OXFORD CAMBRIDGE AND RSA EXAMINATIONS

GCSE

B731/01

GATEWAY SCIENCE
BIOLOGY B
Biology modules B1, B2, B3
(Foundation Tier)

WEDNESDAY 25 MAY 2016: Afternoon

DURATION: 1 hour 15 minutes
plus your additional time allowance
MODIFIED ENLARGED 24pt

Candidate forename		Candidate surname	

Centre number						Candidate number				

Candidates answer on the Question Paper.
A calculator may be used for this paper.

OCR SUPPLIED MATERIALS:

None

OTHER MATERIALS REQUIRED:

Pencil
Ruler (cm/mm)

READ INSTRUCTIONS OVERLEAF

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INSTRUCTIONS TO CANDIDATES

Write your name, centre number and candidate number in the boxes on the first page. Please write clearly and in capital letters.

Use black ink. HB pencil may be used for graphs and diagrams only.

Answer ALL the questions.

Read each question carefully. Make sure you know what you have to do before starting your answer.

Write your answer to each question in the space provided. If additional space is required, you should use the lined page(s) at the end of this booklet. The question number(s) must be clearly shown.

INFORMATION FOR CANDIDATES

The quality of written communication is assessed in questions marked with a pencil (✎).

The number of marks is given in brackets [ ] at the end of each question or part question.

The total number of marks for this paper is 75.

Any blank pages are indicated.

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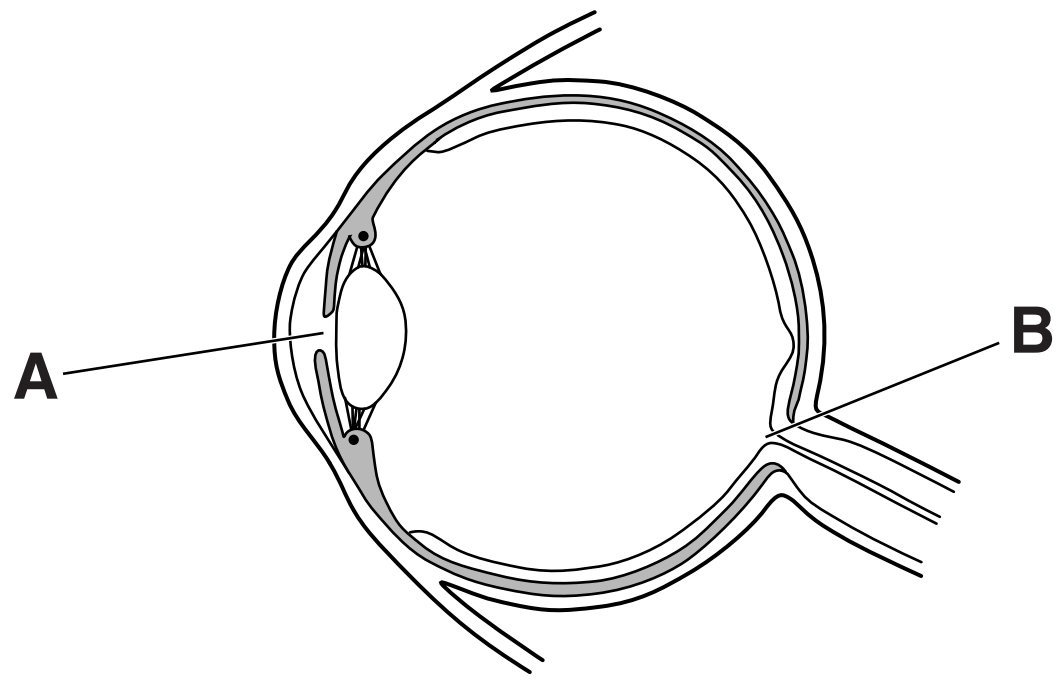
Answer ALL the questions.

SECTION A – Module B1

1 The diagram shows a section of a human eye.



(a) Write down the names of parts A and B.

part A _____

part B _____

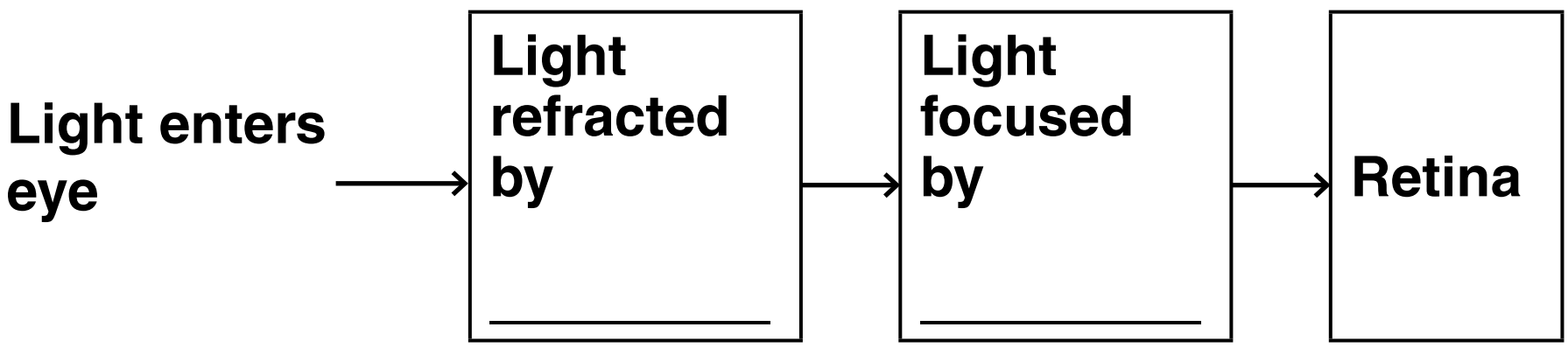
[2]

(b) Light enters the eye.

