans.

Some people are worried that this may harm humans.

Other people say that this is not a problem for two reasons.

Firstly, the milk is pasteurised (heated to high temperatures).

Secondly, the growth hormone is destroyed in the human stomach.

(i) Suggest what happens to the growth hormone when milk is pasteurised.

(1)

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(ii) Describe how the growth hormone could be destroyed in the stomach.

(3)

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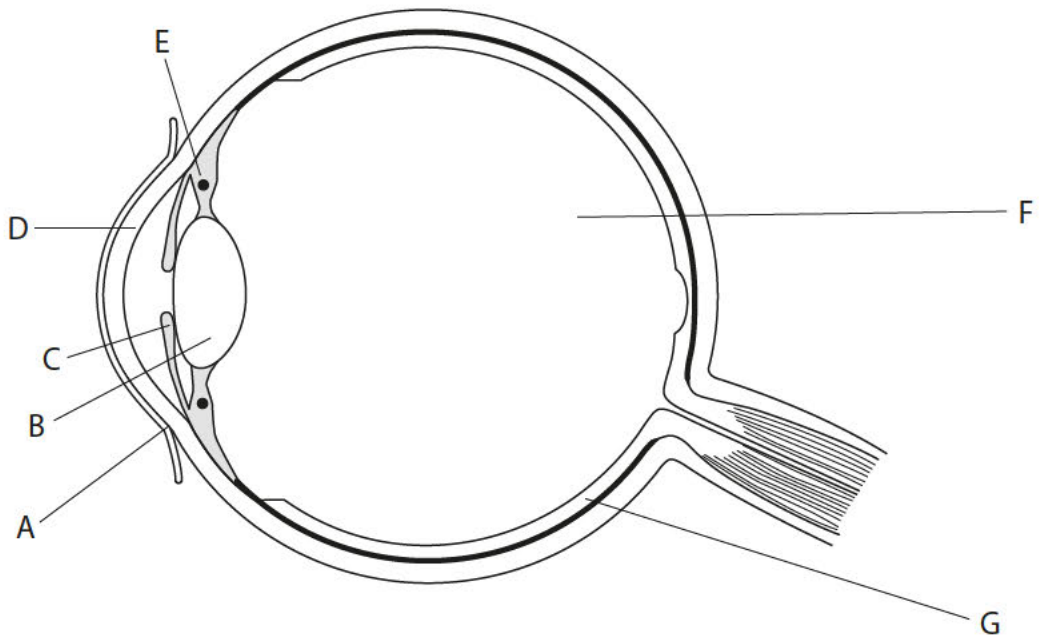
(d) The growth hormone used in this investigation was obtained from genetically modified bacteria.

Describe how bacteria can be genetically modified and used to produce growth hormone.

(4)

(Total for Question = 13 marks)

3 The diagram shows a section through the human eye. Different parts of the eye have been labelled A to G.



The table lists some health problems that affect the eye and describes how they are caused.

Complete the table by choosing the correct label letter for the part of the eye linked with each health problem. The first one has been done for you.

(4)

Health problem	Description	Label letter
conjunctivitis	infection of the conjunctiva	A
cataract	a cloudy lens	
blindness	a detached retina	
glaucoma	increased fluid pressure	
myopia	a change in the shape of the cornea	

(Total for Question = 4 marks)

4 The photograph shows a bird called a parakeet.



(a) (i) Parakeets eat seeds.

Parakeets can be eaten by birds of prey called raptors.

Use this information to draw a food chain.

(2)

(ii) Many seeds contain starch.

Suggest what happens to starch in the gut of a parakeet.

(3)

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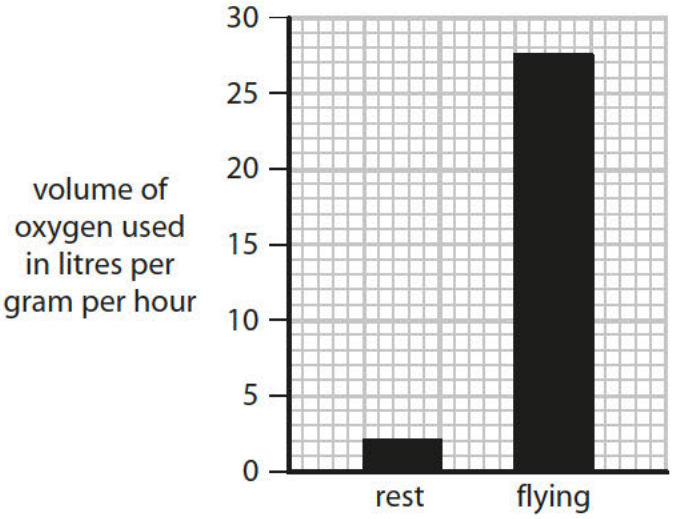
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(b) (i) The graph shows the volume of oxygen used by a resting parakeet compared to a flying parakeet.



Calculate the extra volume of oxygen used in litres per gram per hour when flying compared to the volume used at rest.

Show your working.

(2)

Answer ..... litres per gram per hour

(ii) Like humans, parakeets need to keep their body temperature constant.

Suggest how the volume of oxygen used by a parakeet at rest would change if it was moved to a colder environment.

(3)

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(Total for Question = 10 marks)

5 Describe how the levels of blood glucose are kept constant in human plasma after eating a meal.

(3)

(Total for Question = 3 marks)

6 One of the characteristics of living organisms is the ability to respond to a change in their surroundings.

In mammals, such as humans, responses are controlled by nervous or hormonal communication.

(a) ADH is an example of a hormone.

(i) Where is ADH produced?

(1)

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(ii) Describe the effects of ADH in the body.

(3)

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(b) Describe **two** ways in which nervous communication differs from hormonal communication.

(2)

1 .....

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2 .....

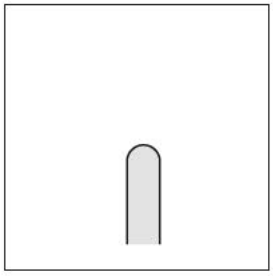
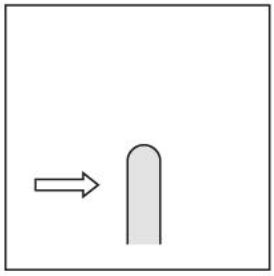
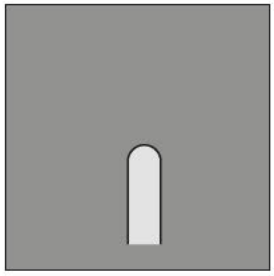
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(c) Plants are also able to respond to their surroundings. The diagram shows young cereal shoots (coleoptiles) which are placed in different light conditions.

Complete the diagram to suggest how each of the shoots would appear after two days.

(3)

At start			
	light from all around	light from left side	darkness
After two days			

(d) Plant roots also respond to external stimuli.

Describe the response of roots to gravity and explain how this response benefits the plant.

(3)

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(Total for Question = 12 marks)