

Friday 12 June 2015 – Afternoon

**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. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).
- Do **not** write in the bar codes.

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 (a) Some farmers use intensive farming methods.

Other farmers use organic farming methods.

Put **one** tick (✓) in each **row** of the table to show if the farming method is intensive or organic.

One has been done for you.

Farming method	Intensive	Organic
use of artificial fertilisers		
use of battery farming		
use of biological control		
use of glasshouses	✓	
use of pesticides		

[2]

(b) (i) Insecticides are a type of pesticide.

Some insecticides are used in liquid form.

They are poured onto the soil around a plant.

They are absorbed by the plant and transported to the leaves to kill insects feeding there.

Suggest which part of a plant absorbs the insecticide and which part transports the insecticide to the leaves.

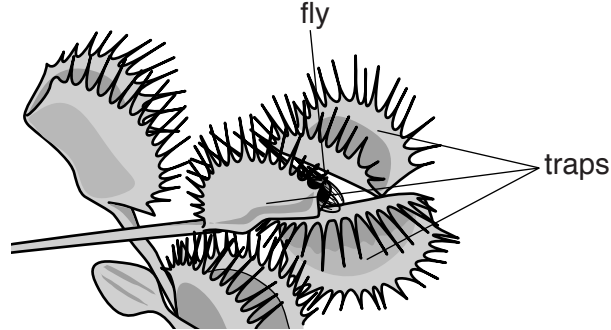
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..... [2]

(ii) Herbicides are another type of pesticide.

What do herbicides kill?

..... [1]

2 The venus flytrap is a plant that lives in very wet ground, such as bogs.
Bogs contain very low levels of minerals, such as nitrates, that plants need for growth.
The venus flytrap catches insects which it digests to get minerals.



(a) Bogs contain very low levels of minerals because the rate of decay is very slow.

This is because of the conditions in bogs.

Suggest why the rate of decay in bogs is very slow.



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

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..... [6]

(b) The traps on the venus flytrap are modified leaves.

The traps are green.

Suggest why they are green.

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..... [2]

(c) Venus flytraps are small plants and only grow up to 10 cm tall.

Although they grow in bogs, they do **not** grow well in places where other types of plants are growing.

Suggest why not.

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..... [2]

(d) The traps close when water moves out of some cells and into others.

By what process does water move in and out of cells?

..... [1]

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3 Wilson grows tomatoes in a glasshouse.

The more the tomato plants photosynthesise, the bigger the crop of tomatoes.

(a) (i) What is the word equation for photosynthesis?

Put a tick (✓) next to the correct equation.

carbon dioxide + water → glucose + oxygen

carbon dioxide + glucose → water + oxygen

water + oxygen → glucose + carbon dioxide

glucose + oxygen → water + carbon dioxide

[1]

(ii) Which of the following statements is correct?

Put a tick (✓) next to the correct statement.

