AQA GCSE BIOLOGY (4411)

BIOLOGY



EXAM QUESTION PACK

UNIT B1 HIGHER TIER BLY1H PAPERS

STEMUP

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Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
8	
TOTAL	

General Certificate of Secondary Education
Higher Tier
June 2012

Science B
Unit Biology B1

BLY1H

H

Biology
Unit Biology B1

Written Paper

Tuesday 12 June 2012 9.00 am to 9.45 am

For this paper you must have:
- a ruler.

You may use a calculator.

Time allowed
- 45 minutes

Instructions
- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 45.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.

Advice
- In all calculations, show clearly how you work out your answer.

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Do not write outside the box

Answer **all** questions in the spaces provided.

1 (a) **List A** gives the names of three stages in trialling a new drug.

List B gives information about the three stages.

Draw a line from each stage in **List A** to the correct information in **List B**.

List A Stage	**List B Information**
	Used to find if the drug is toxic
Tests on humans including a placebo	
	The first stage in the clinical trials of the drug
Tests on humans using very small quantities of the drug	
	Used to find the optimum dose of the drug
Tests on animals	
	Used to prove that the drug is effective on humans

(3 marks)

Do not write outside the box

1 (b) Read the passage.

Daily coffee dose delays development of Alzheimer's in humans.

Alzheimer's is a brain disease that causes memory loss in elderly people. Scientists studied 56 mice that had been genetically engineered to develop Alzheimer's.

Before treatment all the mice did badly in memory tests.

Half the mice were given a daily dose of caffeine in their drinking water. The dose was equivalent to the amount of caffeine in six cups of coffee for a human.

The other mice were given ordinary water.

After two months, the caffeine-drinking mice did better in memory tests than the mice drinking ordinary water.

The headline for the passage is not justified.

Explain why as fully as possible.

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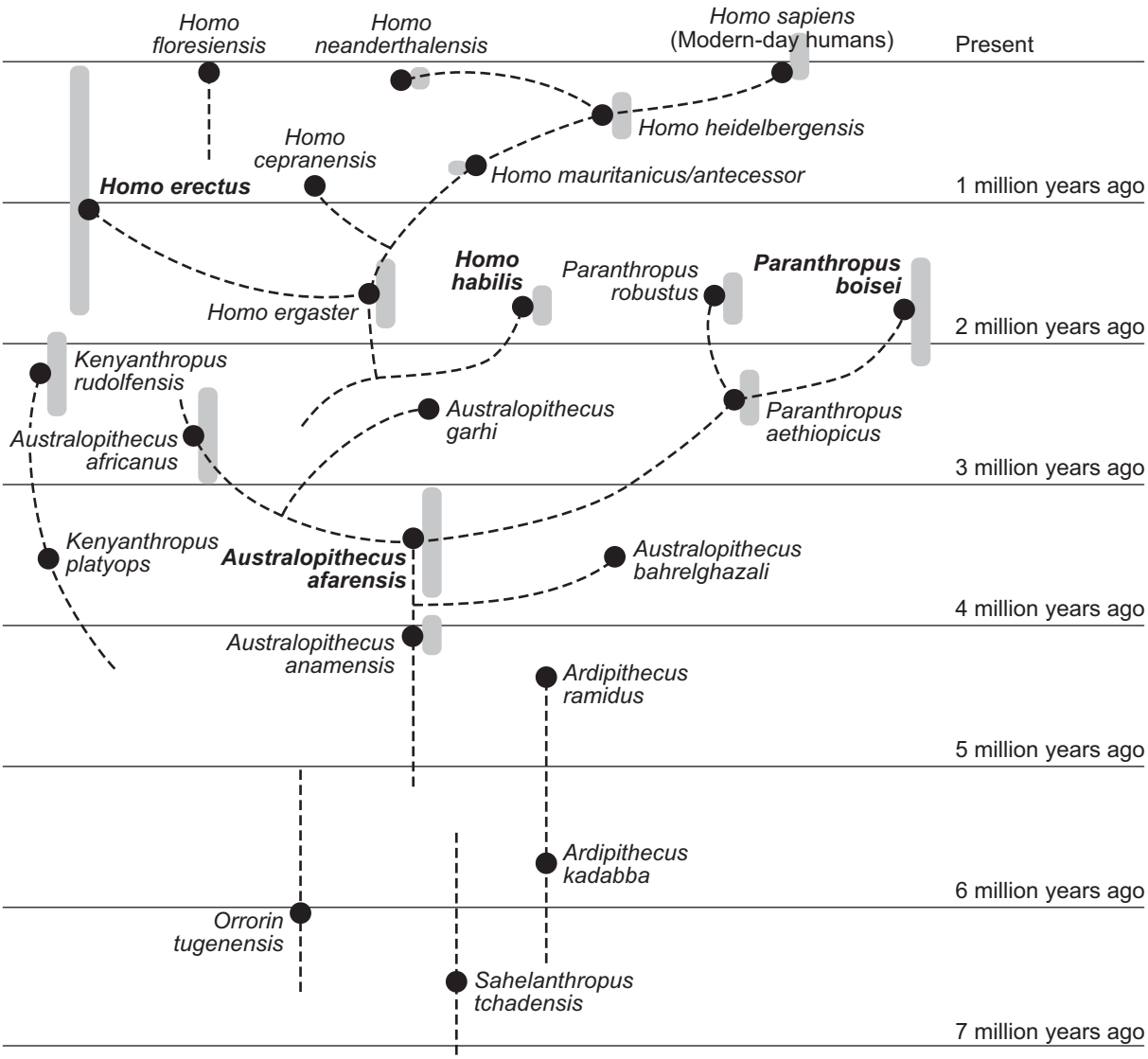
(3 marks)

