

**GENERAL CERTIFICATE OF SECONDARY EDUCATION**

**GATEWAY SCIENCE**

**B631/01**

**BIOLOGY B**

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)

**Wednesday 20 May 2009**

**Afternoon**

**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 clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Answer **all** the questions.
- Do **not** write in the bar codes.
- Write your answer to each question in the space provided, however additional paper may be used if necessary.

**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** Matt is thirteen. He plays in a football team.

**(a)** Matt's football coach tells him that it is important that he eats a balanced diet.

Look at the list of some of the types of food found in a balanced diet.

**carbohydrate**

**fibre**

**minerals**

**protein**

**vitamins**

**water**

Write down the type of food found in a balanced diet that is missing from the list.

..... [1]

**(b)** Matt has a 10-year-old younger brother who does **not** play much sport.

Matt needs to eat more carbohydrate and protein than his younger brother.

One reason he needs to eat more is because he is bigger.

**(i)** Suggest **one other** reason why Matt needs to eat more **carbohydrate** than his younger brother.

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

**(ii)** Suggest **one other** reason why Matt needs to eat more **protein** than his younger brother.

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

3

- (c) When Matt plays football, his breathing and pulse rates increase.

Finish these sentences to explain why.

**One** reason his breathing rate increases is .....

.....

**One** reason his pulse rate increases is .....

..... [2]

- (d) When Matt plays football his muscles produce a lot of heat.

Describe **one** way he loses this extra heat.

.....

..... [1]

- (e) Matt falls over while playing football.

He gets a small cut on his leg.

His football coach cleans the cut.

After a few minutes the bleeding stops.

- (i) Why is it important to clean the cut?

.....

..... [1]

- (ii) What happens to Matt's blood to stop the cut bleeding?

..... [1]

[Total: 8]

2 Nick and Phil are at a party.

(a) Nick accidentally knocks an empty glass off a table.

Phil reacts quickly. He sees the glass falling and catches it in his hand.



In Phil's reaction

(i) what is the stimulus? ..... [1]

(ii) what is the receptor? ..... [1]

(iii) what is the effector? ..... [1]

(b) The table shows how many units of alcohol there are in different drinks.

drink	units of alcohol
1 glass of sherry	1
1 glass of wine	1
1 pint of beer	2
1 pint of cider	2
1 single whisky	1

5

Nick drinks 3 glasses of wine and 2 single whiskies.

Phil drinks 2 pints of beer and a single whisky.

(i) Nick and Phil have had different drinks.

However, they both had the **same** number of units of alcohol.

How many units have they each had?

answer .....

[1]

(ii) Phil has drunk a greater volume of liquid than Nick.

However, they have both had the same number of units of alcohol.

Explain why.

.....

..... [1]

(c) Alcohol is a depressant drug.

The list below shows other drugs.

Put a tick (✓) in the box next to the **one** drug that is also a depressant.

aspirin ☐

cannabis ☐

ecstasy ☐

LSD ☐

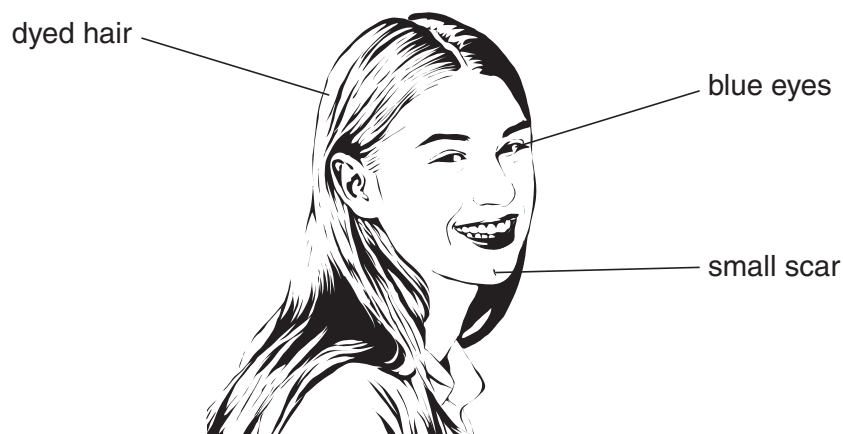
nicotine ☐

temazepan ☐

[1]

[Total: 6]

3 Cathy is a teenager.



(a) Some of Cathy's features are controlled by her genes, some by her environment and some by both.

Put ticks (✓) in the boxes to show how each of her features is controlled.

feature	controlled by genes	controlled by environment	controlled by genes and environment
blue eyes			
dyed hair			
small scar			

[3]

(b) Write about genes.

