

Tuesday 12 June 2012 – Morning**GCSE GATEWAY SCIENCE
BIOLOGY B****B632/02** Unit 2 Modules B4 B5 B6 (Higher 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

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 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 **60**.
- This document consists of **24** pages. Any blank pages are indicated.

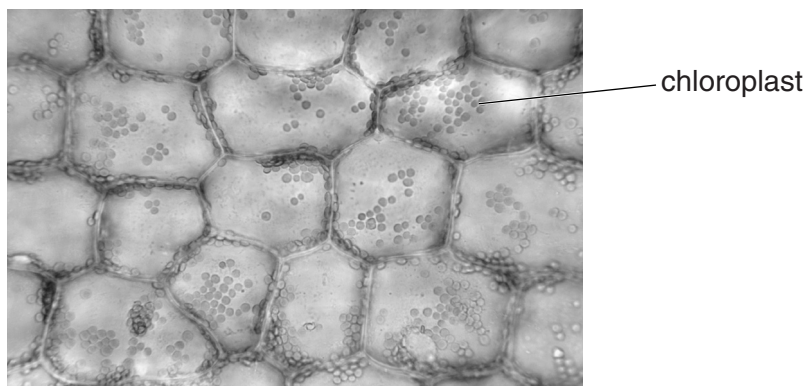
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3

Answer **all** the questions.**Section A – Module B4**

- 1 Look at the picture of chloroplasts in some plant cells.



- (a) Palisade cells have more chloroplasts than spongy mesophyll cells.

Explain why.

..... [1]

- (b) Chloroplasts contain chlorophyll.

Plants need magnesium to make chlorophyll.

Plants deficient in magnesium do not grow as well as healthy plants.

Write down **one other** sign of magnesium deficiency in a plant.

..... [1]

- (c) Plants also need the element phosphorus.

Write down **two** reasons why plants need phosphorus.

1

.....

2

..... [2]

- (d) Plants take in phosphorus in the form of phosphates by active transport.

Explain why plants need to use active transport.

.....

..... [1]

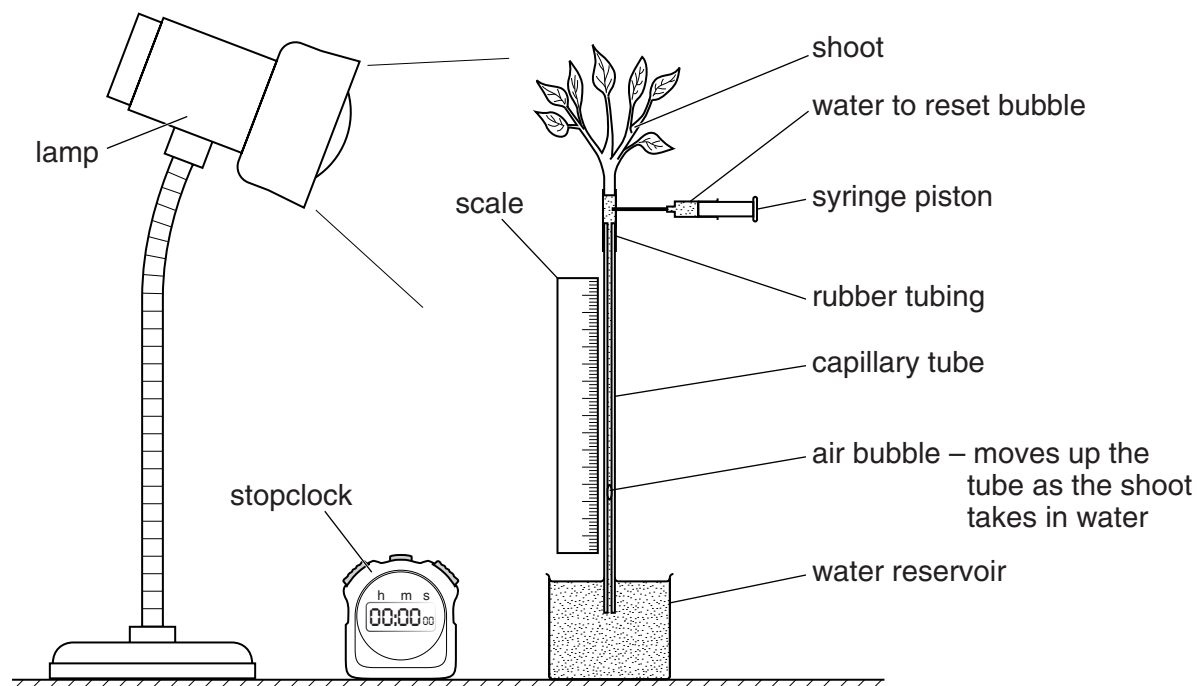
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Turn over

2 Look at the diagram.

The apparatus can be used to investigate the rate of transpiration.

