

Friday 16 June 2017 – Morning

**GCSE GATEWAY SCIENCE
BIOLOGY B**

B732/01 Biology modules B4, B5, B6 (Foundation Tier)

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)

Duration: 1 hour 30 minutes



Candidate forename		Candidate surname	
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Centre number						Candidate number				
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INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above. 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.
- Do **not** write in the barcodes.

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 **85**.
- This document consists of **28** pages. Any blank pages are indicated.

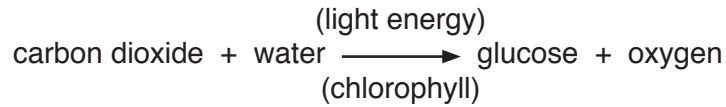
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Answer **all** the questions.

SECTION A – Module B4

- 1 Look at the equation for a process that occurs in plants.



- (a) What is the name of the process shown in the equation?

..... [1]

- (b) Carbon dioxide and water enter a plant at different points.

Finish these sentences to show where water and carbon dioxide enter plants.

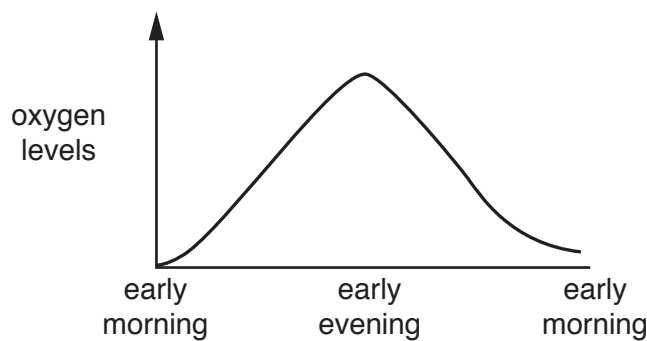
Water enters a plant through the

Carbon dioxide enters a plant through the [2]

- (c) Josh investigates how oxygen levels change in a pond.

He uses a probe to measure the levels of oxygen in the pond at different times of the day.

The graph shows his results.



The pond is full of plant life.

Use the equation to explain the pattern in the graph.

..... [2]

- 2 Mia investigates the effect of two liquids on animal cells.

She puts 5 cm³ of distilled water into test tube **A**.

She puts 5 cm³ of concentrated salt solution into test tube **B**.

Mia then adds 3 drops of blood to each of the test tubes.

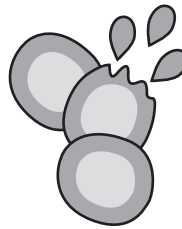
She records the appearance of the test tubes as soon as the blood is added and then again after 2 minutes.

Here is her results table.

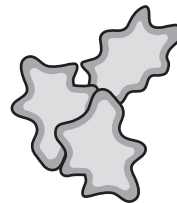
Test tube	Contents	Appearance at start	Appearance after two minutes
A	distilled water and blood	cloudy	clear red liquid
B	concentrated salt solution and blood	cloudy	cloudy

The diagrams show what has happened to the cells in the different liquids.

in test tube **A**



in test tube **B**



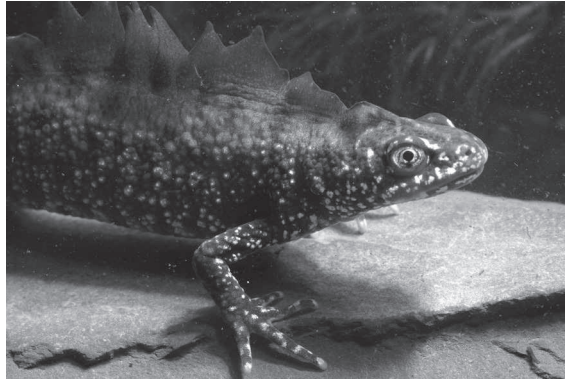
Use ideas about **osmosis** to explain the results.



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

[6]

- 3 The photograph shows a great crested newt.



Great crested newts live in ponds.

Scientists monitor the population of newts in a pond over 5 years.

They do this by collecting a sample of newts swimming in the pond.

- (a) Which piece of apparatus would they use to collect the newts?

Put a ring around the correct answer.

net

pooter

quadrat

pit fall trap

[1]

- (b) The scientists use the numbers of newts they collect to estimate the population.

