

Monday 21 May 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	
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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 **20** pages. Any blank pages are indicated.

Answer **all** the questions.

Section A – Module B1

- 1 Charlotte and her friend Kamran are walking in the hills.
They are carrying all their camping equipment in rucksacks.



- (a) Charlotte needs lots of energy to walk up the hills.

Glucose in Charlotte's muscles reacts with a gas to release energy.

This process is called respiration.

Write down the name of the gas **used** in respiration.

..... [1]

- (b) As Charlotte walks uphill her breathing rate increases.

Explain why her breathing rate increases.

Use ideas about muscles in your answer.

.....
.....
.....
..... [2]

3

- (c) Charlotte's body temperature also starts to increase.

To lose heat, more blood starts to flow near her skin surface.

- (i) Write down **one other** way that Charlotte's body loses heat.

..... [1]

- (ii) It is important that Charlotte's body does **not** get too hot.

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

High body temperature is called hypothermia.

☐

High body temperature is a result of homeostasis.

☐

High body temperature can cause dehydration.

☐

High body temperature can cause shivering.

☐

[1]

- (d) Kamran has diabetes. This means he has to take insulin with him on his walk.

- (i) Put a (ring) around the organ in the body that makes insulin.

heart

liver

pancreas

[1]

- (ii) Insulin controls the level of a chemical in the blood.

Write down the name of this chemical.

..... [1]

[Total: 7]

2 Read these facts about fruit flies.

Fruit flies are used to study genes. They only have four pairs of chromosomes in each body cell. Some fruit flies hatch with smaller wings. This is caused by a gene mutation. When fruit flies that have normal wings are mated with fruit flies with smaller wings, all the offspring have normal wings.	
--	--

(a) Finish the sentences about the fruit flies.

Fruit flies have four pairs of chromosomes in the of their body cells.

Having smaller wings is caused by a mutation. A mutation is a to a gene.

The offspring all have normal wings because having smaller wings is

a characteristic.

[3]

(b) A fruit fly can inherit smaller wings.

Humans also inherit some characteristics.

Put a tick (✓) in the box next to **one** characteristic inherited by humans.

earlobe shape

☐

scars

☐

spoken language

☐

[1]

[Total: 4]

- 3 Look at the picture of a little owl.



- (a) Owls have binocular vision.

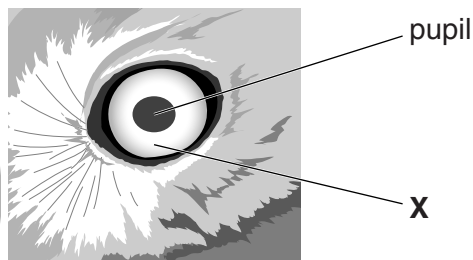
Describe the difference between binocular and monocular vision.

.....

.....

..... [2]

- (b) Look at the picture of the owl's eye.



The owl's eye is similar to a human eye.

Part **X** is the coloured part of the eye.

Write down the name of part **X**.

..... [1]

- (c) The pupil lets in light.

Owl eyes have large pupils compared with human eyes.

Suggest why they need large pupils.

..... [1]

[Total: 4]

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4 Read the information about three different people.

Hiten

Age: 14
Mass: 70 kg
Height: 1.80 m
Hiten plays squash
three times a week.

Clare

Age: 16
Mass: 70 kg
Height: 1.70 m
Clare plays hockey once
a week and swims for the
local club.

John

Age: 16
Mass: 105 kg
Height: 1.80 m
John plays on his
computer most days of
the week. He does not
like to play sport.

(a) Clare eats a high protein diet.

(i) What does her body use the protein for?

..... [1]

(ii) The recommended daily average (RDA) protein intake is calculated using the formula

$$\text{RDA in g} = 0.75 \times \text{body mass in kg}$$

Calculate Clare's RDA.

.....
.....