plants photosynthesise only when it is light

plants respire only when it is light

plants respire only when it is dark

plants photosynthesise only when it is dark

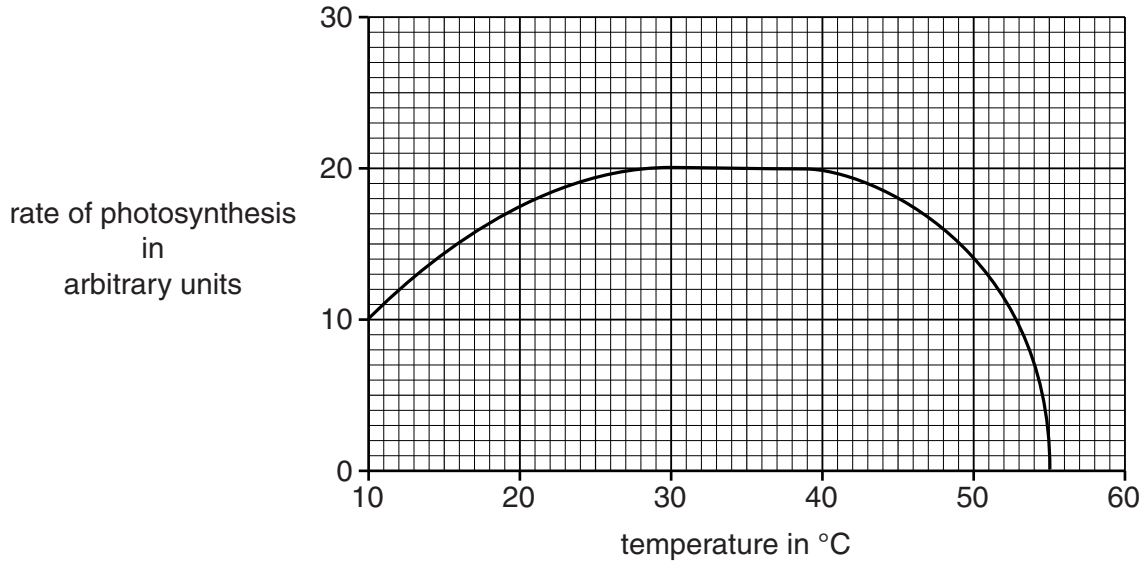
[1]

(b) Wilson knows that the rate of photosynthesis depends on temperature.

He wants to use heaters in his glasshouse to make his tomato plants photosynthesise faster.

He wants to find out the best temperature to have in his glasshouse.

Look at the graph.



(i) **Describe** what the graph shows. Use data in your answer.

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..... [3]

(ii) According to the graph, what is the best temperature for Wilson to have in his glasshouse?

..... °C

Explain your answer.

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..... [2]

(iii) Before Wilson decides to use heaters in his glasshouse, suggest what else he should consider, apart from the increased rate of photosynthesis.

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..... [2]

10
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SECTION B – Module B5

4 (a) This question is about the respiratory system.

Draw straight lines to join each **part of the respiratory system** to its **job**.

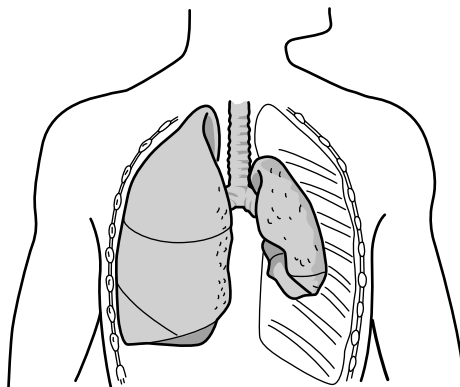
part of the respiratory system	job
alveoli	traps microbes in mucus
lining of the bronchi	gases are exchanged
intercostal muscles	moves the ribs during breathing

[2]

(b) Tim has been in an accident.

One of his lungs will not inflate properly when he breathes in.

A doctor thinks that this is because one of Tim’s ribs has broken.



Finish these sentences about Tim’s injury.

Write the correct word in each gap.

Tim’s rib has broken into two pieces but has not damaged the skin.

This type of fracture is called a fracture.

The doctor thinks that Tim’s lung will not inflate because that side of his chest is not airtight.

This could be because the broken rib has punctured the membrane.

The doctor wants to investigate further by taking a picture of Tim’s chest.