Transpiration is the loss of water from the leaves.



(a) Peter uses the apparatus to investigate transpiration rate.

He finds that the air bubble moves 4.5 cm in 15 minutes.

Peter places a clear plastic bag over the leaves.

He then repeats his experiment while controlling all other variables.

Suggest how far the air bubble might move in 15 minutes.

answer cm

Explain your answer.

.....

.....

.....

.....

.....

..... [4]

5

(b) Transpiration involves the movement of water.

Translocation also involves moving substances through the plant.

Write down **two** ways translocation is different from transpiration.

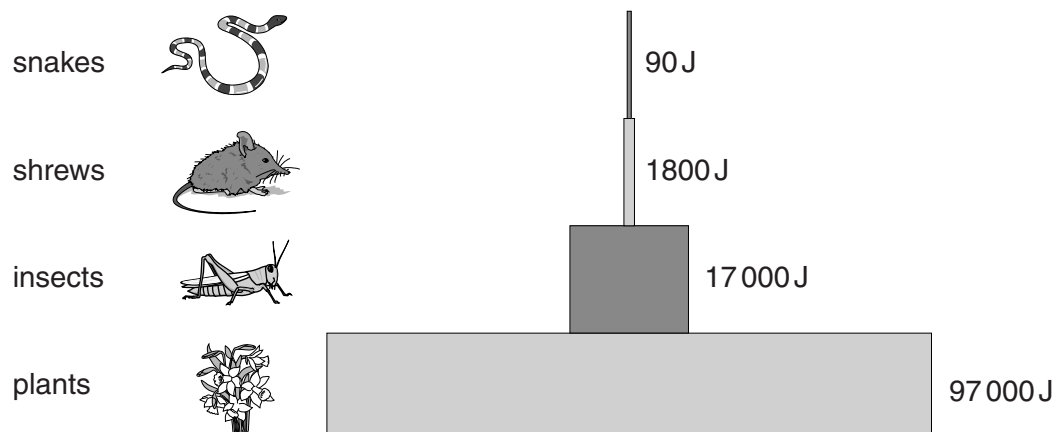
1

2 [2]

[Total: 6]

3 Look at the diagram.

It shows the amount of energy at each stage of a food chain.



(a) The percentage energy transfer from the plants to the insects is 17.5%.

(i) Calculate the percentage energy transfer from the shrews to the snakes.

Show your working.

.....

answer % [2]

(ii) Not all the energy is transferred from one level to the next.

Describe **one** reason why.

.....
 [1]

(b) The diagram shows a food chain from farmland.

It is unusual to have more than four trophic levels in a food chain.

Use the data to explain why.

.....
 [1]

7

- (c) One year the farmer sprays the plants with insecticides to kill insects.

Snakes are then found to contain large amounts of insecticides in their bodies.

Explain why.

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

[Total: 5]

- 4 Ceri grows tomato plants.

Look at the picture of her tomato plants.



- (a) Her plants need water.

Put ticks (✓) in the boxes next to **two** correct statements about water in plants.

water is absorbed by active transport

☐

water diffuses out of the leaves through stomata

☐

water loss is reduced by having partially permeable cell walls

☐

water is the only substance needed to grow plants using hydroponics

☐

water and cell walls are needed for support

☐

[2]

- (b) Ceri's tomatoes are growing on her patio. They become covered in greenfly.

Ceri tries to use ladybirds as a biological control.

Ladybirds eat greenfly.

Three weeks later her tomatoes are still covered in greenfly.

Suggest why.

.....

..... [1]

9

(c) Ceri picks too many tomatoes to eat at once.