Clare's RDA =g [1]

(b) Each person's Body Mass Index (BMI) can be calculated using the formula

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

(i) Hiten has a BMI of 21.60.

Does Clare have a higher or lower BMI?

Explain your answer.

.....
.....
..... [2]

(ii) John has the highest BMI of all of the three people.

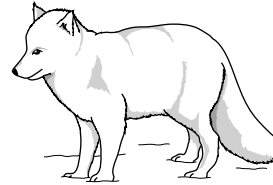
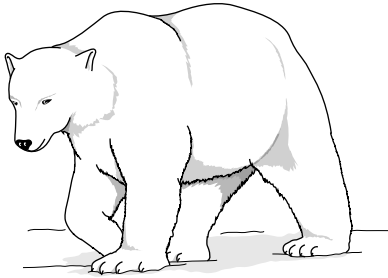
Suggest **one** reason why his BMI is the highest.

..... [1]

[Total: 5]

Section B – Module B2

- 5 Look at the pictures of a polar bear and an Arctic fox.



- (a) Both of these animals are adapted to survive in cold Arctic conditions.

Write down **two** ways the **Arctic fox** is adapted to cold conditions.

- 1
- 2
- [2]

- (b) Look at the polar bear population estimates between 1950 and 2005.

date	polar bear population estimate
1950	5 000
1965	9 000
1984	25 000
2005	20 000

Describe the changes in population estimate and suggest possible reasons for them.

-
-
-
-
- [3]

9

- (c) (i) Global warming could soon make the polar bear an **endangered** species.

Write down what endangered means.

.....
 [1]

- (ii) Pollution from an increasing human population is speeding up global warming.

Write down **one** pollutant that is causing global warming.

..... [1]

[Total: 7]

6 This question is about plants.

- (a) Use the words in this list to complete the sentences.

carbon dioxide
 chlorophyll
 competition
 oxygen
 photosynthesis
 respiration
 starch

Plants make glucose by the process of

This releases as a waste product.

Some of the glucose is converted to and stored. [3]

- (b) Woodland can be used as a **sustainable resource**.

- (i) What does sustainable resource mean?

.....
 [1]

- (ii) Write down **one other** example of a sustainable resource.

..... [1]

- (c) Coal is a fossil fuel. It is made from fossilised plants.

Limestone statues are damaged when coal is burned in factories close to the statues.

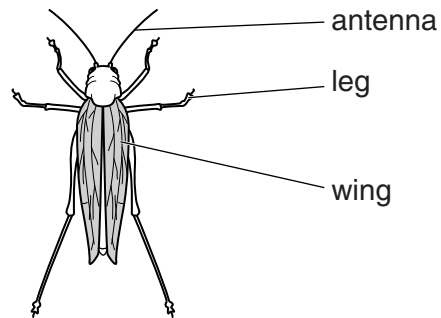
Write down the air pollutant that causes the damage.

..... [1]

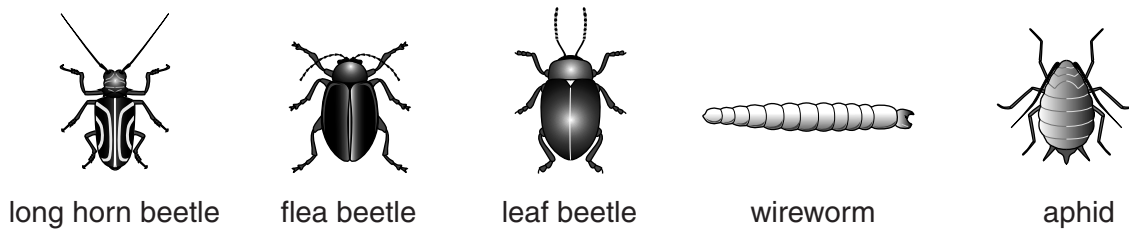
[Total: 6]

