

Tuesday 24 January 2012 – Morning

**GCSE GATEWAY SCIENCE
BIOLOGY B**

B631/01 Unit 1 Modules B1 B2 B3 (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



Candidate forename		Candidate surname	
Centre number		Candidate number	

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 **20** pages. Any blank pages are indicated.

2

Answer **all** the questions.**Section A – Module B1****1** Look at Nicholas.

- (a) (i)** Nicholas eats a balanced diet containing all the nutrients he needs. Different nutrients do different jobs in the body.

Draw straight lines to connect each **nutrient** to its **job in the body**.

One line has been drawn for you.

nutrient	job in the body
fibre	prevents scurvy
iron	growth and repair
protein	makes haemoglobin
vitamin C	prevents constipation

[2]

3

(ii) Nicholas' body mass is affected by his diet.

His body mass is also affected by his genes.

These genes came from his parents.

What proportion of his genes came from his mother?

..... [1]

(b) Glucose is a nutrient in his diet.

Complete the following sentences to explain what glucose is used for in the body.

Choose your words from this list.

carbon dioxide

nutrition

oxygen

reproduction

respiration

water

Glucose reacts with to release energy.

This process is called [2]

(c) Glucose is transported in the blood.

The blood is under pressure.

Explain why it is important for the blood to be under pressure.

..... [1]

[Total: 6]

2 This question is about smoking.



(a) Smoking cigarettes has harmful effects on the body.

A burning cigarette produces many harmful substances.

Nicotine is one substance found in cigarette smoke.

Write down the names of **two other** substances found in cigarette smoke.

1

2 [2]

(b) (i) Smoking can affect the birth weight of babies born to mothers who smoke.

Look at the information in the table.

	baby born to mother who smokes	baby born to mother who does not smoke
mass at birth in kg	3.4	3.9
height at birth in m	0.50	0.52
BMI		14.4

Body Mass Index (BMI) is calculated using the formula

$$\text{BMI} = \frac{\text{mass in kg}}{(\text{height in m})^2}$$

Calculate the BMI of the baby born to the mother who smokes.

Show your working.

.....

.....

BMI

[2]

5

- (ii) Nicotine makes it difficult to give up smoking.

Which word best describes this effect?

Put a ring around the correct answer.

accumulation

addiction

irritation

tolerance

[1]

- (iii) A new nicotine patch treatment has been developed to help smokers quit.

It must be tested before it can be used on humans.

Write down **one** reason why it must be tested.

..... [1]

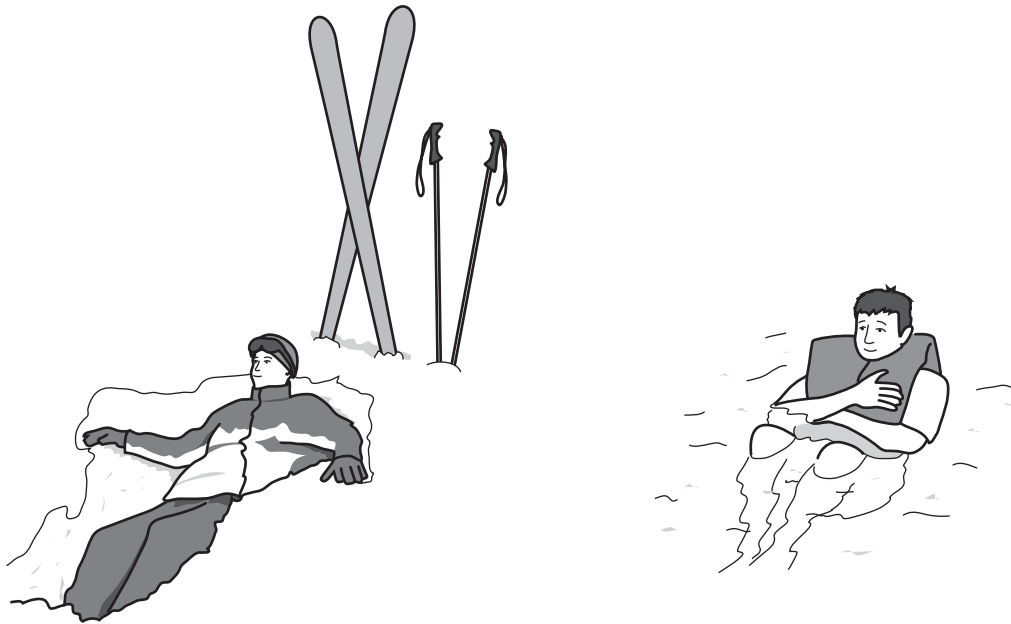
- (iv) Explain why some people have objections to certain forms of testing.