She makes some tomato pickle by cooking the tomatoes in vinegar.

Explain why vinegar preserves the tomatoes.

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

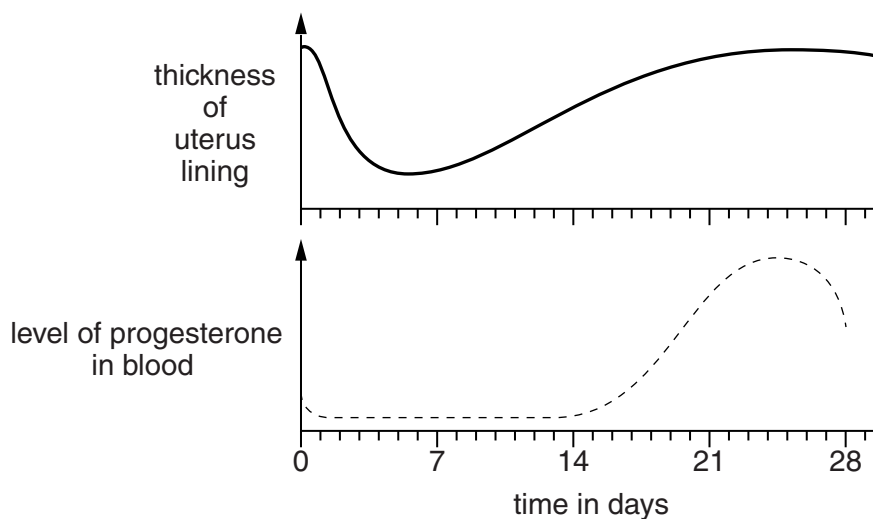
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Section B – Module B5

5 Linda is trying to get pregnant.

(a) The graph shows the changes taking place in the uterus during her menstrual cycle.

It also shows the level of progesterone in her blood.



(i) Write down **one** function of progesterone in the control of Linda's menstrual cycle.

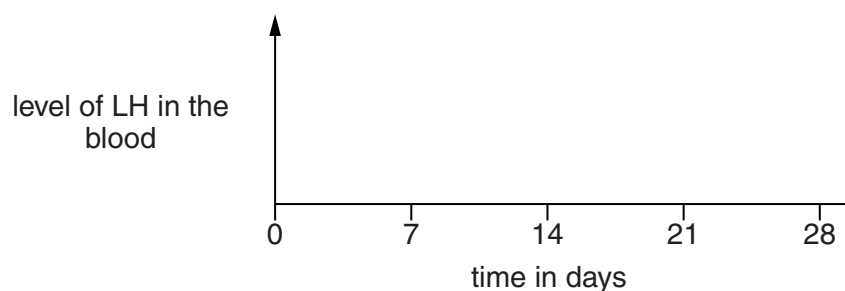
.....
 [1]

(ii) Linda's body produces one egg during each cycle.

The egg is most likely to be released at about day 14.

The level of LH in Linda's blood changes during the cycle.

Draw a line on the axes below to show how the level of LH changes during the cycle. [1]



(b) Linda is finding it difficult to get pregnant.

She goes to a clinic and finds out the problem.

She meets other women who have other infertility problems.

			
Linda has blocked fallopian tubes	Lucy makes eggs but her uterus cannot hold a growing baby	Helen has had her ovaries removed	Joanna does not produce an egg every month

(i) Write down the name of the woman who could use FSH as a treatment for infertility.

..... [1]

(ii) **Helen** decides to try to get pregnant using egg donation.

Choosing to use egg donation is a difficult decision for people to make.

Suggest reasons why.

.....

 [2]

[Total: 5]

12

6 Barry is getting pain in his hip and so he goes to the doctor.

(a) The doctor takes an image of the bones in Barry's hip.



The hip joint is a type of synovial joint.

Why is it called a synovial joint?

..... [1]

13

(b) The doctor can see that Barry's hip bone is not fractured.

He wants to work out how likely it is to fracture in the future.

The doctor measures the density of Barry's bones.

They score **-1** on a special bone density scale.

He asks Barry about risk factors that might make a fracture more likely.

He finds out that Barry has **2** risk factors.