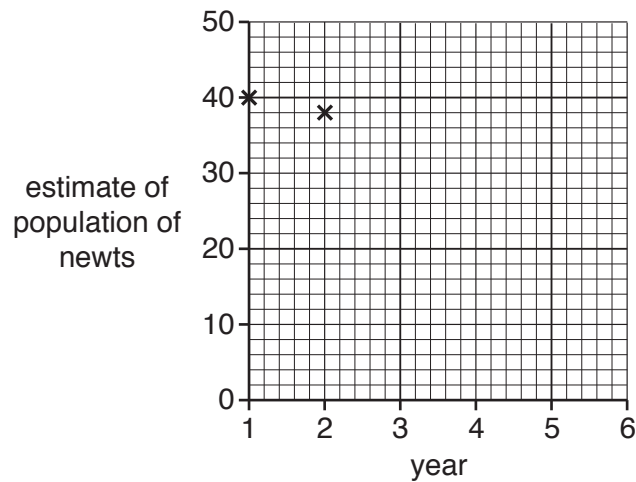
The table shows their estimates.

year	Estimate of population in pond
1	40
2	38
3	36
4	26
5	16

- (i) Plot the estimates onto the graph.

The first two points have been done for you.

[1]



- (ii) Use a line of best fit to predict a population estimate for year 6.

estimate = newts.

[1]

- (iii) The scientists are concerned about the newt population.

Use the data to suggest why they might be concerned.

.....

 [2]

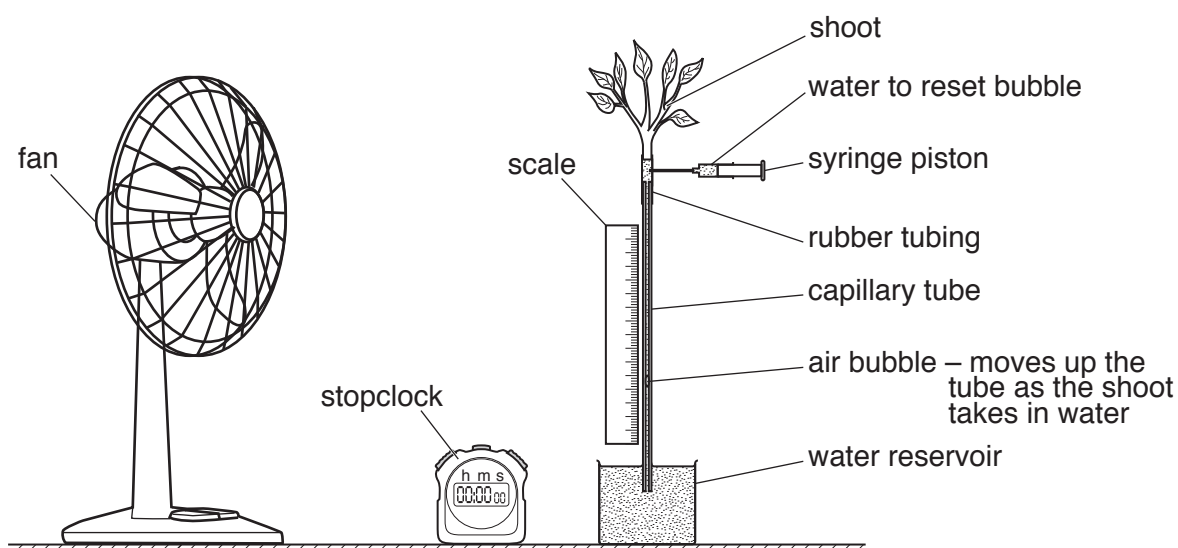
- (c) The scientists are studying the **population** of newts in the pond.

The newts are also part of a **community** living in the pond.

Explain the difference between the terms population and community.

.....
 [1]

The apparatus in the diagram can be used to measure the rate of transpiration.



Describe how to use the apparatus to investigate how air movement affects the rate of transpiration.

[3]

- 5 Farmers can use organic or intensive farming methods to grow crops.



- (a) Organic farming does not use pesticides but intensive farming does.

Write about **two other** differences between organic and intensive farming methods.

.....

.....

..... [2]

- (b) There are different types of pesticides used in intensive farming.

Draw a straight line from each of the **pesticides** to its correct **use**.

pesticides	use
fungicides	kill small animals eating the crops
herbicides	kill plants competing with the plants
insecticides	control infections such as mould

[1]

- (c) Some people agree with the use of pesticides and others disagree with the use.

Suggest reasons why people may have different opinions.

.....