6

Turn over for the next question

Do not write outside the box

2 The diagram shows an evolutionary tree for humans.
The diagram is based on a study of fossils.



Key: When each species lived | Relationships between species

2 (a) When did *Australopithecus afarensis* first appear?

..... million years ago.
(1 mark)

2 (b) Which species was the direct ancestor of *Paranthropus boisei*?

.....
(1 mark)

Do not write outside the box

2 (c) Which species is most closely related to *Homo habilis*?

.....

(1 mark)

2 (d) About 250 fossils of *Homo erectus* have been found. About 50 of these fossils have been found in China.

A Chinese scientist has suggested the hypothesis that Chinese people evolved from *Homo erectus*.

Most scientists do **not** agree with this hypothesis.

Use the information above and information from the diagram to suggest **two** reasons why.

1 .....

.....

2 .....

.....

(2 marks)

2 (e) Darwin suggested the theory of natural selection. It was a long time before this theory was accepted by most scientists.

Give **two** reasons why it took a long time.

1 .....

.....

2 .....

.....

(2 marks)

7

Turn over for the next question

Do not write outside the box

3 (a) Many people in developed countries are *malnourished*.

3 (a) (i) What does *malnourished* mean?

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(1 mark)

3 (a) (ii) Give **two different** effects on the body of being malnourished.

1 .....

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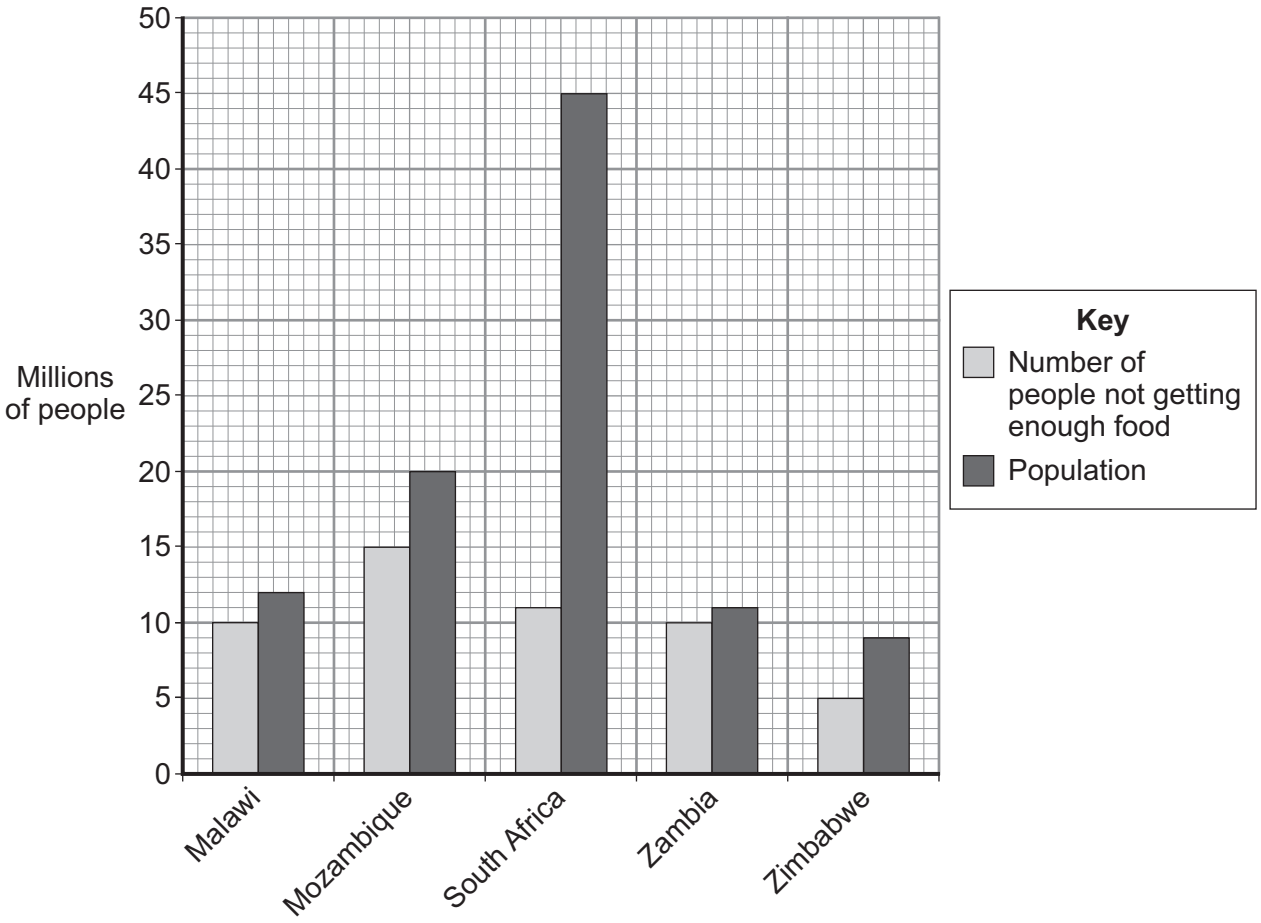
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(2 marks)