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

[Total: 7]

- 3 Look at the pictures of an injured skier and a man in cold water.

Both of these people face difficulty in keeping warm.



- (a) (i) What is normal core body temperature?

..... °C

[1]

- (ii) Look at the pictures.

To keep warm, the men need to reduce heat loss and produce more heat in their bodies.

Write about the ways their bodies could reduce heat loss and produce more heat.

.....

 [3]

- (iii) Some of the changes in the body are caused by reflex actions.

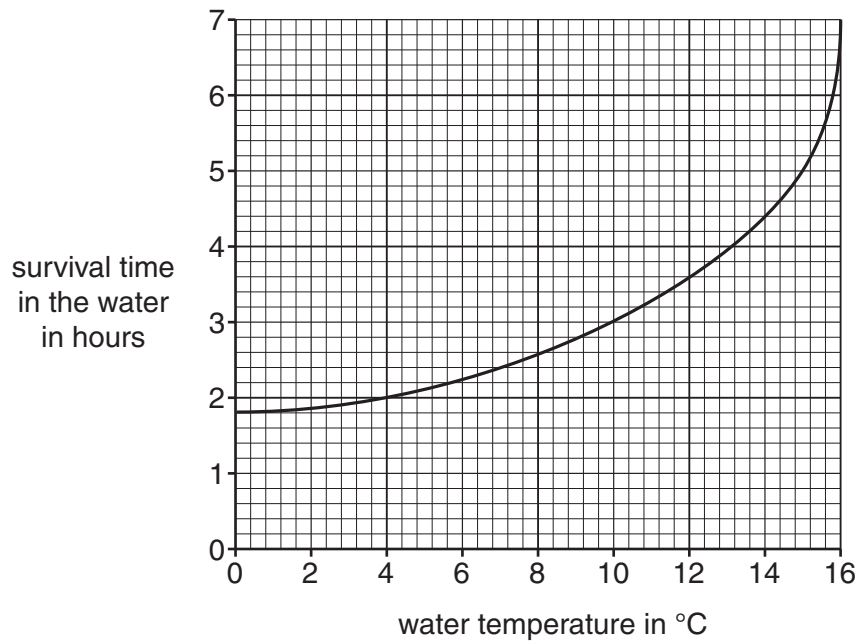
All reflex actions are automatic.

Describe **one other** characteristic of reflex actions.

..... [1]

(b) Look at the graph.

It shows how long people survive in water at various temperatures.



(i) How many hours longer is survival time in water at 15°C than water at 10°C?

..... [1]

(ii) In the past, people used to drink alcohol because they thought it kept them warm.

People recovering from very cold conditions should not be given alcohol.

Explain why alcohol should **not** be given.

.....

..... [1]

[Total: 7]

Section B – Module B2

4 Look at the picture.

It shows an orangutan.

Orangutans live in rainforests.



(a) What name describes where the orangutan lives?

Choose from this list.

community

habitat

population

answer

[1]

(b) Orangutans are an **endangered** species.

(i) Write down what is meant by the word endangered.

..... [1]

(ii) One reason orangutans are endangered is because the rainforest is being cut down.

Suggest **one other** reason why they might be endangered.

.....
 [1]

(iii) Stopping the rainforest being cut down may help the orangutan species to survive.

Describe **one other** way the orangutans could be helped.

.....
 [1]

(c) Orangutans have to compete for the space that is left in the rainforest.

Write down **two other** things orangutans might compete for.

1

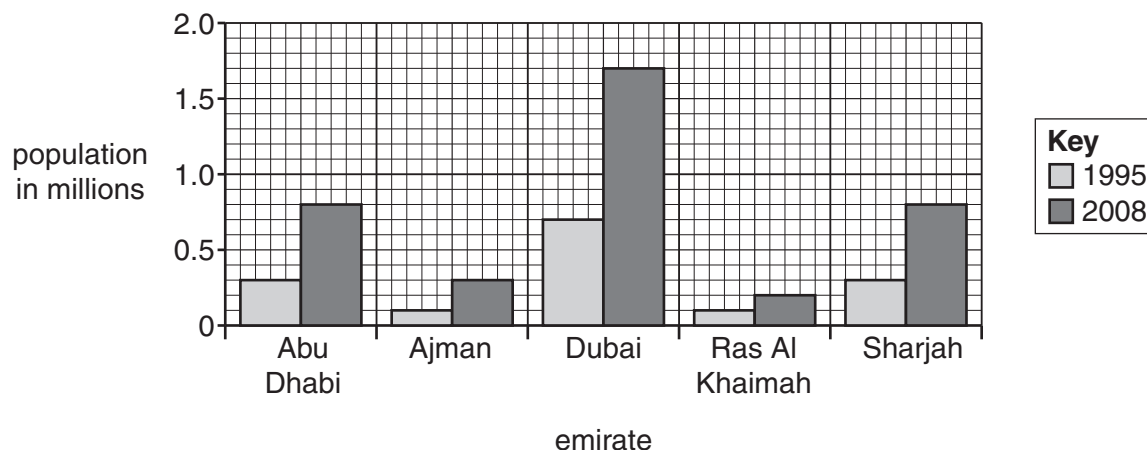
2 [2]

[Total: 6]

- 5 The UAE is a country made up of different areas called emirates.