The flowchart shows what happens to the light as it travels through to the back of the eye.

What are the parts of the eye that the light is travelling through?

Write the names in the boxes.



[2]

(c) Some people have red-green colour blindness.

What causes red-green colour blindness?

_____ [1]

(d) Binocular vision helps people judge distances.

Explain how.

_____

_____

_____ [2]

[TOTAL: 7]

2 (a) Alan and Charlotte are investigating plant growth.

They know that plants respond to changes in their environment.

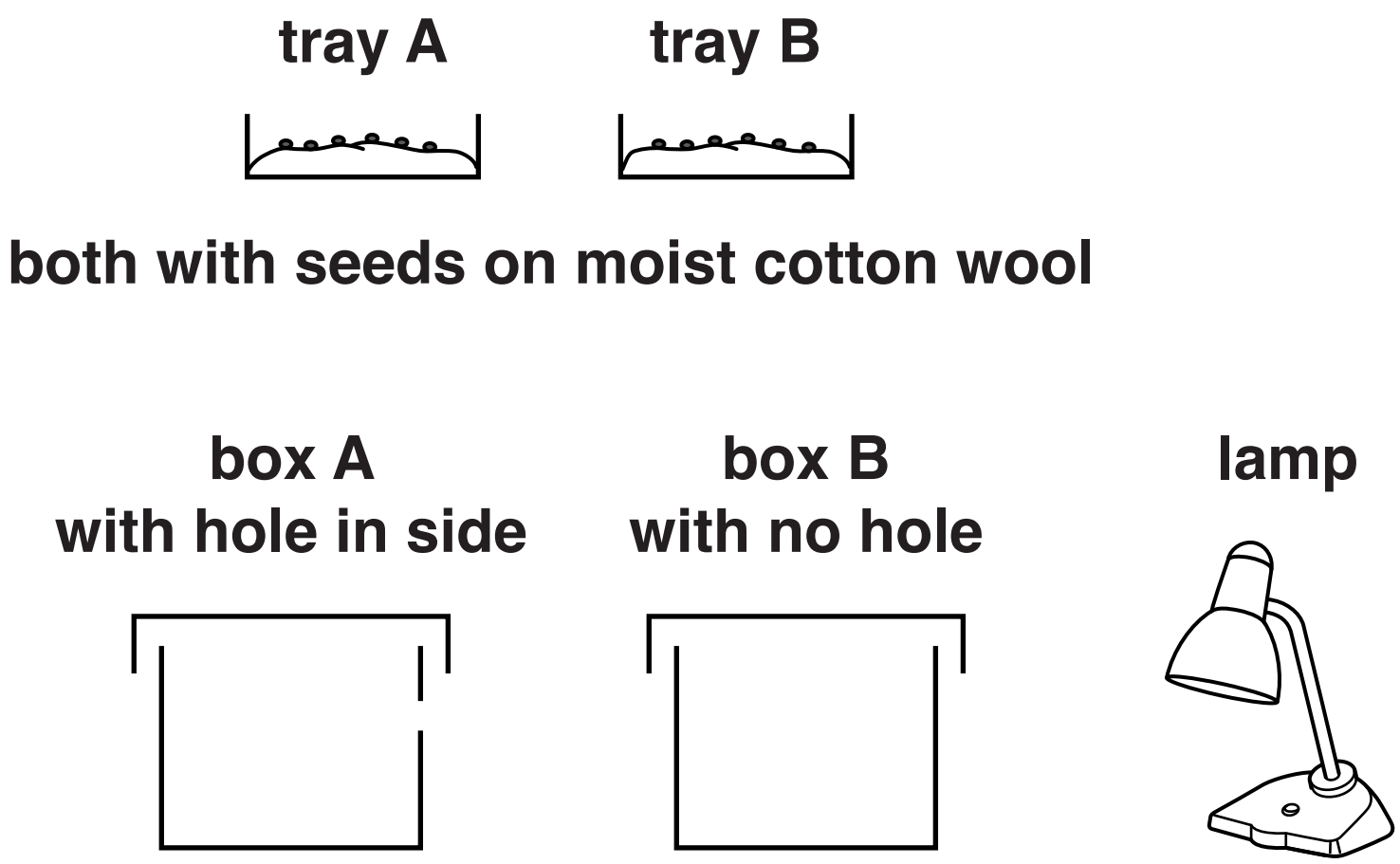
Plant growth is controlled by chemicals.

Write down the name of the chemicals that control plant growth.

_____ **[1]**

(b) Alan and Charlotte want to investigate how plants grow towards light.

Look at the equipment.



Describe how this equipment should be used and the results that would be expected.

You can draw a labelled diagram to help you answer.