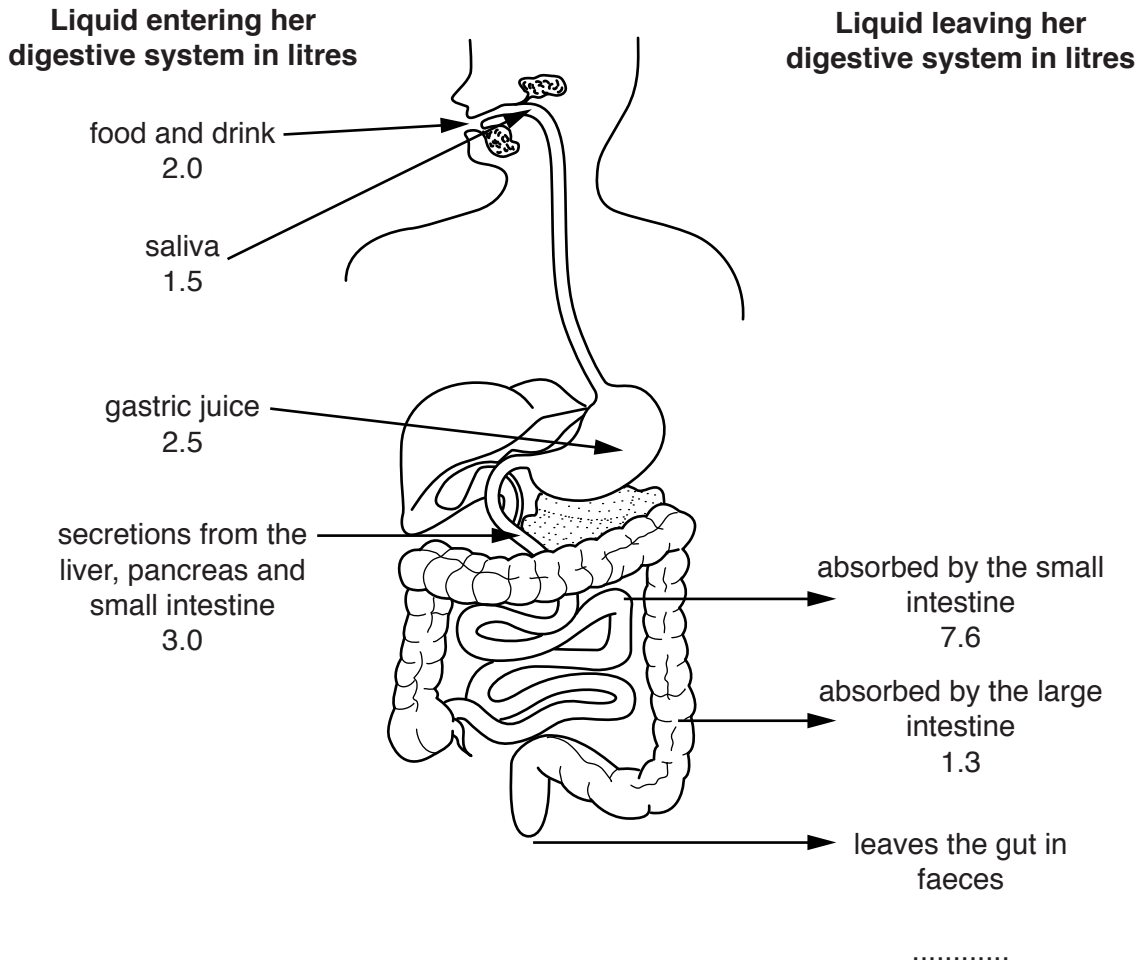
He is going to use an machine to do this.

[3]

5 Kyra is having a quiet day at home.

Liquid enters and leaves different parts of her digestive system.

The diagram shows how much liquid enters and leaves each part during this day.



(a) 2.5 litres of gastric juice are released into Kyra’s digestive system.

Which organ makes gastric juice?

..... [1]

(b) 1.5 litres of saliva are released into Kyra’s digestive system.

Write about what saliva does.

.....

 [2]

- (c) (i) Each day, the volume of liquid entering Kyra’s digestive system equals the volume leaving her system.

Calculate the volume of liquid lost in Kyra’s faeces during each day.

answer = litres

[2]

- (ii) The next day is hot and Kyra plays a long tennis match.

She drinks much more liquid during this day.

The amount of liquid she loses in her faeces stays the same.

Write about:

- where the liquid Kyra drinks enters her bloodstream
- and how any extra liquid is lost from her body.

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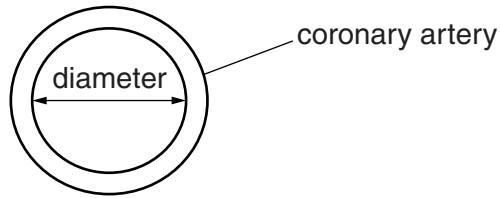
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..... [3]

6 This question is about coronary heart disease.

The heart is supplied with blood by the coronary artery.