The population of each emirate is increasing.

Look at the graph. It shows the population of five of the emirates.



- (a) The graph shows the populations in 1995 and 2008.

- (i) Write down the name of the emirate with the smallest increase in population.

..... [1]

- (ii) Calculate the increase in population of **Abu Dhabi** between 1995 and 2008.

You should show your working.

.....

population increase million [2]

- (b) As the population increases more finite resources are used.

Put a tick (✓) in the box next to **one** finite resource.

chicken manure ☐

minerals ☐

wood ☐

vegetable oil ☐

[1]

10

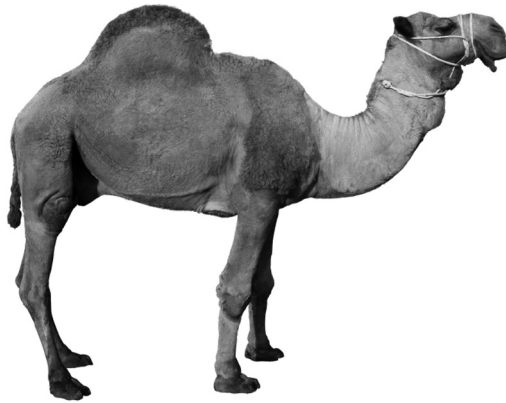
- (c) The increase in population means there is more air pollution from burning fossil fuels.

Write down the name of **one** gas which is made when fossil fuels are burned.

..... [1]

- (d) The UAE is a desert country. There are camels living in the deserts.

Look at the picture of a camel.



- (i) The fat on a camel is kept in the hump. This stops the fat insulating the whole body.

Write about **other** ways the camel is adapted to live in the desert.

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

- (ii) Camels produce milk for their young.

Write down the name of the group of vertebrates that produce milk for their young.

..... [1]

[Total: 9]

- 6 Look at the picture of some cactus plants.



- (a) Plants make food from carbon dioxide and water.

- (i) Write down the name of the process plants use to make food.

..... [1]

- (ii) The cactus stem contains a green chemical needed for the process of making food.

Write down the name of this chemical.

..... [1]

- (b) The cactus has long roots to help it get water.

Look at the statements about the cactus.

Put a tick (✓) in the box next to the **one** correct statement.

The cactus is adapted to live in rainforests.

☐

The cactus is adapted to live in a cold, wet place.

☐

The cactus is adapted to live in the Arctic.

☐

The cactus is adapted to live in a hot, dry place.

☐

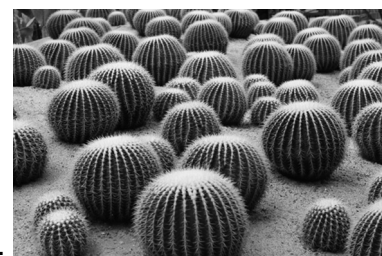
[1]

- (c) Fred lives near a population of small cactus plants.

He wants to find out the number of cactus plants in the area.

He uses a quadrat to collect results.

Describe how Fred can use a quadrat to collect reliable results.



.....

 [2]

[Total: 5]

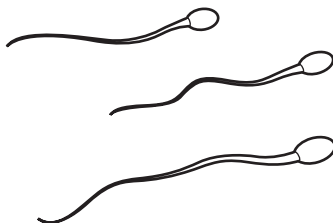
Turn over

Section C – Module B3

- 7 This article appeared in a newspaper.

Read the article carefully, some key words are underlined.

A group of scientists claim to have made gametes from human stem cells.



The stem cells were taken from an embryo which had been made by cloning.

The stem cells were diploid but they were made to divide to produce sperm cells.

One of the scientists said,

“This is amazing and very exciting. The sperm cells all have a large nucleus and a tail.

Their shape is not quite normal but they contain all the proteins needed for fertilisation.”

- (a) The following are definitions of words underlined in the article.

Write down the correct word next to each definition.

Sex cells that can join to make a zygote.

A process that makes genetically identical cells. [2]

- (b) The sperm cells that were produced all had a large nucleus and a tail.

Finish these sentences to describe the job of these parts of the sperm.

