THIS IS A NEW SPECIFICATION

OCR
RECOGNISING ACHIEVEMENT

F

Thursday 12 January 2012 – Morning

GCSE GATEWAY SCIENCE
BIOLOGY B

B731/01 Biology modules B1, B2, B3 (Foundation Tier)

B722170112

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 15 minutes

B731101

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

- Your 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 **75**.
- This document consists of **20** pages. Any blank pages are indicated.

© OCR 2012 [F/601/7586]

OCR is an exempt Charity

BLANK PAGE

PLEASE DO NOT WRITE ON THIS PAGE

© OCR 2012

Answer **all** the questions.

Section A – Module B1

1 Simon is going sledging with his friends.



(a) Simon's body needs to keep warm in the snow.

Why is it important that Simon's body temperature does **not** fall too low?

.....

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

(b) Simon's body sweats less to stop him losing too much heat.

Describe **other** changes that can happen in Simon's body to keep him warm.

.....

.....

.....

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

(c) Simon's dad has some wine with his lunch.

Simon and his dad then have a snowball fight.

His dad loses the fight. He blames this on the alcohol.

Explain how the alcohol might affect Simon's dad during a snowball fight.

.....

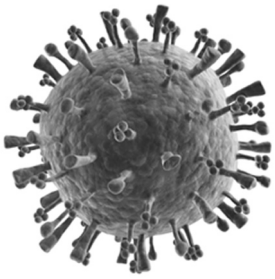
.....

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

[Total: 6]

© OCR 2012

2 Look at the picture of the virus that causes flu.



(a) Viruses are one type of pathogen.

(i) Write down the name of **one other** type of pathogen and a disease it causes.

.....

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

(ii) Doctors can use drugs to treat diseases.

New drugs need to be tested.

Write down **one** reason why they are tested.

.....

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

© OCR 2012

(b) Emma takes her sick cat to the vet.

The vet says it has cat flu and that the virus infected the cells of the cat's **lungs.**

The virus must have got past the cat's defence mechanisms.

The vet says that cats have similar defence mechanisms to humans.

Emma thought the cat's body should have stopped the virus infecting its cells.

Suggest how the flu virus got into the cat and describe the cat's defence mechanisms against the virus.



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

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... **[6]**

[Total: 9]

© OCR 2012

3 Rafik plays rugby.



Rafik thinks he needs a special diet.

He finds out about diets for rugby players.

Read the information Rafik finds.

> The training diet of a rugby player should
>
> - **be high in carbohydrate-rich foods** eg cereal, bread, rice, pasta, potato, fruit
> - **be moderate in protein-rich foods** eg meat, chicken, fish, milk and cheese
> - **be low in fat** eg avoid too much butter, fatty meats, high fat snacks and fried food
> - **include fruit & vegetables** to help prevent illness.

(a) Suggest why rugby players need a diet high in carbohydrates.

.....

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

(b) The diet says rugby players need moderate amounts of protein.

Rafik knows proteins are needed for muscle growth.

Rafik also knows he could take performance enhancers to develop his muscles.

Many people believe rugby players should **not** take performance enhancers.

Suggest why.

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

© OCR 2012

(c) Rafik is concerned that he might be too overweight to play rugby.

Read the information in the box.

Body Mass Index (BMI)

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

- underweight < 18.5
- normal weight = 18.5 – 24.9
- overweight = 25 – 29.9
- obese = 30 or more.

(i) Rafik is 180 cm tall and has a mass of 85 kg.

Calculate Rafik's BMI.

Show your working.

BMI = ... **[2]**

(ii) Is Rafik overweight? .....

Use the information in the box to explain your answer.

.....

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

(iii) Rafik finds out about the BMI of other rugby players.

He finds out that most of the England rugby team have a BMI greater than 30.

Rafik's friend tells him that a high BMI does not mean you are unfit **and** unhealthy.

Is Rafik's friend correct?.....

Suggest reasons for your answer.

.....

.....