The inside diameter of the coronary artery can be measured.

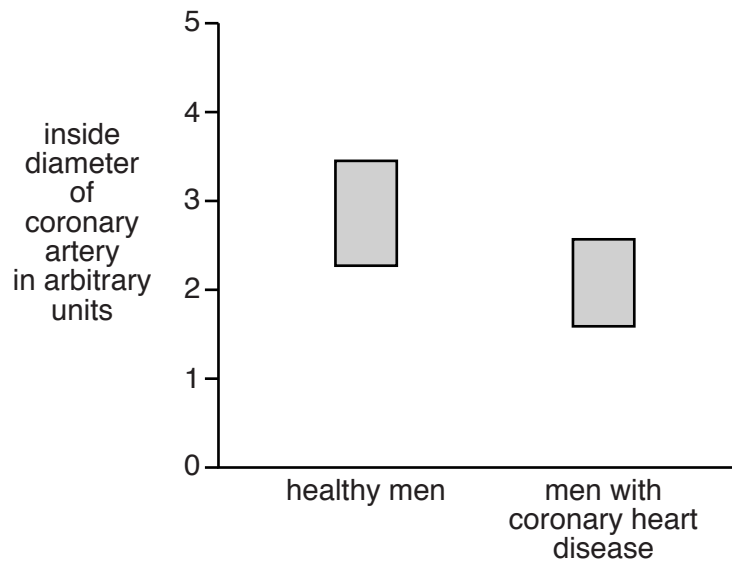


This diameter was measured in two groups of men.

One group was healthy men.

The other group was men with coronary heart disease.

The range of diameters for each group is shown in the graph.



7 Sometimes people need to have their organs replaced by donor organs.

Many of these donor organs are taken from dead people.

There are different systems of deciding whether the organs of a dead person can be used.

- **Opt in** – the organs can only be used if the person carries a donor card or is on the donor register.
- **Opt out** – the organs can be used unless the person has said no while they were alive.

Two doctors are talking about organ donation.

I think **opt out** is best.
It would give us more organs to use for transplants.
This means we would have fewer difficult ethical decisions to make.

Dr Grace



Opt out may provide more organs but I think there could be problems.
Relatives might think that the donor has forgotten to opt out.
We could then have difficult ethical decisions to make.

Dr Henshaw



(a) Both doctors are talking about ethical decisions.

Write about the ethical decisions that each doctor is talking about.

Dr Grace

.....

.....

Dr Henshaw

.....

..... [2]

(b) Dr Grace thinks that in an **opt out** system more people will donate their organs.

(i) Suggest why this might happen.

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..... [2]

(ii) The table shows the number of people in different countries who donated organs in 2008.

System used	Country	Number of people donating organs per million people in the country
Opt out	Spain	34.2
	Portugal	26.7
	Poland	11.2
		mean (average) = 24.0
Opt in	UK	14.7
	Germany	14.6
	Netherlands	12.8
		mean (average) = 14.0

How well does the data in the table support Dr Grace’s prediction?

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..... [2]

SECTION C – Module B6

8 Enzymes have many household and industrial uses.

(a) Draw straight lines to join each **use** with the correct **function of the enzyme**.

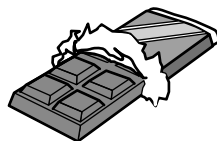
One has been done for you.

Use	Function of the enzyme
on reagent test strips	digests food materials in stains
in the sweet industry	digests the cell walls in fruit
in extracting juice	breaks down sucrose to other sugars
in washing powders	detects glucose in urine

[2]

(b) Read the article about using enzymes to make chocolate.

Using enzymes to make better chocolate



Chocolate is made from cocoa seeds.
The fresh seeds have to be treated to produce the chocolate flavour.