In your answer, include

- what genes do
- what genes are made from
- where genes are found.

.....

.....

.....

.....

..... [3]

[Total: 6]

## Section B – Module B2

- 4 Look at the picture of a zebra.



- (a) The zebra is a mammal. Mammals belong to a larger group of animals.

What name is given to this group?

Put a ring around the correct answer.

**amphibians**

**invertebrates**

**reptiles**

**vertebrates**

[1]

- (b) Zebra are prey to lions.

They are adapted to avoid being caught.

Look at the list.

**short mane**

**eyes at side of head**

**stripes for camouflage**

**sharp teeth**

**two eyes**

Write down **two** ways that zebra are adapted to avoid being caught.

Choose your answers from the list.

1 .....

2 ..... [2]

8

- (c) Lions are predators. They are adapted to catch the zebra.

Suggest **one** way predators are adapted to catch their prey.

..... [1]

- (d) Plants are adapted to live in different environments.

Which environment are cacti adapted for?

..... [1]

[Total: 5]

- 5 Look at the picture of a sperm whale.



- (a) Sperm whales are normally found far out to sea.

However, sperm whales are often seen near the coast of New Zealand.

- (i) Suggest **one** reason why these whales need to come closer to land.

..... [1]

- (ii) Finding them close to land has also become important to the people living nearby.

Suggest **one** reason why.

..... [1]

- (b) Many whale species are endangered.

- (i) What is meant by the term **endangered**?

..... [1]

- (ii) Put a tick (✓) in the box next to a bird which is endangered in Britain.

blue tit ☐

blackbird ☐

goldfinch ☐

osprey ☐

robin ☐

[1]

- (c) Whales produce milk for their young.

Write down the **class** of animals that feed their young on milk.

..... [1]

[Total: 5]

Turn over

6 Rose works for the council.

(a) She needs to find out how many rats are living in one area of town.

Rose set traps to catch the rats. The traps did not harm the rats.

Rats were collected from the traps, marked with harmless paint and released.

Rose then set the traps again a week later.

The results are shown in the table.

	number of rats
number caught first time	30
number caught second time	28
number of marked rats caught the second time	2

An estimate for the population of rats can be calculated using the formula:

$$\text{population} = \frac{\text{number caught first time} \times \text{number caught second time}}{\text{number of marked rats caught the second time}}$$

Use the formula to estimate the population of rats.

answer ..... [2]

(b) People are concerned that the rat population is increasing because of household waste. There is now more household waste compared with 100 years ago.

Suggest **one** reason why there is now more waste.

..... [1]

(c) Rose tries to kill the rats using food containing the rat poison warfarin.

All of the rats eat the food.

Most rats die but some survive and breed.

Most of their offspring can also survive eating the poisoned food.

Explain why some rats survive.

.....

.....

.....

..... [2]

[Total: 5]

## 7 Read the report about rhododendron plants.



The rhododendron plant is responsible for the destruction of many habitats in Britain.

The reason for this is simple. Where conditions are suitable, it will out compete most other plants.

The rhododendrons become very large, allowing very little light to reach the ground.

- (a) The rhododendrons compete with other plants for light.

Write down **one** other thing that plants compete for.

Choose from the list.

cellulose

minerals

vitamins

protein

answer ..... [1]

- (b) The plants need light for photosynthesis.

Write down the names of **two** chemicals that plants need for photosynthesis.

1 .....

2 ..... [2]

- (c) Dormice are small animals that feed on plants.

However, they cannot eat rhododendrons.

The increase in the number of rhododendrons means there are fewer dormice.

Explain why.

.....

.....

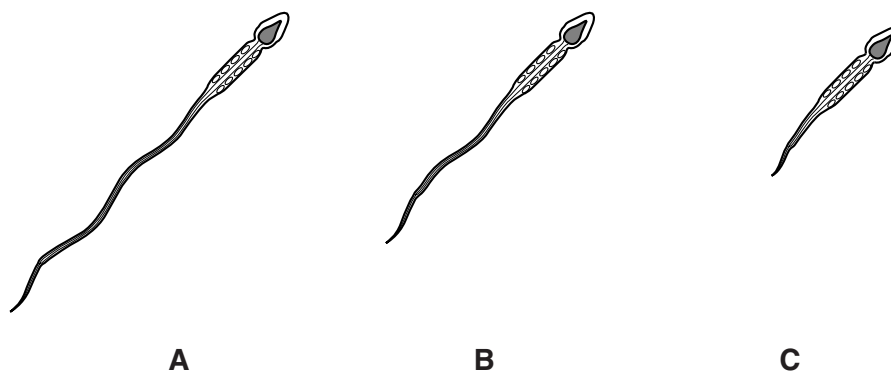
..... [2]

[Total: 5]

## Section C – Module B3

8 This question is about human growth.

(a) The diagrams show some sperm cells.