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

[Total: 7]

© OCR 2012

BLANK PAGE

PLEASE DO NOT WRITE ON THIS PAGE

© OCR 2012

4 Jason and Sandra are investigating how plants grow.

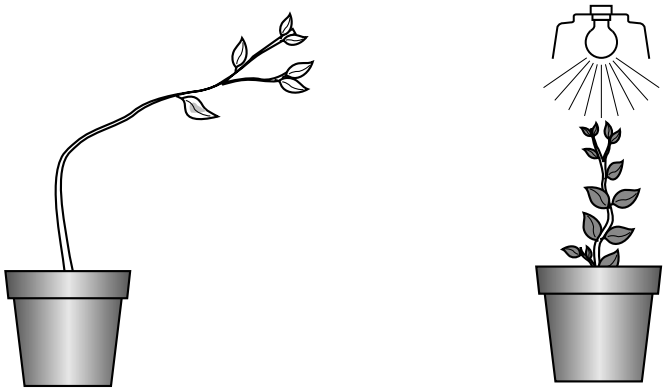
They start with two identical plants.

They put one plant in the middle of a room and the second plant under a lamp.

The only light in the room comes from the lamp.

The plants are watered the same amount each day.

Look at the picture. It shows each plant after they have been left for a week.



plant **A** in the middle of the room

plant **B** under the lamp

(a) Jason thinks the reason the plants look different is because of the effect of the light.

Explain how the results support his conclusion.

.....

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

(b) Sandra thinks the plants might be growing towards the heat from the lamp.

They think about ways to change their experiment to see if the plants are responding to light **not** heat.

They start with two more identical plants.

Put ticks (✓) in **two** boxes to describe the **best** changes they could make.

Put a heat shield between the plants and the lamp.	☐
Put the plant from the middle of the room into a box.	☐
Take the lamp away.	☐
Take the lamp away and replace with a heater.	☐
Water the plants to stop them getting too hot.	☐

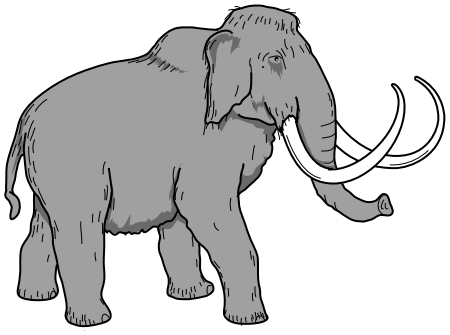
[2]

[Total: 3]

© OCR 2012

Section B – Module B2

5 Read this article about mammoths.



Mammoths were large elephant-like animals that are now extinct.

The bodies of more and more mammoths are being found preserved in ice.
This is because the global temperature is increasing. This is melting the ice caps.

Some people suggest using mammoth tusks instead of elephant tusks as a source of ivory. They hope that this will stop elephants from becoming extinct.
However, they know that this is not a long term solution because mammoth ivory is not sustainable.

(a) Mammoths are now extinct.

(i) Write down **one** possible cause of animals becoming extinct.

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

(ii) Some people are worried that elephants in Africa might become extinct.

Suggest **one** way that preventing the extinction of elephants could **benefit** people that live in Africa.

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

© OCR 2012

(b) Elephants and mammoths are thought to be related.

Elephants have developed due to groups of animals changing over long periods of time.

Natural selection is a theory that explains how these changes happened.

(i) What name is given to a gradual change in a group of organisms?

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

(ii) Write down the name of the scientist who suggested the theory of natural selection.

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

(c) The increase in global temperature is melting ice and exposing the dead mammoths.

Many people think that the increase in global temperature is due to increased carbon dioxide levels in the atmosphere.

Explain how increased carbon dioxide levels could lead to global warming.

.....

.....

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

(d) Using mammoth ivory instead of elephant ivory is **not** sustainable.

Explain why this is.

.....

.....

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

[Total: 8]

© OCR 2012

6 **(a)** Buffalo are herbivores that live in Africa.



Buffalo feed on grass.

Yellow-billed oxpeckers are small birds that live on buffalo.

Yellow-billed oxpeckers hunt for live ticks that feed on buffalo.

The ticks feed on buffalo blood.

(i) How many trophic levels are there in this food chain?

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

(ii) How does energy enter and flow through this food chain?

.....

.....

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

(iii) The ticks are **parasites** of the buffalo.

What does the word parasite mean?

.....

.....

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

(iv) Suggest how the buffalo might benefit from the yellow-billed oxpecker.

.....

.....

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

© OCR 2012

(b) A different species of oxpecker lives in another part of Africa.

This is the red-billed oxpecker. It also lives on buffalo.

A scientist wants to investigate whether buffalo also benefit from the red-billed oxpecker.