Scientists think that they can use protease enzymes to treat the seeds.
They claim that the chocolate tastes 50% better.
The enzymes can be made by genetic engineering.
This might also help the chocolate manufacturers.

(i) Which substance in the cocoa seeds is digested by protease enzymes?
..... [1]

(ii) The scientists claim that the chocolate tastes 50% better.
Why can this only be a claim and **not** scientific proof?
.....
.....
..... [2]

(iii) The protease enzyme can be made by genetically engineered bacteria.
Suggest **one** advantage to the chocolate manufacturer of getting enzymes by this method.
.....
..... [1]

9 There are many different types of microorganisms that live in soil.

The table gives the average number of each type of microorganism in one gram of soil.

Type of microorganism	Average number of microorganisms in one gram of soil
viruses	150 000 000
bacteria	3 000 000
fungi	1 000 000

(a) Which type of microorganism shown in the table is the smallest?

..... [1]

(b) Lucy wants to find out if the soil in her garden contains the average number of bacteria.

She mixes one gram of soil with water.

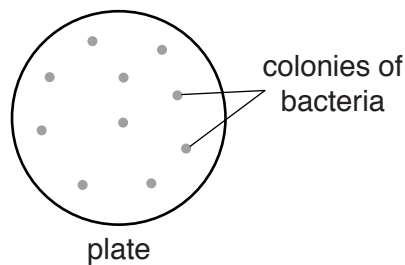
She then **dilutes** this mixture and spreads some on an agar plate.

The mixture in the agar plate contains 100 000 times fewer bacteria than in the soil.

She puts the plate in an incubator.

Each single bacterium reproduces to form a colony.

Here are her results.



Do the results show that Lucy's soil contains the average number of bacteria?

Use the results from the plate and the data in the table to work out your answer.

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 [2]

(c) As well as microorganisms, earthworms also live in soil.

Why are earthworms important in soil?

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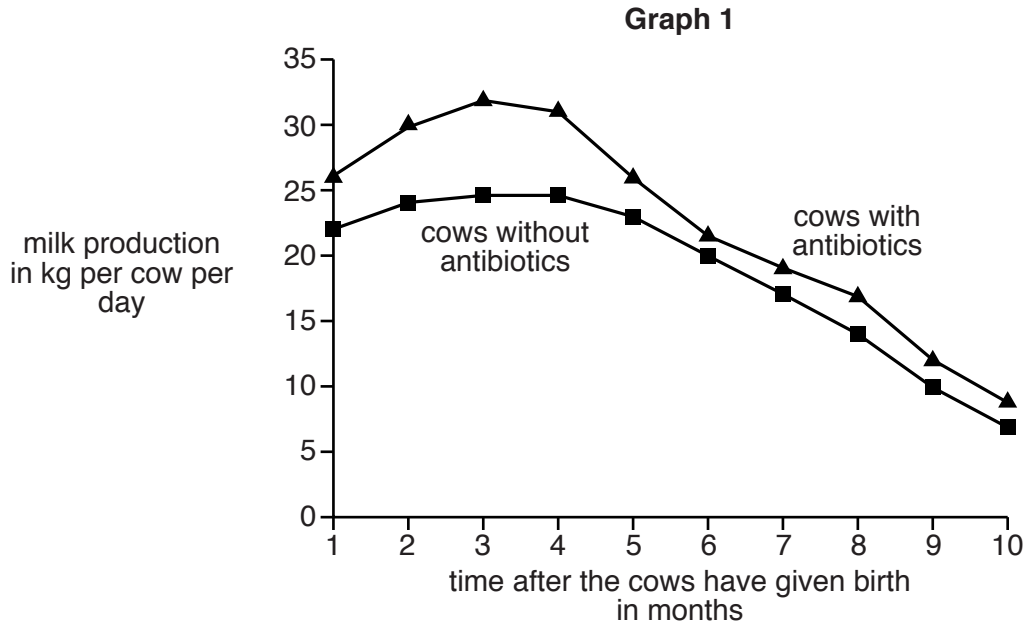
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..... [2]

10 (a) Some farmers give their cows antibiotics.