Sperm cells swim to egg cells to join with them.

Which sperm cell is most likely to reach the egg first?

Choose from **A**, **B** or **C**.

.....

Explain your answer.

.....

..... [2]

(b) Complete the sentences by choosing from the following words.

**differentiation**

**division**

**dormancy**

**fertilisation**

**modification**

**mutation**

When a sperm cell joins with an egg cell, this is called .....

The new cell formed starts to grow by cell ..... forming an embryo.

As the embryo grows, different types of cells are produced.

This is called cell .....

[3]

14

(c) The developing embryo needs food and oxygen to help it grow.

(i) Where does the embryo get its food and oxygen from?

..... [1]

(ii) One of the first organs to develop in the embryo is the heart.

Why does the embryo need a heart?

.....

..... [2]

[Total: 8]

9 (a) Mary has a potato plant growing in her garden.

Mary lets the potato plant reproduce **asexually**, producing four new potato plants.

Describe how a potato plant reproduces asexually.

You may use a labelled diagram to help you answer.

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

15

- (b) All of Mary's new potato plants are produced asexually.

Mary was expecting them to have the same features.

However, three of the plants have white flowers and one has yellow flowers.

Suggest why one plant might have different coloured flowers.

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

- (c) Mary's neighbour Sachin also grows potato plants.

Sachin's potato plants are all different.

He decides to use selective breeding to improve his potato plants.

Put ticks (✓) in the boxes next to the **two** features that would be suitable for selection.

easily damaged by frost

☐

need a lot of watering

☐

produce many potatoes on one plant

☐

resistant to disease

☐

take a long time to grow

☐

[2]

[Total: 6]

- 10 The enzyme carbohydrase breaks down starch into sugar.

John investigates the effect of different pH values on the time taken for carbohydrase to break down starch.

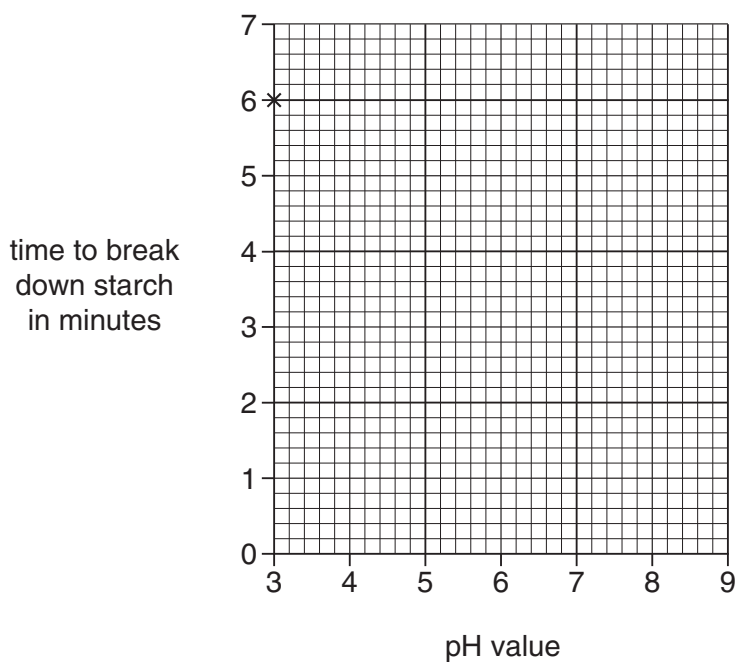
The table shows his results.

pH value	3	4	5	6	7	8	9
time to break down starch in minutes	6.0	5.0	4.0	3.0	2.5	2.5	3.0

- (a) (i) Plot a graph of John's results.

The first point has been plotted for you.

Complete the graph by drawing the best curve.



[3]

- (ii) Look at the graph. What is the optimum pH for carbohydrase?

..... [1]

17

(b) In the body, starch is broken down to sugar so it can be absorbed from the small intestine into the blood.

(i) Sugar moves from the small intestine into the blood.

Write down the name of the process by which it moves.

..... [1]

(ii) Which part of the blood transports sugar around the body?

..... [1]

[Total: 6]

**END OF QUESTION PAPER**

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