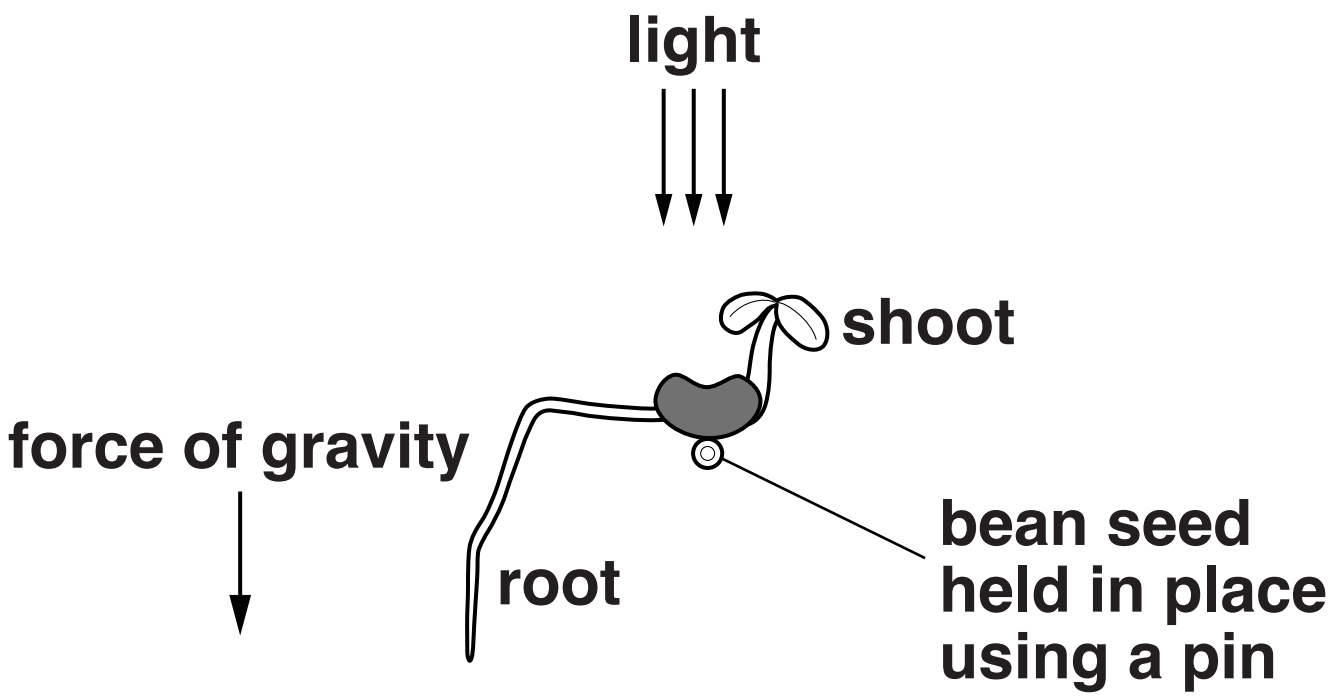
_____

_____

_____

_____ **[4]**

(c) Alan finds a diagram showing the results of an investigation into the growth of roots.



Alan makes a conclusion about the results.

"I think that the results show that plant roots respond to both gravity and light."

Do the results SUPPORT Alan's conclusion?

Explain your answer.

_____

_____

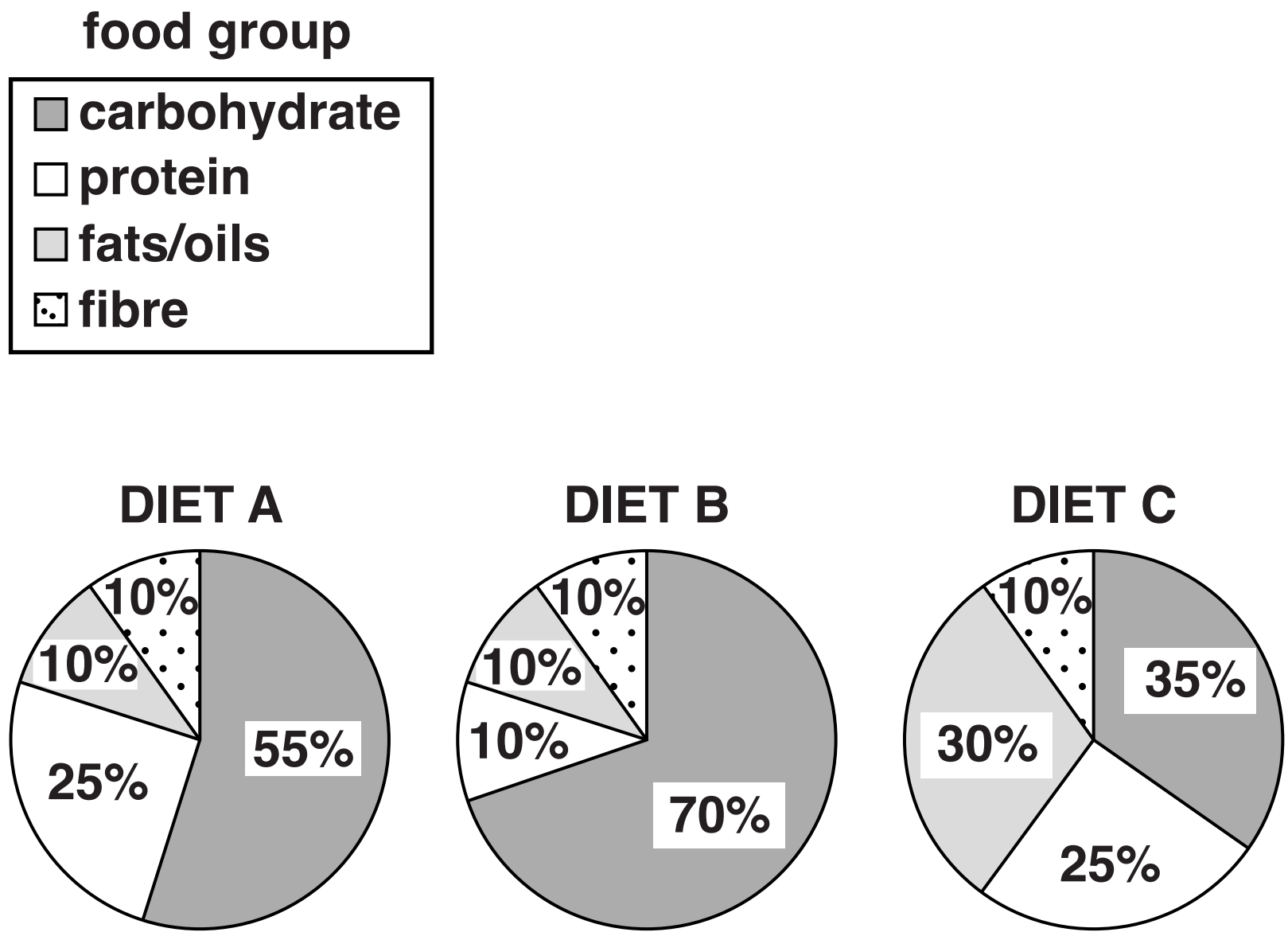
_____ [2]

[TOTAL: 7]

3 **This question is about diet.**

Look at the pie charts.