Graph 1 shows the milk production for two groups of cows.

One group are given antibiotics regularly and the other group are not given any.



A farmer decides to give his cows antibiotics for five months after they have given birth.

The antibiotics cost the farmer money.

Suggest why he gives them antibiotics and why he stops after five months.

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..... [2]

11 Lake Tahoe is a large lake in California.

(a) Microscopic plants live in the lake and photosynthesise.

Put a ring around the name of the microscopic plants in this list.

fungi phytoplankton yeast viruses zooplankton

[1]

(b) In 1968, people noticed that the microscopic plants were increasing in numbers.

They thought it could be a sign that the lake was becoming more polluted by fertilisers.

If many plants die at once then this could cause fish in the lake to die.

Explain how the death of large numbers of plants could cause the death of fish.

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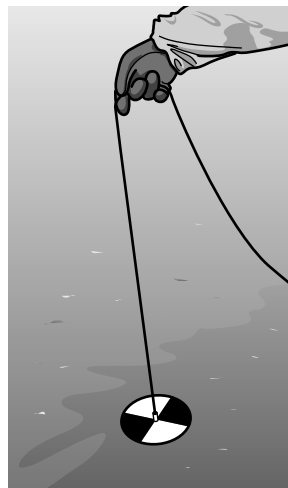
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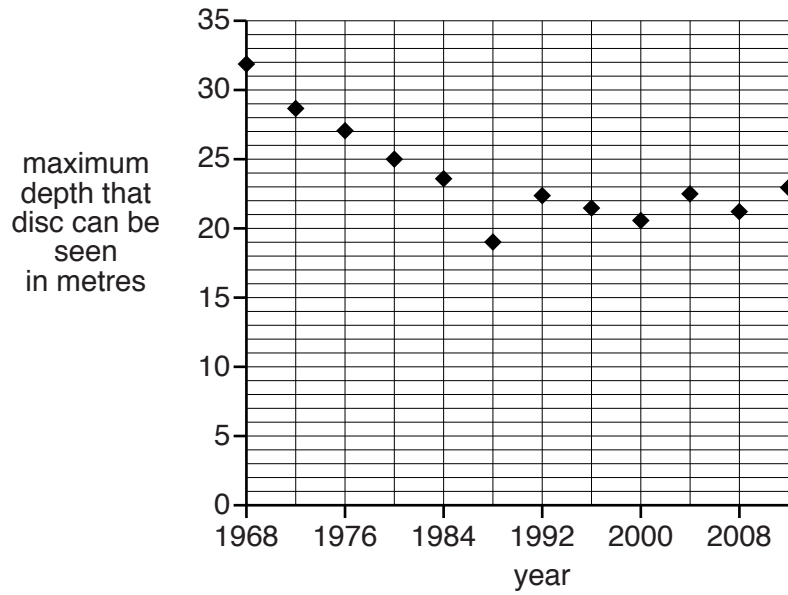
(c) Scientists have been taking measurements of how clear the water is in Lake Tahoe since 1968.

A black and white disc is slowly lowered into the water.

When the disc cannot be seen, the depth of the disc is measured.



The graph shows the results for Lake Tahoe.



- (i) The graph provides some evidence that pollution by fertilisers in the lake was getting worse after 1968.

Describe and explain this evidence.

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..... [2]

- (ii) In the year 2000, scientists put plans in place to try to stop fertilisers getting into the lake.

Does the graph give any evidence that the scientists are being successful? Explain your answer.