The doctor uses this table to find out the **percentage risk** of Barry having a fracture in the next ten years.

	percentage risk of a fracture					
	bone density -4	bone density -3	bone density -2	bone density -1	bone density 0	bone density 1
0 risk factors	27	15	10	7	6	5
1 risk factor	37	22	14	10	9	7
2 risk factors	49	30	20	15	12	10
3 risk factors	62	41	27	20	17	15
4 risk factors	73	52	36	27	23	20

What is the percentage risk for Barry?

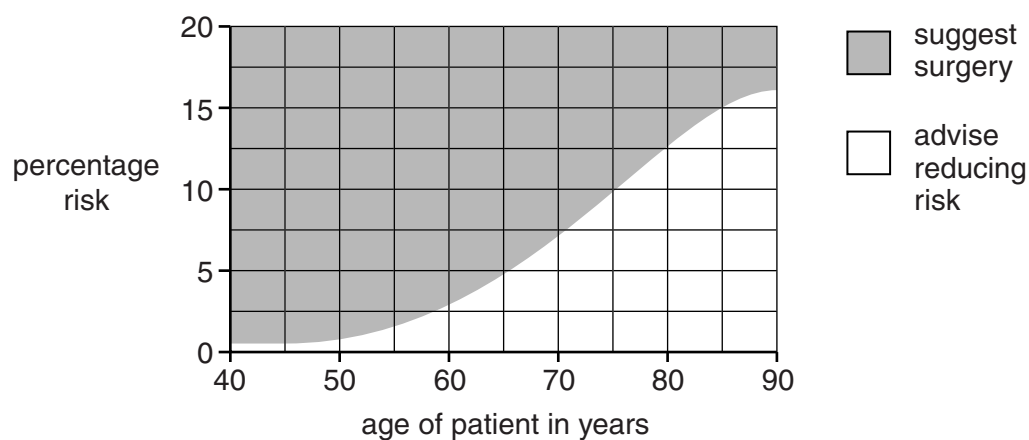
..... [1]

14

- (c) When doctors work out the percentage risk they have to advise the patient.

They can suggest surgery on the hip or tell the patient to try to reduce their risk factors.

This graph is used to make the decision.



- (i) Barry is 72 years old.

Draw lines on the graph to work out the advice Barry's doctor would give.

What action does Barry's doctor advise?

..... [1]

- (ii) Describe how the advice a doctor gives changes as a patient gets older.

.....
 [1]

- (iii) Suggest why the advice given changes depending on the age of the patient.

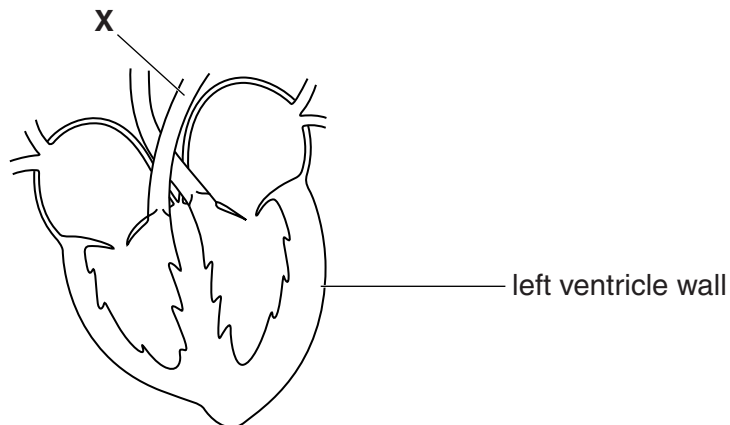
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 [1]

[Total: 5]

15

7 Different animals have different types of blood system.

(a) The diagram shows a human heart.

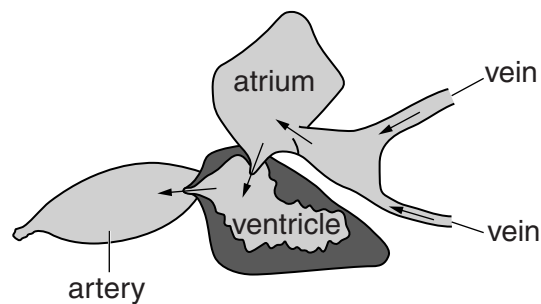


Name the part that is labelled X.

.....

[1]

(b) The diagram shows a fish heart.