They show the percentage of food groups in three different diets.



Diet A	Diet B	Diet C
Protein sources	Protein sources	Protein sources
beans	meat	eggs
eggs	cheese	cheese
soya	fish	beans

(a) **Nicola and Paul are friends.**

Nicola is a vegetarian who wants to lose weight.

Paul is a long distance runner and chooses diet B.

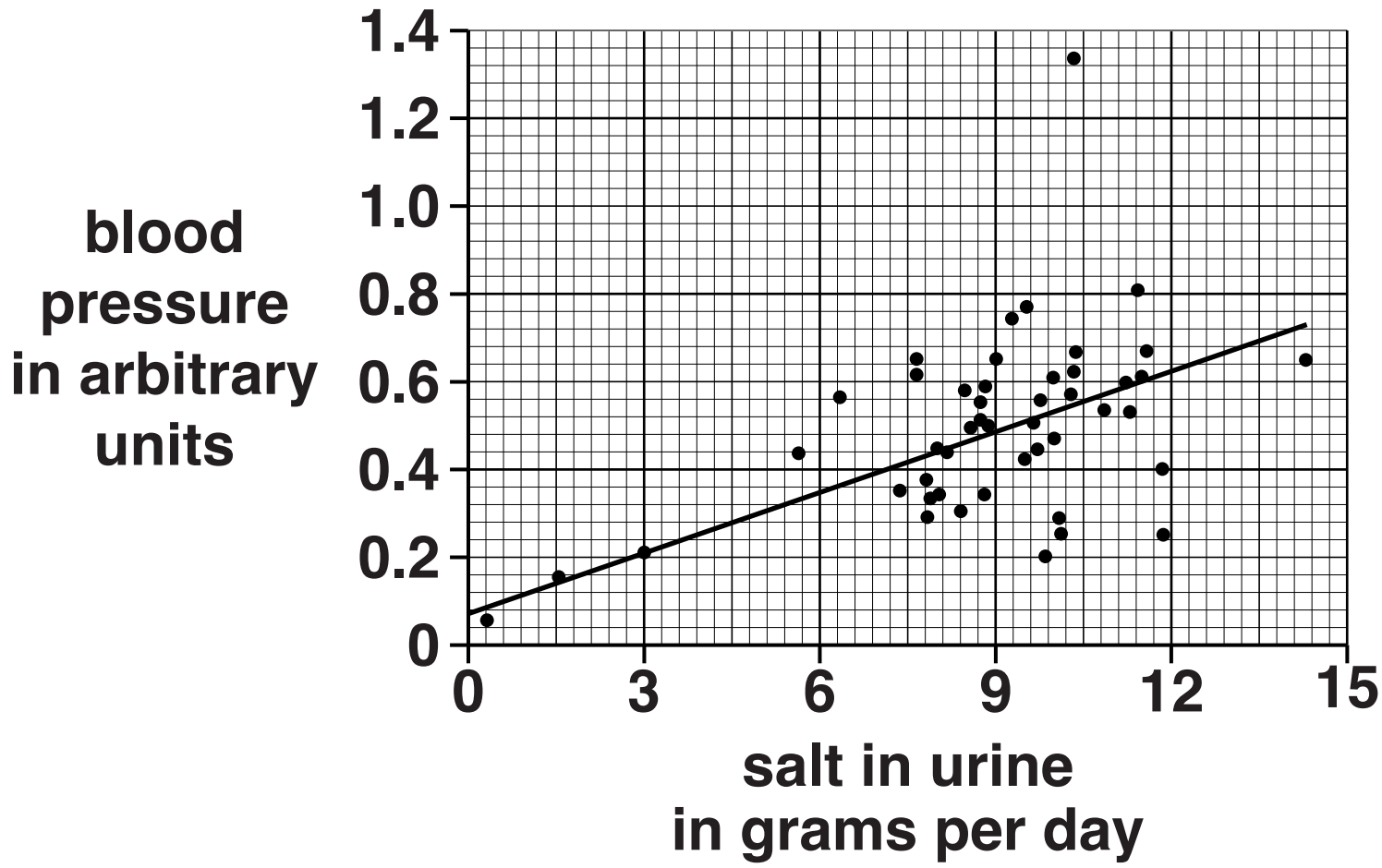
Explain which diet Nicola should choose and why Paul chooses diet B.

The quality of written communication will be assessed in your answer to this question.

[6]

(b) More salt in the diet gives a higher amount of salt in the urine.

Look at the graph.
It shows the relationship between the amount of salt in urine and blood pressure.



Nicola wants to avoid having too much salt in her diet.
Use the information in the graph and your scientific knowledge to explain why.

_____

_____

_____

_____ [2]

[TOTAL: 8]

4 (a) **High energy drinks often contain large amounts of caffeine.**

Caffeine is a STIMULANT.

What does a stimulant do to the body?