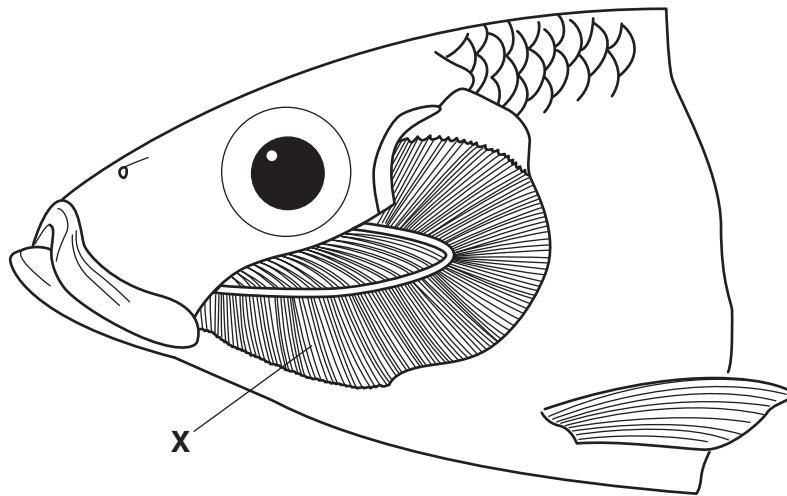
.....

.....

..... [2]

SECTION B – Module B5

- 6 Look at the diagram of the head of a fish.



- (a) The part labelled **X** is used by the fish for gas exchange.

- (i) What is the name of part **X**?

..... [1]

- (ii) Part **X** has a **large** surface area.

How does having a large surface area affect gas exchange?

.....
 [1]

- (b) In humans, gas exchange happens in the lungs.

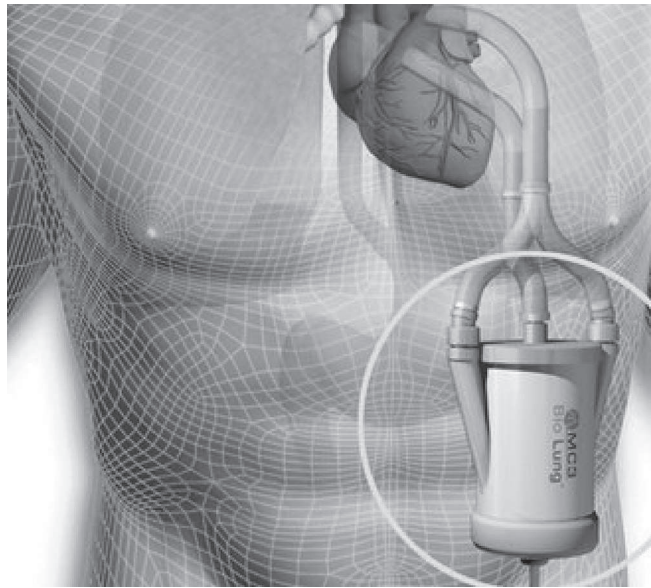
Asbestosis is a disease that affects the lungs.

Describe how asbestosis affects the lungs.

.....

 [2]

- (c) The picture shows an artificial lung.



Scientists have developed an artificial lung that can be attached to the heart.

The heart pumps blood into the lung.

Gas exchange takes place inside the artificial lung.

The blood then passes back into the body.

- (i) Finish these sentences about the artificial lung.

Choose words from this list.

dialysis

fertilisation

insemination

respiration

trauma

Someone may need the artificial lung to replace lungs damaged by disease or

..... .

Carbon dioxide is removed from the blood inside the artificial lung.

The carbon dioxide is made by the process of

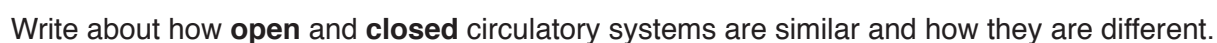
[2]

- (ii) Before the artificial lung can be used it has to be tested.

Suggest why.

.....

..... [1]



Use the diagrams and your scientific knowledge to help you.



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

[6]

13
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- 8 Wrestling is a physical sport in which people often get injured.



Some wrestlers were surveyed to find out about their injuries.

They were asked to list any injury that had stopped them competing during one year.

The table shows the results.

Type of injury	Number of wrestlers listing that injury
bruising	7
dislocation	19
fracture	29
graze	2
open wound	5
sprain	42
no injury	31

- (a) Which was the **most** common injury?

..... [1]

- (b) 132 wrestlers were interviewed in the survey.