(i) The fish has a single circulatory system.

How is a single circulatory system different from a double circulatory system?

.....

..... [1]

(ii) Write down **one** way that a fish heart is different from a human heart.

..... [1]

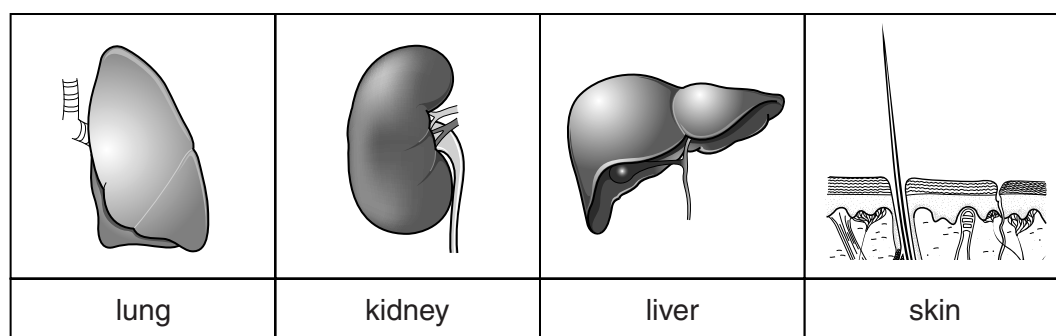
[Total: 3]

16

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- 8 The drawings show some of the main excretory organs in the body.



- (a) Two of these organs are responsible for changing the level of urea in the body.

Write down the functions of these two organs in this process.

organ

function

organ

function [2]

- (b) (i) Which of these organs is most affected by the hormone ADH?

..... [1]

- (ii) The illegal drug ecstasy increases the production of the hormone ADH.

Explain what effect this action may have on the body.

.....

.....

.....

..... [3]

- (c) The respiratory system can be damaged by infectious diseases and genetic conditions.

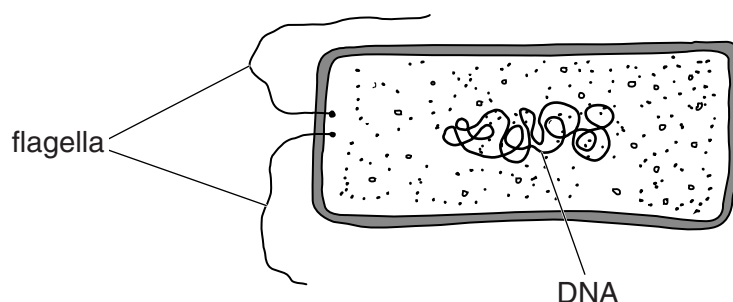
Write down **one** genetic condition that affects the lungs.

..... [1]

[Total: 7]

Section C – Module B6

- 9 (a) The diagram shows a bacterial cell.



- (i) What is the job of the flagella?

..... [1]

- (ii) Write down **one** feature found in a **human** cell that is **not** found in a bacterial cell.

..... [1]

- (b) Some bacteria cause disease.

One example is cholera.

Hundreds of thousands of people across the world get cholera every year although it is very rare in Britain.

- (i) How do people become infected with cholera bacteria?

..... [1]

- (ii) When cholera bacteria enter the human body it may take a few days before any symptoms appear.

Explain why the symptoms do **not** appear straight away.

.....

 [2]

- (iii) Suggest why cholera is very rare in Britain.

.....
 [1]

19

- (c) Some bacteria living in soil are important in the nitrogen cycle.

Draw straight lines to join **each** of the **bacteria** with its **role** in the nitrogen cycle.

bacteria*Azotobacter**Clostridium**Nitrobacter**Nitrosomonas***role**

nitrifying bacteria

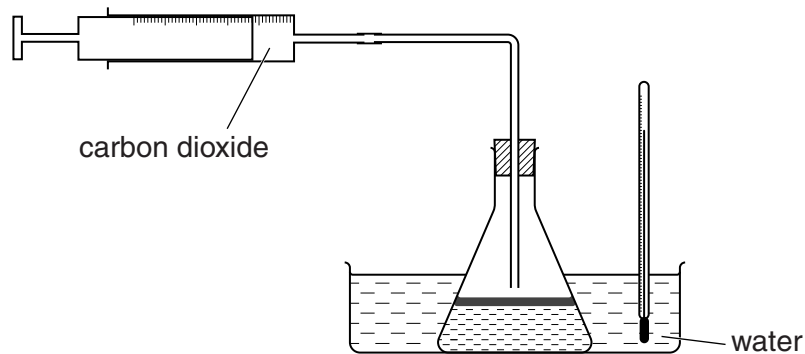
nitrogen-fixing bacteria

[2]

[Total: 8]

10 (a) Liz and Paul are investigating fermentation by yeast.