7 Fatima catches insects in two different fields, **X** and **Y**.

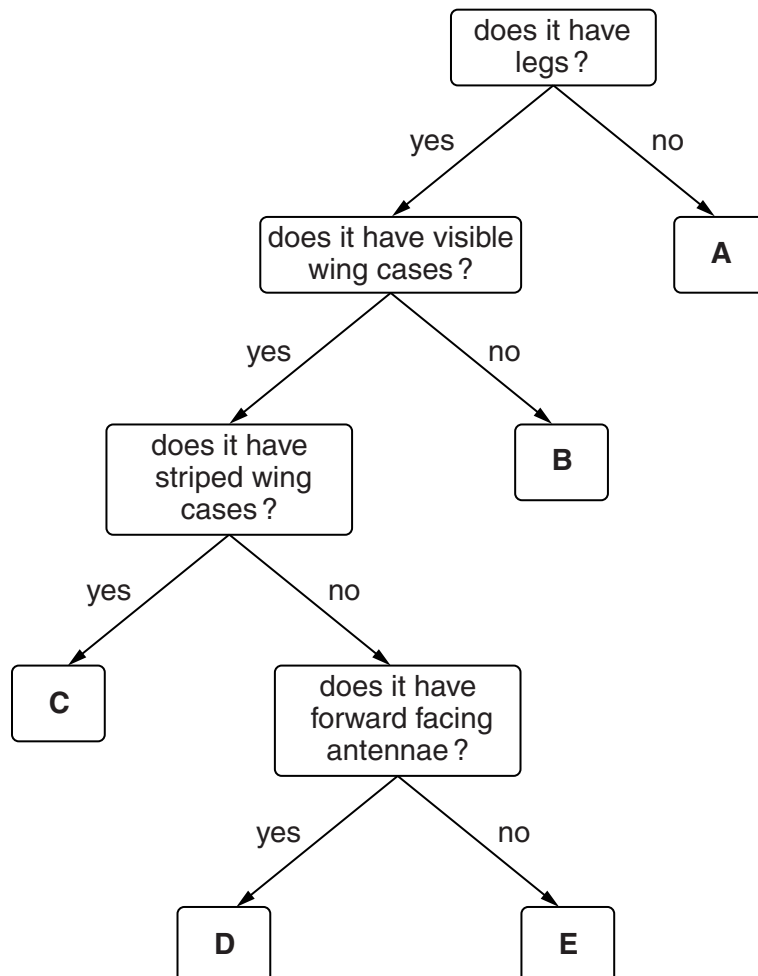
She identifies a grasshopper.



(a) Fatima uses a biological key to identify the other insects.



Look at the biological key and use it to identify the insects.



11

Write the name of each insect in the correct box.

A	
B	
C	
D	
E	

[2]

(b) Fatima collects leaf beetles in field **X**.

She collects them from areas marked by quadrats.

The table shows her results.

area of field X	3200m ²
size of quadrat used	0.25m ²
total number of leaf beetles in 10 quadrats	120
average number of leaf beetles in 1 m ²	

(i) Calculate the average number of leaf beetles in **1 m²** of the field.

.....

answer [2]

(ii) Use the results to estimate the number of leaf beetles in field **X**.

.....

answer [1]

(c) There are no grasshoppers in field **X**.

Both grasshoppers and leaf beetles feed on grass.

Grasshoppers have larger mouth parts than leaf beetles.

Suggest what would happen to the population of leaf beetles in field **X** if grasshoppers got in.