The tail is used for

The large nucleus carries the [2]

13

- (c) The sperm cells were produced from **stem** cells.

What is a stem cell?

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

- (d) The stem cells are diploid.

They can divide to make sperm cells.

What name is given to this type of cell division?

..... [1]

[Total: 6]

8 The heart has two ventricles that pump blood to different parts of the body.

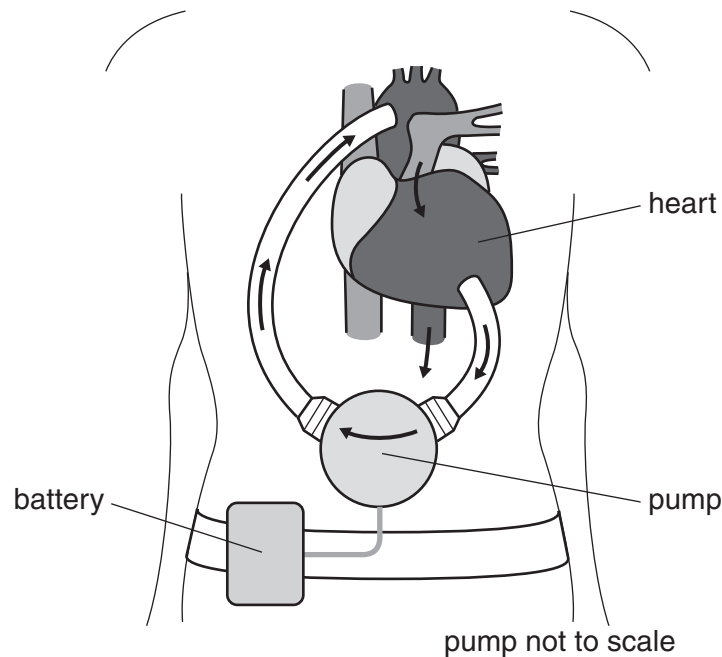
(a) Where does the **right** side of the heart pump blood to?

..... [1]

(b) The diagram shows a new type of artificial heart pump.

It is connected to the left ventricle.

It helps the left ventricle pump blood into a blood vessel.



(i) What is the name of the blood vessel that takes blood away from the **left** ventricle?

Put a ring around the correct answer in this list.

aorta **pulmonary artery** **pulmonary vein** **vena cava**

[1]

(ii) The pump is made from a special substance so the blood does not clot.

Which structures in blood cause clotting?

..... [1]

(iii) The pump is implanted inside the body.

The pump is connected by a wire to the power supply which is outside the body.

Suggest **one** problem that this might cause.

.....

..... [1]

[Total: 4]

- 9 The table shows the concentration of different substances in the blood.

The concentrations are shown for the blood of a pregnant woman and her foetus.

substance	concentration in the woman's blood in mg/100 cm ³	concentration in the foetus' blood in mg/100 cm ³
carbon dioxide	30	32
haemoglobin	12000	17000
glucose	90	63
fats	1000	600
oxygen	100	30
urea	22	25

- (a) Three of the substances shown in the table will diffuse from the woman's blood to the foetus.

Write down the names of these **three** substances.

..... [1]

- (b) How can you tell from the table which direction the substances diffuse?

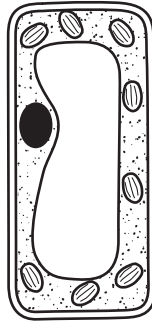
..... [1]

[Total: 2]

10 This question is about rice.



(a) Look at the diagram of a cell from a rice plant.



Add labels to the diagram to show

- the vacuole
- one chloroplast.

[2]

(b) When rice seeds start to grow, their shoots grow upwards, away from the soil.

(i) What are the shoots growing towards?

..... [1]

(ii) As they grow, the rice plants start to produce different types of cells.

What is the name of the process that produces different types of cells?

Put a ring around the answer in this list.

differentiation

division

fertilisation

tropism

[1]

17

- (c) About 100 years ago in Japan, the rice crops often failed.

The shoots would grow too quickly and then collapse.

- (i) This could be due to a sudden change in the genes of the rice.

What name is given to a change in the genes?

..... [1]

- (ii) Scientists discovered that the crops failed because of a disease.

The disease was caused by a fungus.

The fungus was releasing a plant hormone.

Gardeners can now buy this plant hormone to use in their gardens.

Suggest what this plant hormone could be used for.

.....

 [2]

- (d) Scientists have now produced a new variety of rice that supplies people with extra vitamin A.

They have put a gene from carrots into rice.

Put a tick (✓) next to the name of this type of process.

cloning

☐

genetic engineering

☐

selective breeding

☐

tropism

☐

[1]

[Total: 8]

END OF QUESTION PAPER

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