He counts the number of ticks on six buffalo.

He stops red-billed oxpeckers from sitting on three of the buffalo.

Red-billed oxpeckers are allowed to sit on the other three buffalo.

After several days he works out the change in the number of ticks on each buffalo.

His results are in the table.

	change in the number of ticks on each buffalo after the experiment			**average change**
buffalo with red-billed oxpeckers	+3	+7	–4	+2
buffalo without red-billed oxpeckers	+4	–4	+6	

(i) Work out the average change in ticks on the buffalo **without** red-billed oxpeckers.

average change = ... **[1]**

(ii) What is the conclusion from this experiment?

.....

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

(iii) Buffalo often have small wounds and sores on their bodies.

The scientist also looks at the effect that red-billed oxpeckers have on these wounds.

	number of wounds that DO NOT heal	**number of wounds that heal**	**total number of wounds**
buffalo with red-billed oxpeckers	49	55	104
buffalo without red-billed oxpeckers	3	24	27

Use this information to suggest what the red-billed oxpeckers do to the buffalo.

.....

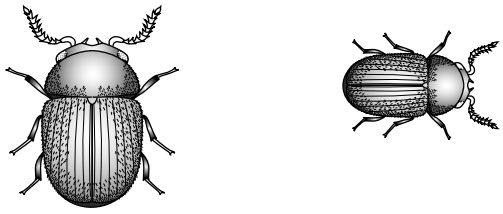
.....

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

[Total: 11]

© OCR 2012

7 Scientists discover **two** new organisms living in a remote forest.

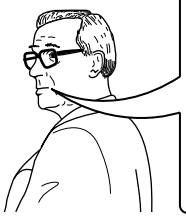


organism 1 **organism 2**

Two of the scientists are discussing the organisms.

Dr Smith
We know that they are definitely **animals**.
I would also classify them both as **arthropods** and **insects**.





Dr Jones
They certainly look similar.
It would be interesting to find out if they are both members of the same **species**.

The scientists want to find out if their ideas about classifying these organisms are correct, and if both organisms are members of the same species.

Write about the characteristics that the scientists would look for in order to test their ideas.

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

.....

.....

.....

.....

.....

.....

.....

.....

.....

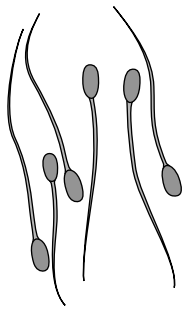
..... **[6]**

[Total: 6]

© OCR 2012

Section C – Module B3

8 Look at the picture of bull sperm cells.



Bull sperm cells contain a different number of chromosomes to the number in body cells.

Bull **skin** cells contain 60 chromosomes.

Work out how many chromosomes are in a bull sperm cell.

Use this to explain why skin cells have 60 chromosomes.

bull sperm cell = …….. chromosomes

.....

.....

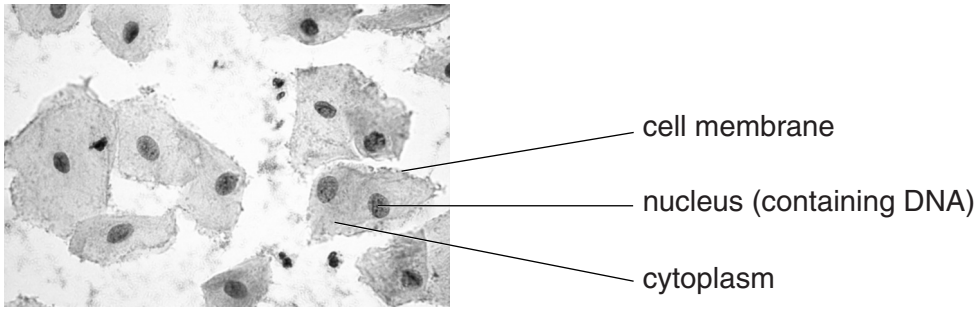
.....

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

[Total: 3]

© OCR 2012

9 Look at the image of human cheek cells.



(a) (i) DNA contains the code for the production of a substance needed for growth.

Write down the name of this substance.

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

(ii) Cell division occurs during growth.

Write down the name of the type of cell division used for growth.

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

(iii) Explain why DNA replicates **before** cells divide.