Did any of the wrestlers list more than one injury?

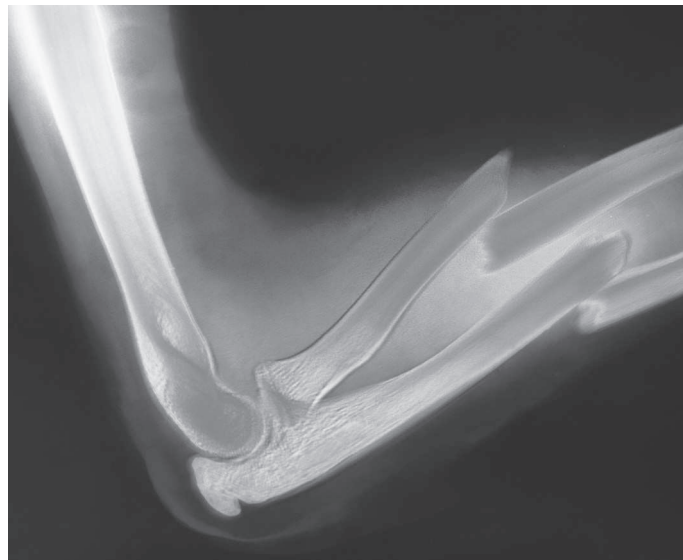
Use a calculation to explain your answer.

.....

 [2]

- (c) The X-ray shows the injury of one of the wrestlers.

The injury is a fracture in the lower arm.



- (i) Write about the injury seen in the X-ray.

Include ideas about:

- the type of fracture
- the names of the bones that have been fractured.

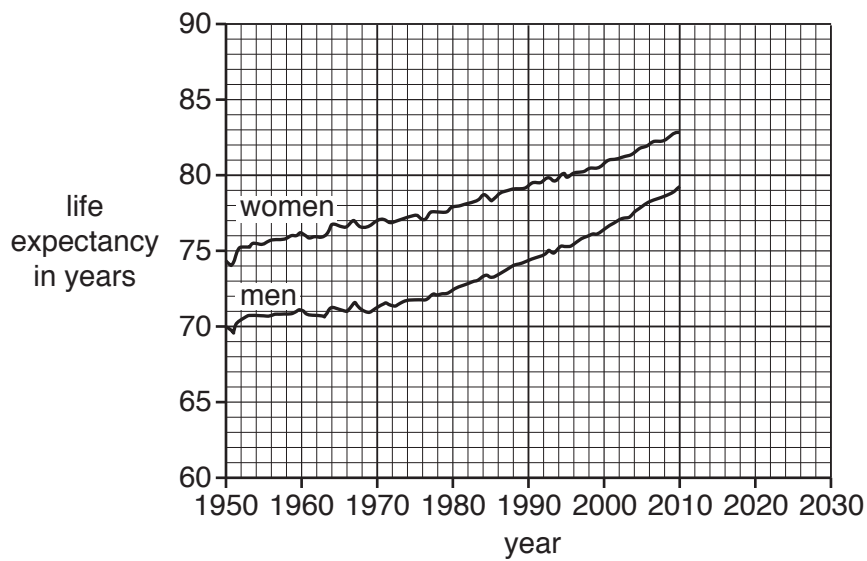
.....

 [3]

- (ii) Which **type** of joint is seen in the X-ray?

..... [1]

- 9 The graph shows how life expectancy has changed in England and Wales from 1950 to 2010.



- (a) Suggest **two** reasons for the change in life expectancy since 1950.

.....

.....

.....

..... [2]

- (b) Continue the two lines on the graph to predict the life expectancy ages in 2030.

- (i) Write down **two** conclusions about the predicted life expectancies in 2030.

.....

.....

.....

..... [2]

- (ii) Suggest **one** reason why any prediction may **not** be correct.

.....

..... [1]

SECTION C – Module B6

- 10 The image shows patterns made from the DNA found at a crime scene and from four suspects.

crime DNA	suspects			
	1	2	3	4
	████████			
████████		████████	████████	
████████	████████	████████	████████	
			████████	
████████		████████		████████
	████████		████████	
			████████	████████
████████		████████		
	████████		████████	████████

- (a) What is the pattern called and why can it be used to identify a person?

.....