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..... [1]

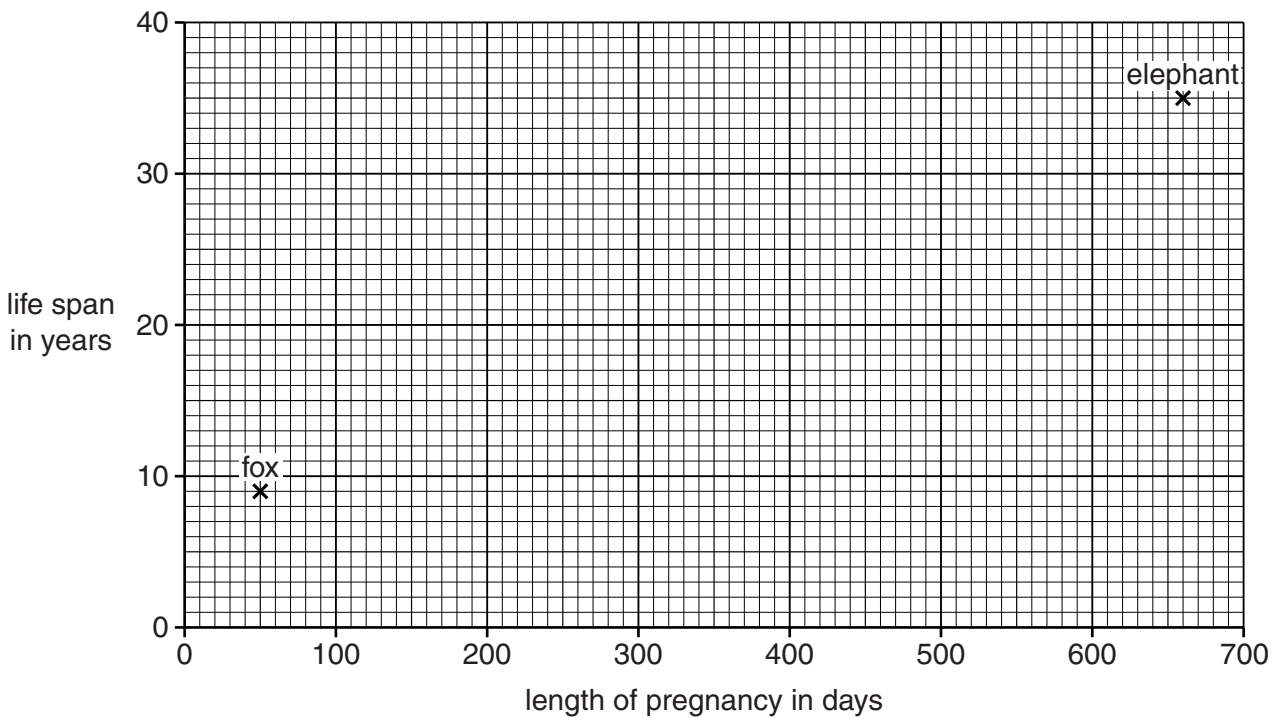
SECTION D

12 (a) Look at the table about African mammals.

It shows the mean (average) lengths of pregnancy and life spans.

Mammal	Length of pregnancy in days	Life span in years
fox	50	9
lion	110	10
hippopotamus	240	30
gorilla	260	20
giraffe	425	10
elephant	660	35

Look at the graph.



(i) Plot the points for all the other mammals. [2]

(ii) Discuss whether these results show a link between length of pregnancy and life span.

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..... [2]

- (iii) Joe says that there are **not** enough results in the table to decide if there is a pattern between length of pregnancy and life span for **all animals**.

Do you agree with Joe? Explain your answer.

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..... [2]

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

It shows the mean (average) mass, heart rate and life span.

It also shows the mean (average) number of heart beats in a life time, in billions.

(1 billion = 1 thousand million.)

Animal	Mass in g	Heart rate per minute	Life span in years	Life time heart beats in billions
hamster	60	450	3	0.7
chicken	1 500	275	15	2.2
cat	2 000	150	15	1.2
pig	150 000	70	25	0.9
horse	1 200 000	44	40	0.9
whale	120 000 000	20	80	0.8

(i) Look at the information in the table.

What patterns can you see between mass, heart rate and life span?

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..... [2]

(ii) The ‘heart beat hypothesis’ states that:

‘every animal has a similar number of heart beats in its life time’.

Discuss whether or not the information in the table supports the ‘heart beat hypothesis’.

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..... [2]

END OF QUESTION PAPER