.....

reason

..... [2]

[Total: 7]

Turn over

12

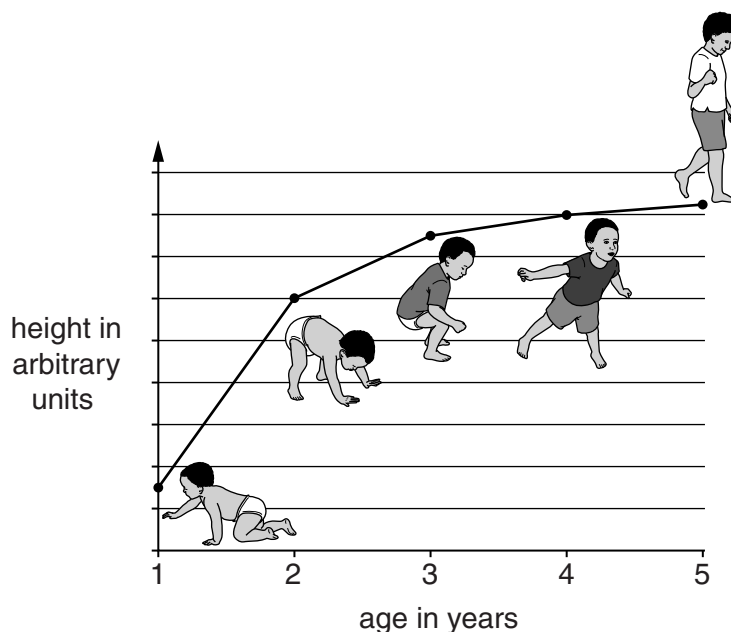
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Section C – Module B3

8 Look at the chart.

It shows a human growth curve for the first two phases of human growth.



(a) (i) Write down the names of the **two** growth phases shown in the chart.

..... and [2]

(ii) Use the graph to finish the sentence.

Growth is fastest between and years. [1]

(b) When humans grow they make different types of cells.

What name is given to the process of making different **types** of cells?

Choose from this list.

cloning

differentiation

diffusion

answer

[1]

(c) Red blood cells are one type of cell made by the human body.

Write down the job of red blood cells.

..... [1]

[Total: 5]

14

- 9 Fernando grows raspberry plants in his garden.



- (a) The shoots of his plants grow upwards in response to light.

Finish the sentences.

The roots of his plants grow downwards in response to

Fernando can use chemicals to make the fruit ripen more quickly.

The chemicals are called plant

[2]

- (b) Fernando takes some cuttings from his raspberry plants to grow in pots.

Describe how he could do this.

You may use a labelled diagram to help you.

.....

.....

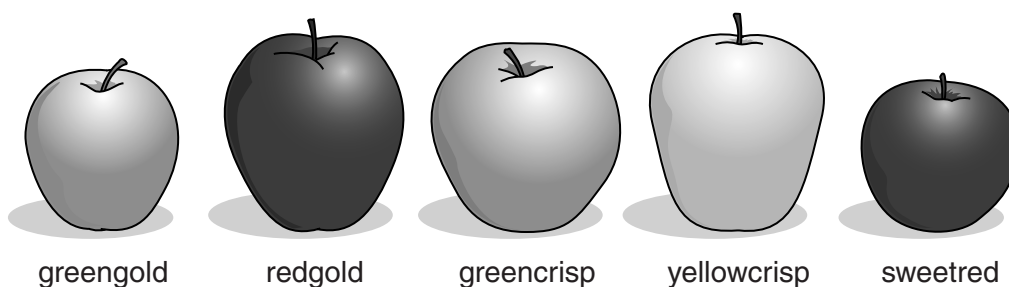
.....

..... [3]

15

(c) Fernando also grows different varieties of apples.

Read the information about Fernando's apples.



- Greengold are small, green and have little taste.
- Redgold are large, red and have little taste.
- Greencrisp are large, green and taste sour.
- Yellowcrisp are large, yellow and taste sour.
- Sweetred are small, red and taste sweet.

Fernando uses selective breeding to grow large, sweet, red apples.

He starts by choosing the two varieties of apples he needs and breeding them.

(i) Write down the **two** varieties he should use in his breeding program.

..... and [1]

(ii) Describe what he would need to do as part of his breeding program to produce trees that provide large, sweet, red apples.