_____

_____ **[1]**

(b) **People who regularly drink these high energy drinks**

often find it difficult to give up

often have to drink increasing amounts to have the same effect.

Explain why.

_____

_____

_____ **[2]**

[TOTAL: 3]

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SECTION B – Module B2

5 Look at the picture of a tiger.

(a) The large, sharp canine teeth and sharp claws are features of a successful predator.

Write down TWO OTHER features a tiger has that make it a successful predator.

_____

_____ **[2]**

(b) Tigers are successful predators but at great risk from hunting and habitat destruction.

In the wild the population of tigers is very low and at risk of dying out.

What name is used to describe animals and plants at risk of dying out?

Put a ring around the correct answer.

camouflaged

endangered

extinct

finite

sustainable

[1]

(c) Write down TWO ways that could prevent tigers from dying out.

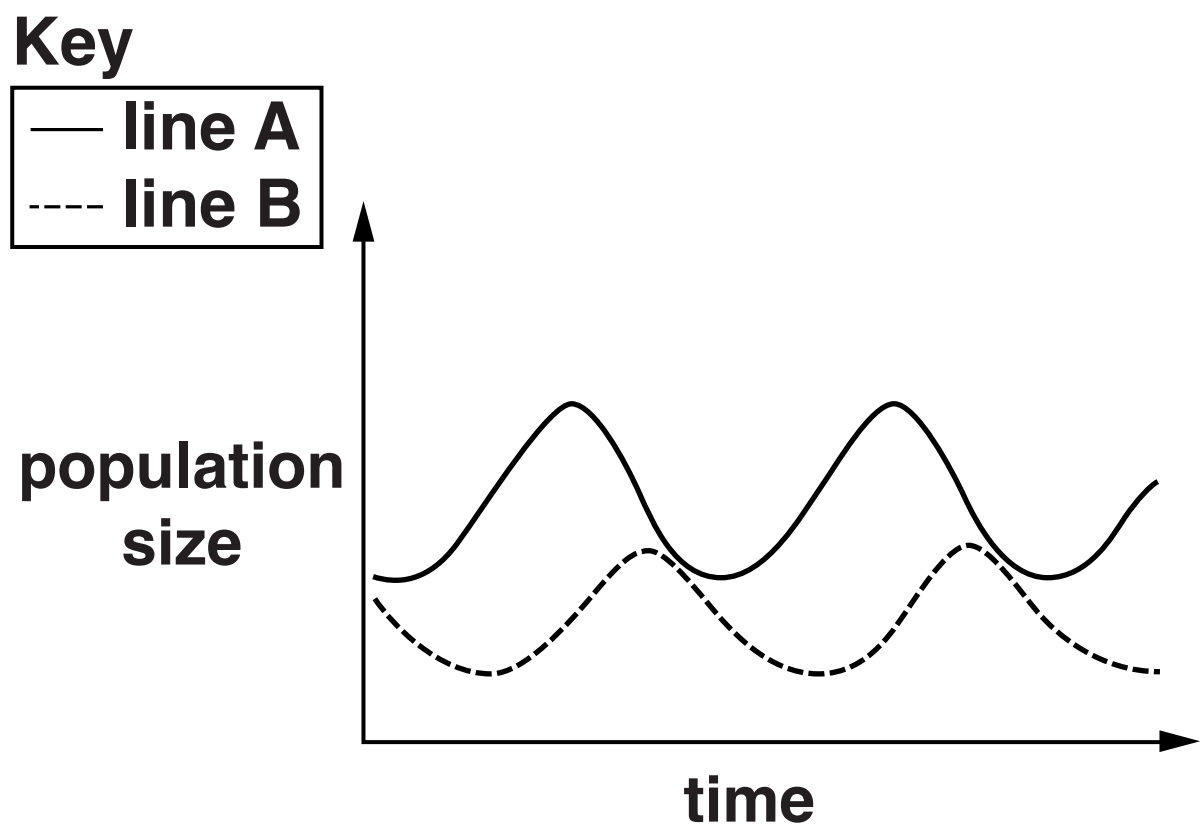
_____

_____

_____ [2]

(d) Look at the graph.

It shows the relationship between populations of tigers and their prey.



Which is the line for the tiger population?

Line _____

Explain your answer.

_____

_____

_____

_____ [2]

[TOTAL: 7]

BLANK PAGE

6 Look at the pictures.

They show two species of butterfly.

(a) Both species have antennae, two pairs of wings and six legs.

What class of arthropod do both species belong to?

Choose your answer from this list.

arachnids

crustaceans

insects

myriapods

_____ **[1]**

(b) Over long periods of time groups of organisms can change to become new species.

What is the name biologists give to this change?

_____ **[1]**

(c) (i) The picture shows three species of butterfly on a buddleia bush.

These butterflies feed on nectar from flowers.

Buddleia are found in open shrub land.

These different species of butterfly all live in open shrub land.

Suggest why.

_____

_____ [1]

(ii) A different species of butterfly lives in oak woodland.

This butterfly is closely related to the other three butterflies but has different mouthparts.

Suggest why it needs different mouthparts.