 [2]

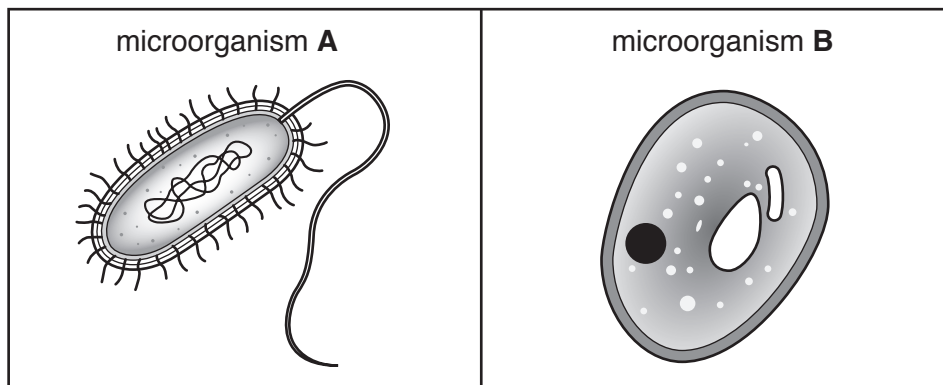
- (b) Which suspect left their DNA at the crime scene?

Give a reason for your answer.

suspect

reason
 [1]

11 Look at the diagrams of two different microorganisms.



(a) One of the microorganisms is yeast and one is a bacterium.

Which is a bacterium? Choose from **A** or **B**

Write down **two** reasons for your answer.

1

2

[2]

(b) After an earthquake, diseases can spread rapidly.

Which diseases are often spread by **bacteria** after an earthquake?

Put a ring around **two** correct answers.

athlete's foot

chicken pox

cholera

food poisoning

influenza

[2]

- 12 Many water companies release treated sewage back into rivers in places called sewage outfall.



Most sewage outfalls are monitored for pollution by the environment agency.

In 1989 there were a number of outfalls not being monitored.

These outfalls were identified and named TDC outfalls.

Water companies have been told to reduce these TDC outfalls by allowing the environment agency to monitor them.

The table shows how the number of TDC outfalls has changed in some areas.

Water company progress in reducing TDCs		
	number of TDCs in 1989	number of TDCs in 2016
Anglian	328	328
Northumbrian	9	9
South West	62	46
Southern	29	29
Thames	1787	400
United Utilities	650	650
Wessex	152	84
Yorkshire	234	234

- (a) Which water company had made the **most** progress in reducing the number of TDCs?

..... [1]

- (b) Why is it important to reduce the number of TDC outlets?

.....

 [2]

13 This question is about biofuels.

- (a)** Gasohol is a biofuel that contains alcohol.

Finish the sentences about gasohol.

Alcohol can be made using a microorganism called

To make gasohol the alcohol is then mixed with

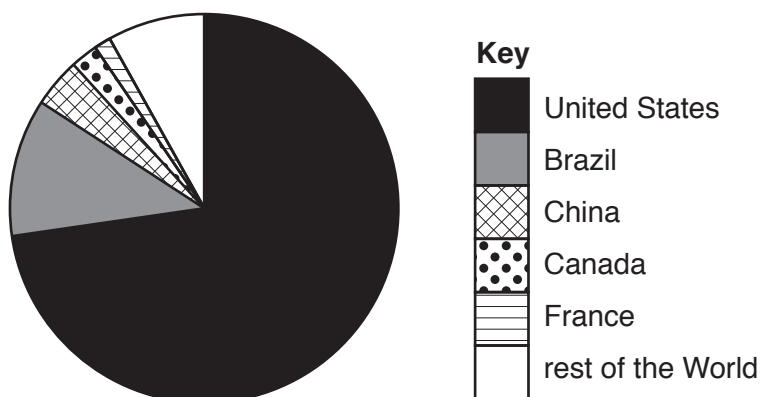
[2]

- (b)** Biogasoline is another type of biofuel that can be made from sugar cane.

Look at the pie chart.

It shows the amount of biogasoline produced in one year.

World: 18 689 thousand tons



- (i)** Which country produced the most biogasoline in one year?

..... **[1]**

- (ii)** Brazil produced 2200 thousand tons of biogasoline.

Calculate this as a percentage of World production.

Give your answer to three significant figures.

.....%

[2]

- (iii) The rest of the World produced 3.3% of the biogasoline in that year.

Compare the percentage produced by Brazil and the rest of the World.

Suggest reasons for the difference.

.....

.....

.....

..... [2]

- (c) Four friends make these statements about biofuels.



Identify **one** of the friends' statements that may only be opinion rather than fact.