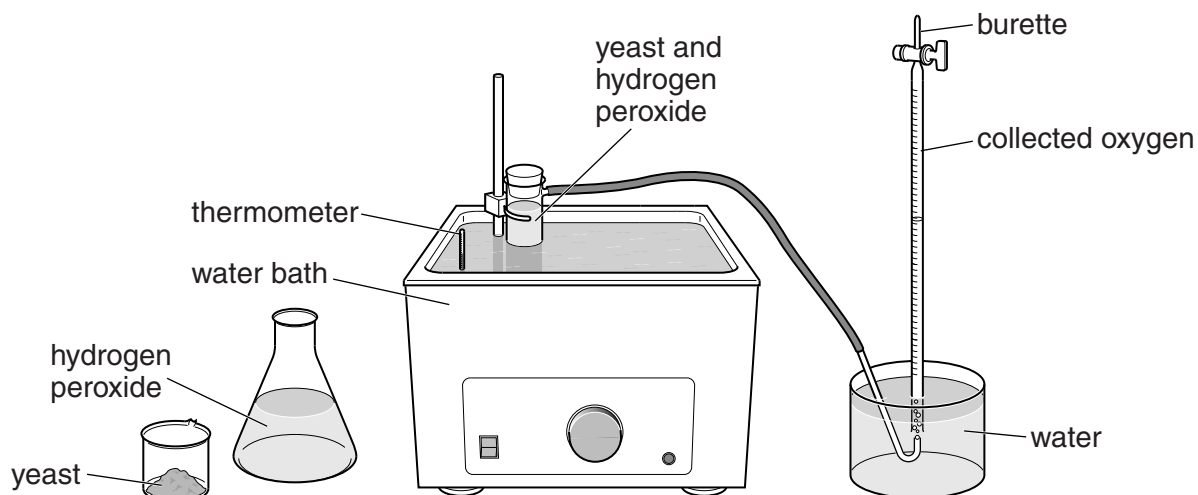
.....

 [2]

[Total: 8]

10 Catherine and Ben investigate an enzyme in yeast.

The picture shows their apparatus.



The enzyme in the yeast breaks down hydrogen peroxide to make oxygen and water.

Catherine and Ben collect the oxygen in the burette for 5 minutes.

They repeat the investigation using different temperatures.

The table shows their results.

temperature in °C	volume of oxygen collected in cm ³			
	first attempt	second attempt	third attempt	average
10	0.3	0.2	0.1	0.2
20	6.1	6.0	6.4	6.2
30	35.1	34.7	34.0	34.6
40	39.6	40.9	38.6	39.7
50	13.9	13.2	2.9	10.0
60	0.8	0.5	0.5	

17

- (a) Calculate the average volume collected at 60°C.

Show your working.

.....

.....

.....

answercm³ [1]

- (b) Ben tells Catherine they have recorded an anomalous result.

- (i) Write down their anomalous result.

..... [1]

- (ii) Ben knows they recorded the amount of oxygen that was in the burette accurately.

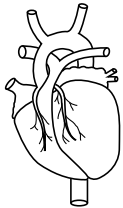
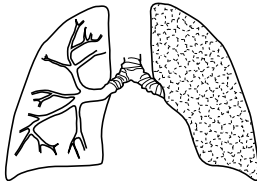
Suggest **one** reason why the amount was not what they expected.

.....

..... [1]

[Total: 3]

11 Look at the diagrams of cells and organs.

name	diagram
sperm cell	
white blood cell	
heart	
lungs	

(a) Which diagram shows the part of the body where oxygen enters the blood?

..... [1]

(b) Which diagram shows the part of the body adapted for fertilisation?

..... [1]

(c) Write down the job of the white blood cell.

..... [1]

(d) Blood is taken from the heart to the lungs by a blood vessel.

Which **type** of blood vessel takes blood from the heart to the lungs?

..... [1]

[Total: 4]

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