This is the equipment they use.



They change the temperature of the water.

For each temperature, they measure how much carbon dioxide is collected in five minutes.

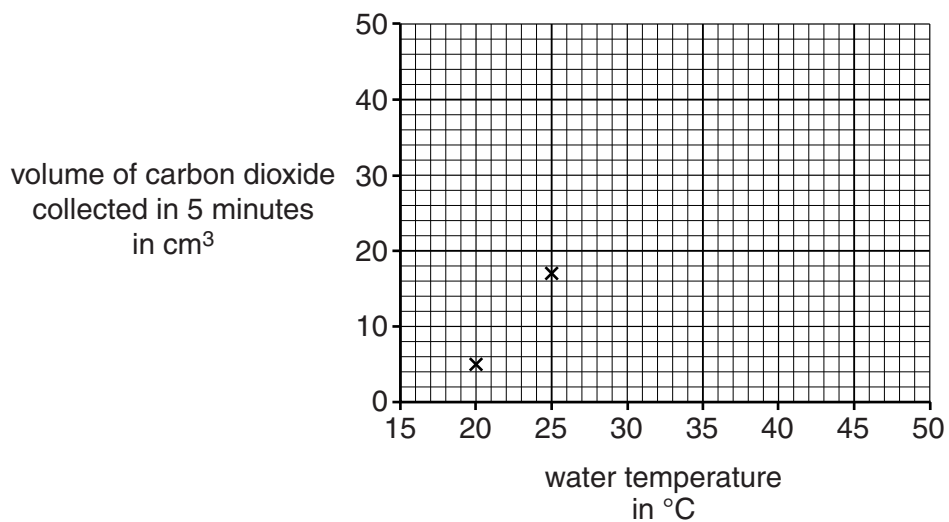
The table shows their results.

water temperature in °C	20	25	30	35	40
volume of carbon dioxide collected in 5 minutes in cm ³	5	17	38	35	6

(i) Complete the graph to show their results.

Plot all the points and draw the best curve.

The first two points have already been plotted.



[2]

21

- (ii) Paul says that the results show that the best temperature for fermentation by yeast is **exactly** 30 °C.

Liz disagrees.

Who is correct?

Explain your answer.

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

- (iii) Fermentation by yeast is used in the brewing industry to produce alcohol.

In John's brewery, fermentation takes place at 25 °C. This is **not** the temperature at which fermentation happens fastest.

Suggest why 25 °C may be the best temperature for John to choose.

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

- (b) Compared with drinks such as beer, which is made by fermentation, other drinks such as vodka have much higher alcohol concentrations.

- (i) What process is used to make drinks with high alcohol concentrations?

..... [1]

- (ii) Why can fermentation alone **not** be used to make drinks with high alcohol concentrations?

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

[Total: 6]

11 (a) Mary lives by the sea.

Her garden is right by the shore and sometimes sea water covers part of her garden.

Plants do **not** grow well in this part of the garden.

- (i)** One reason is that most plants do **not** grow well in water-logged soil.

Explain why.

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

- (ii)** Another reason is that even when the sea water drains away, salt is left behind.

Suggest why a high concentration of salt in the soil harms many plants.

.....
.....
.....
..... [3]

- (b)** Scientists can improve crop plants so they are able to grow in salty soil.

They can do this by genetic engineering.

- (i)** Suggest why it could be an advantage to develop crop plants that can grow in salty soil.

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

- (ii)** Genetic engineering uses enzymes.

One type of enzyme is used to cut a gene from the DNA of one organism.

Another type is used to join the gene with the DNA of another organism.

What type of enzyme is used to **cut** genes from DNA?

..... [1]

[Total: 6]

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