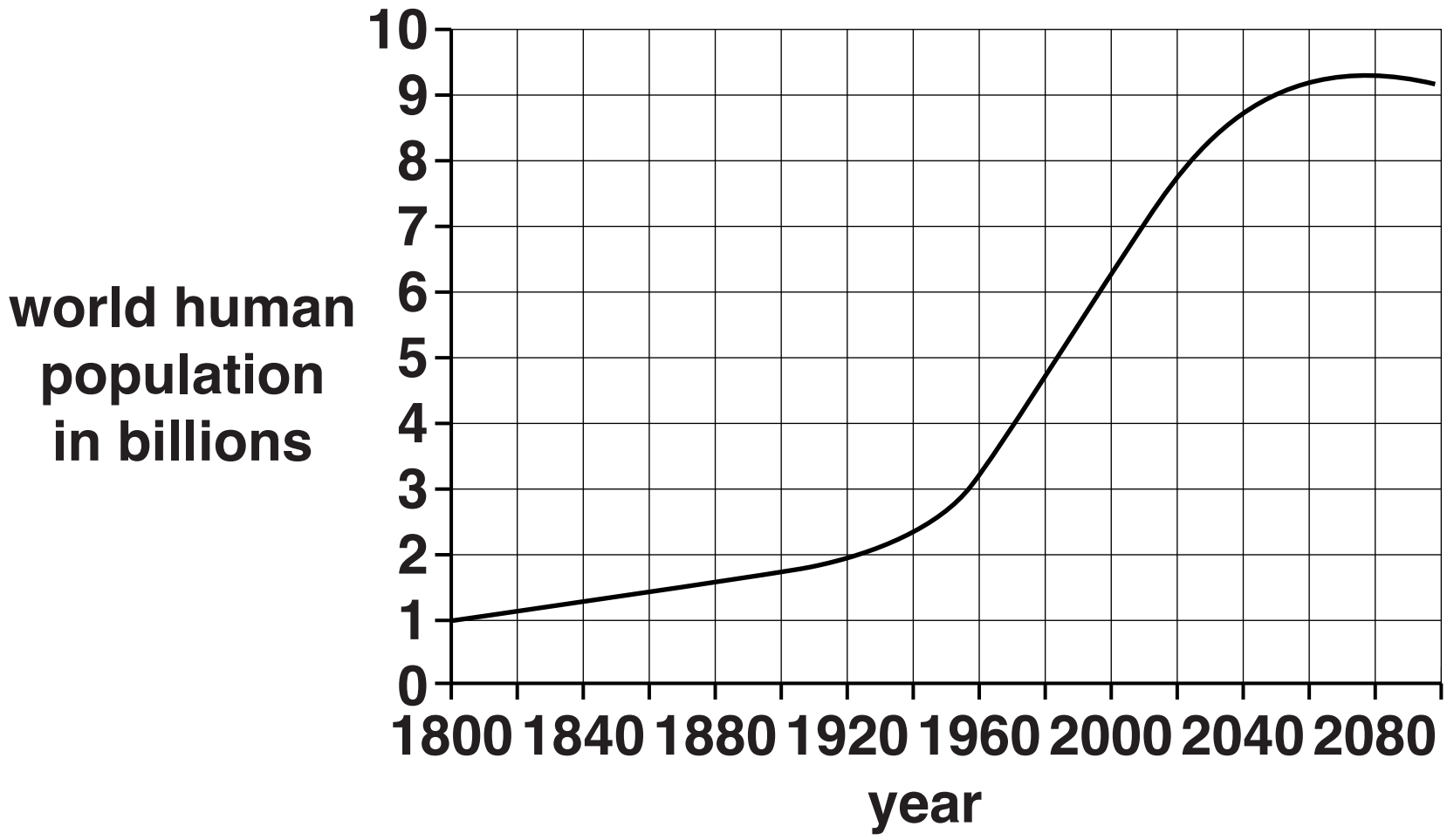
_____

_____ [1]

[TOTAL: 4]

7 Look at the graph.

It shows the world human population and how some scientists think it could change in the future.



The rate of growth of the human population can be calculated by finding the gradient of the graph.

(a) (i) Calculate the rate of population growth from 1800 to 1880 by finding the gradient of the graph.

rate of population growth

= _____ billion per year [2]

(ii) In the year 2000 the rate of growth of the human population was 0.075 billion per year.

How many times greater is the increase in the year 2000 compared to your answer to part (a)(i)?

_____ [1]

(b) The world population figures are only estimates.

Suggest why.

_____

_____ [1]

(c) The increase in population between 1880 and the year 2000 caused more pollution.

Suggest why.

_____

_____

_____

_____ [2]

(d) Use the graph to make predictions about the energy needs and pollution levels after the year 2070.

Explain your answer.