Use the information in question 13 to explain your answer.

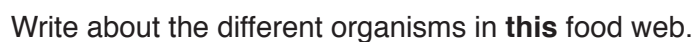
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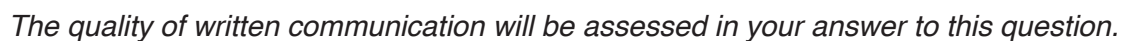
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..... [2]



- which organisms are detritivores, carnivores or decomposers
- how **earthworms** help improve the structure and fertility of the soil.



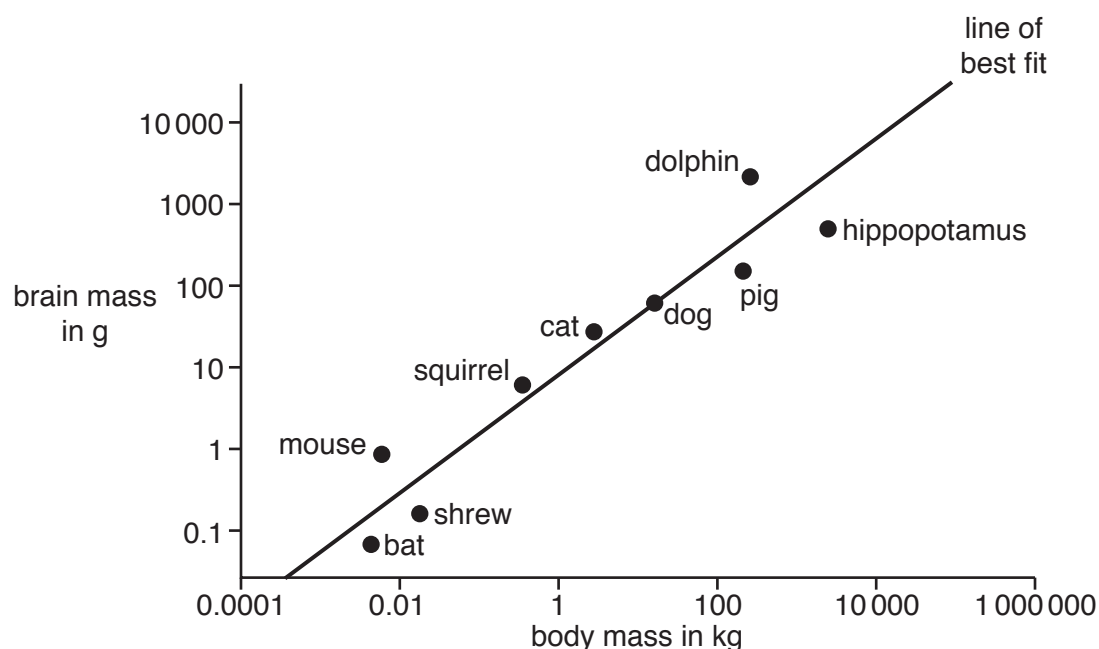
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23
SECTION D

15 (a) Look at the graph.

It shows the brain mass and body mass of some different animals.

A student has drawn a line of best fit on the graph.



(i) Which animal has the smallest brain mass?

..... [1]

(ii) Which animal has the largest body mass?

..... [1]

(iii) Has the student drawn a correct line of best fit?

Explain your answer.

.....

.....

.....

..... [2]

- (b) Look at the table about some different animals.

It shows the mean (average) body mass, brain mass and **relative** brain mass.

The **relative** brain mass is the percentage (%) that the brain mass is of the body mass.

Animal	Body mass in g	Brain mass in g	Relative brain mass (% of body mass)
marmoset monkey	320		2.5
rhesus monkey	7 750	93	1.2
chimpanzee	48 750	390	0.8
gorilla	100 000	500	0.5
elephant	4 148 000	4148	0.1

- (i) For the marmoset monkey, its brain mass is 2.5% of its body mass.

Calculate its brain mass.

Use information from the table.

You should show your working.

answer = g

[2]

- (ii) Look at the information in the table.

What patterns can you see between body mass, brain mass and **relative** brain mass?

.....

.....

.....

..... [2]

- (iii) The mean (average) body mass, brain mass and **relative** brain mass of a human is shown in this table.

Animal	Body mass in g	Brain mass in g	Relative brain mass (% of body mass)
human	66 500	1330	2.0

Do humans fit the patterns shown by the other animals?

Explain your answer.

.....

.....

.....

..... [2]

END OF QUESTION PAPER

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