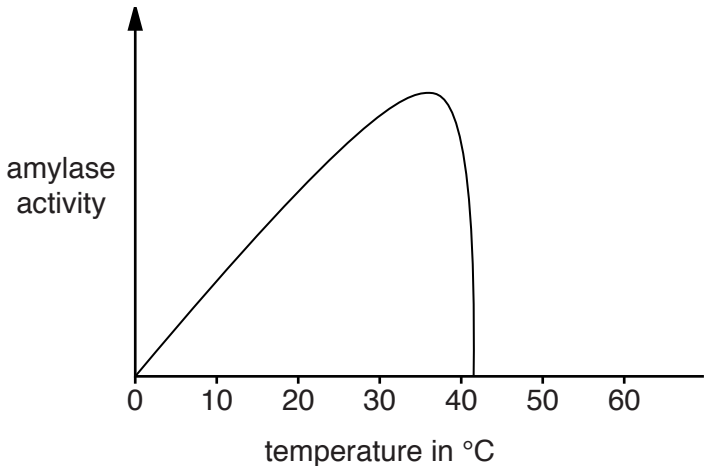
.....

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

(b) Amylase is an enzyme which is found in saliva. It only digests starchy foods.

Look at the graph.

It shows the effect of temperature on amylase.



© OCR 2012

(i) Describe the shape of the graph for amylase and explain why amylase **only** breaks down starch.



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

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... **[6]**

(ii) Bacteria which live in hot water springs also produce amylase enzymes.

Genetic engineering can be used to produce this amylase in large amounts.

What is meant by **genetic engineering**?

.....

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

[Total: 11]

© OCR 2012

10 Carl is an athlete.

He competes in the 200 m sprint.



(a) Sprinting needs energy.

Respiration is a process that releases energy.

Describe this process and suggest how it helps movement during the sprint.

.....

.....

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

(b) During the sprint Carl's breathing rate and pulse rate increase.

Write down **two** reasons why.

1 .....

.....

2 .....

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

© OCR 2012

(c) Look at the table of data.

It shows the maximum oxygen consumption for males of different fitness levels.

The males are aged between 13 and 29 years old.

maximum oxygen consumption in cm^3 per kg per minute						
age in years	**fitness levels**					
	very poor	**poor**	**fair**	**good**	**excellent**	**superior**
13–19	less than 35	35–38	39–45	46–50	51–55	more than 55
20–29	less than 33	33–35	36–42	43–46	47–52	more than 52

(i) Carl is **25** years old.

He has a maximum oxygen consumption of 44 cm^3 per kg per minute.

Carl wants to improve his fitness level to **excellent**.

Look at the table.

Calculate Carl's maximum oxygen consumption as a percentage of the **lowest excellent** value.

answer .....% **[1]**

(ii) Carl was tested to obtain his maximum oxygen consumption after further training.

He trained for one week doing gentle jogging. His maximum oxygen consumption at the end of the week was 45 cm^3 per kg per minute.

The second week, he trained by sprinting and jogging. His maximum oxygen consumption at the end of this week was 48 cm^3 per kg per minute.

Make a conclusion about Carl's fitness level and the training he used.

.....

.....

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

[Total: 7]

© OCR 2012

11 (a) Blood is important for transport in the body.

Blood contains different parts.

Draw straight lines to connect each **part of the blood** to the **job it does**.

part of the blood	job it does
red blood cell	defends against disease
platelet	transports oxygen
white blood cell	helps blood clotting

[2]

(b) Leukaemia is a disease of the blood.

Research scientists do experiments using blood from people with leukaemia.

This allows a more detailed understanding of leukaemia.

Other scientists repeat these experiments.

Explain the benefits of repeating the research scientists' experiments.

.....

.....

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

[Total: 4]

END OF QUESTION PAPER

OCR
RECOGNISING ACHIEVEMENT

Copyright Information

OCR is committed to seeking permission to reproduce all third-party content that it uses in its assessment materials. OCR has attempted to identify and contact all copyright holders whose work is used in this paper. To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced in the OCR Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download from our public website (www.ocr.org.uk) after the live examination series.

If OCR has unwittingly failed to correctly acknowledge or clear any third-party content in this assessment material, OCR will be happy to correct its mistake at the earliest possible opportunity.

For queries or further information please contact the Copyright Team, First Floor, 9 Hills Road, Cambridge CB2 1GE.

OCR is part of the Cambridge Assessment Group; Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.

© OCR 2012