_____

_____

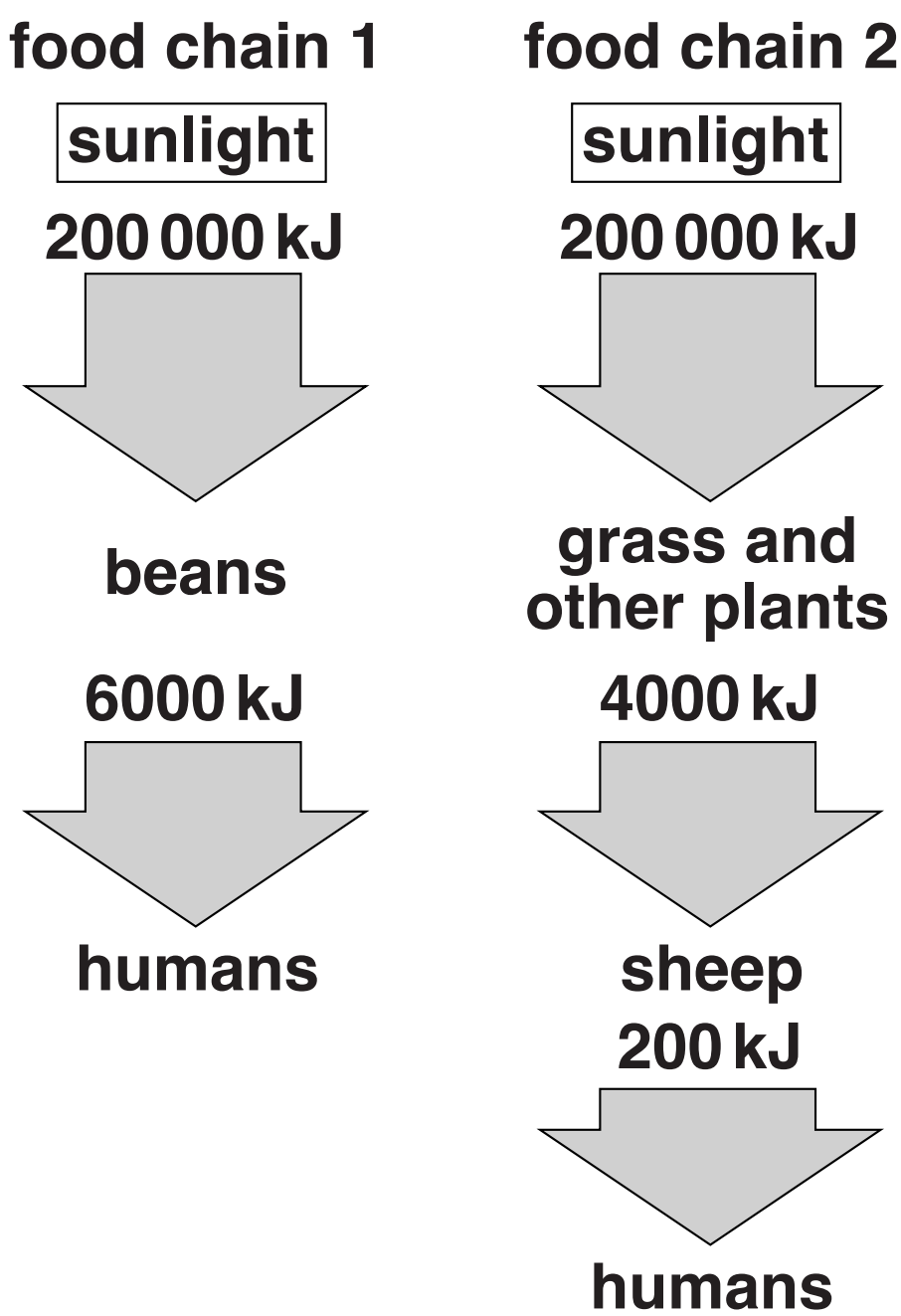
_____

_____ [2]

[TOTAL: 8]

8 Look at the diagram.

It shows the energy flow in two food chains.



Eating plants for food is a better use of energy from the sun than eating meat.

Use the data in the food chains and your scientific knowledge to explain why.

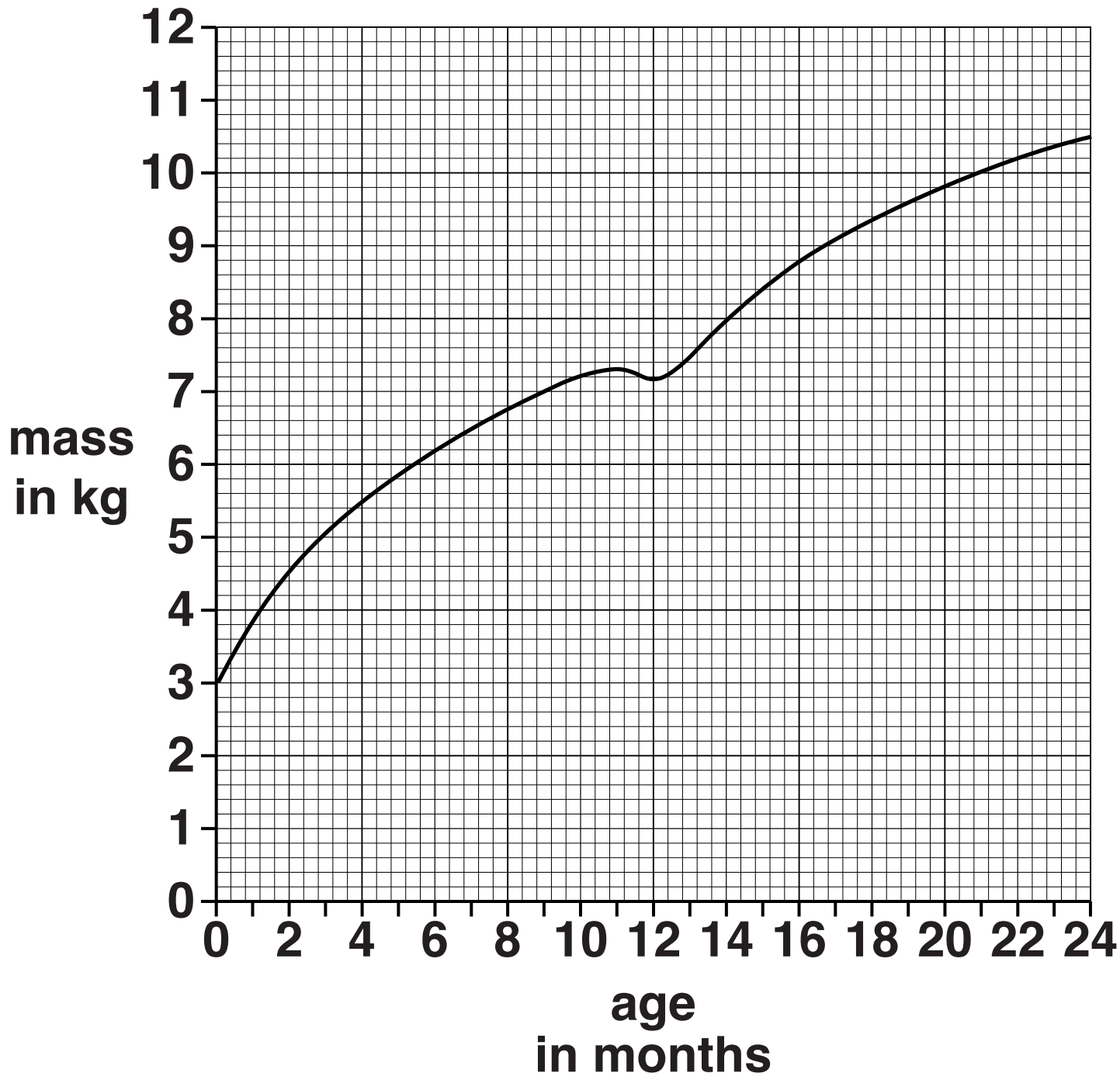
The quality of written communication will be assessed in your answer to this question.

[6]

[TOTAL: 6]

SECTION C – Module B3

9 (a) Lily is a two year old girl. Look at her growth curve.



(i) At what age was Lily growing most rapidly?

_____ **months** **[1]**

(ii) At one stage Lily was ill and her mass did NOT change as expected.

At what age was Lily ill?

_____ months

Explain your answer.

_____

_____ [2]

(b) As Lily grew from an embryo, her cells changed.

Write down the ways Lily's cells changed.

_____

_____

_____ [2]

[TOTAL: 5]

10 Border collies are often used as sheep dogs.

They are able to run quickly and are very intelligent.

(a) Border collies were produced by selective breeding.

Describe how selective breeding can be used to produce dogs like border collies.

The quality of written communication will be assessed in your answer to this question.

[6]

(b) Border collies have 78 chromosomes in each body cell.

(i) How many chromosomes are in a sperm cell from a border collie?

_____ [1]

(ii) How many chromosomes are in a FERTILISED egg cell from a border collie?

_____ [1]

(iii) What substance are chromosomes made from?

_____ [1]

(iv) Which part of a cell contains the chromosomes?

_____ [1]

(c) When border collies run, their breathing and pulse rates have to increase.

Explain why they have to increase.

_____

_____

_____

_____

_____

_____ [3]

[TOTAL: 13]

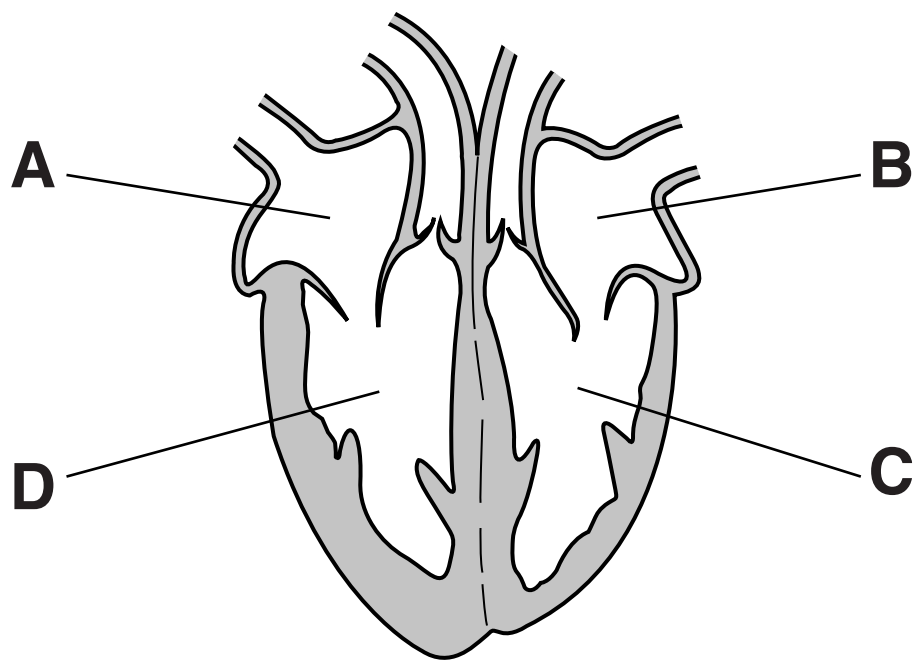
11 About 1 in 10 000 people has a condition called situs inversus.

People with this condition have THEIR ORGANS REVERSED so they are a 'MIRROR IMAGE' of the usual arrangement.

For most people with situs inversus, there are no harmful effects on their health.

However, doctors need to know if someone has the condition if they are going to successfully treat them if they are ill or injured.

(a) The diagram shows the heart from someone with situs inversus, viewed from the front.



(i) Look at the diagram of the heart. Which part pumps blood AROUND THE BODY?

Choose from A, B, C or D, and explain your choice.

_____

_____

_____ [2]

(ii) If someone with situs inversus needs a heart transplant, then a normal heart can be used.

The procedure will be very similar to a normal heart transplant but there will need to be some differences.

Suggest how the procedure will be different.

Explain your answer.

_____

_____

_____

_____ [2]

(b) (i) The population of the UK is about 63 million (63 000 000).

If 1 in 10 000 people has situs inversus, then approximately how many people in the UK have situs inversus?

answer _____ [1]

(ii) All babies in the UK could be x-rayed to test if they have situs inversus.

This information could be kept in their medical records and be available to doctors if they needed it.

Discuss whether all babies in the UK SHOULD be x-rayed to see if they have situs inversus.

Use information from part (i), and other parts of the question, to help you answer.

_____

_____

_____

_____ [2]

[TOTAL: 7]

END OF QUESTION PAPER

ADDITIONAL ANSWER SPACE

If additional space is required, you should use the following lined page(s). The question number(s) must be clearly shown in the margins.

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