Do not write outside the box

3 (b) Many people in developing countries do **not** get enough food.

The bar chart shows the number of people **not** getting enough food in five African countries. The chart also shows the population of each of the countries.



3 (b) (i) Which country has the greatest proportion of people **not** getting enough food?

.....

(1 mark)

3 (b) (ii) Give **two** health problems that are linked to **not** getting enough food.

1 .....

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2 .....

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(2 marks)

6

Turn over ▶

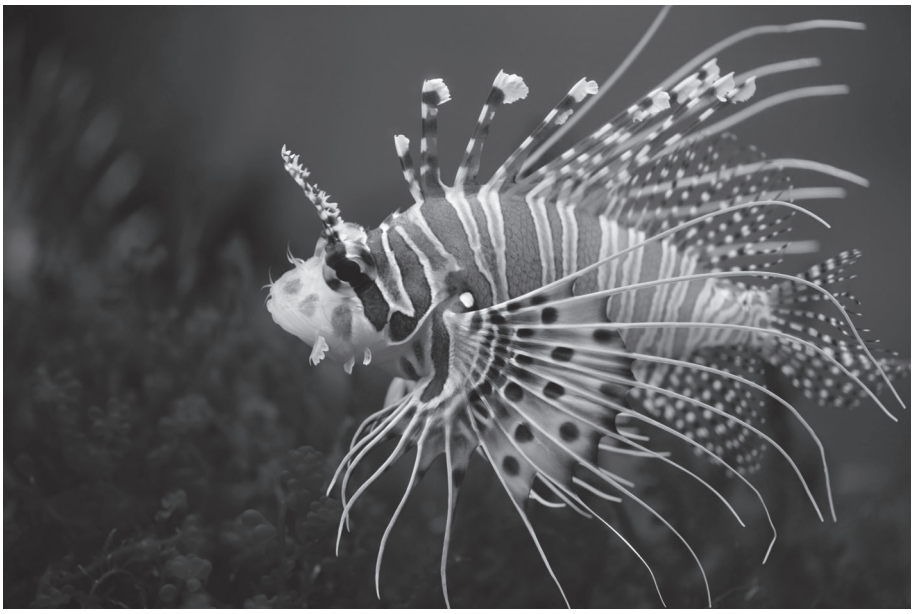
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ANSWER IN THE SPACES PROVIDED

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4 The photograph shows a lionfish. Lionfish are normally found in the Pacific Ocean.



In 1992 six lionfish escaped from an aquarium into the Atlantic Ocean.

Now there are thousands of lionfish in the Atlantic Ocean. Numbers of the native Atlantic fish have gone down because the lionfish have eaten many native Atlantic fish.

Suggest explanations for the large increase in the number of lionfish in the Atlantic Ocean.

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(3 marks)

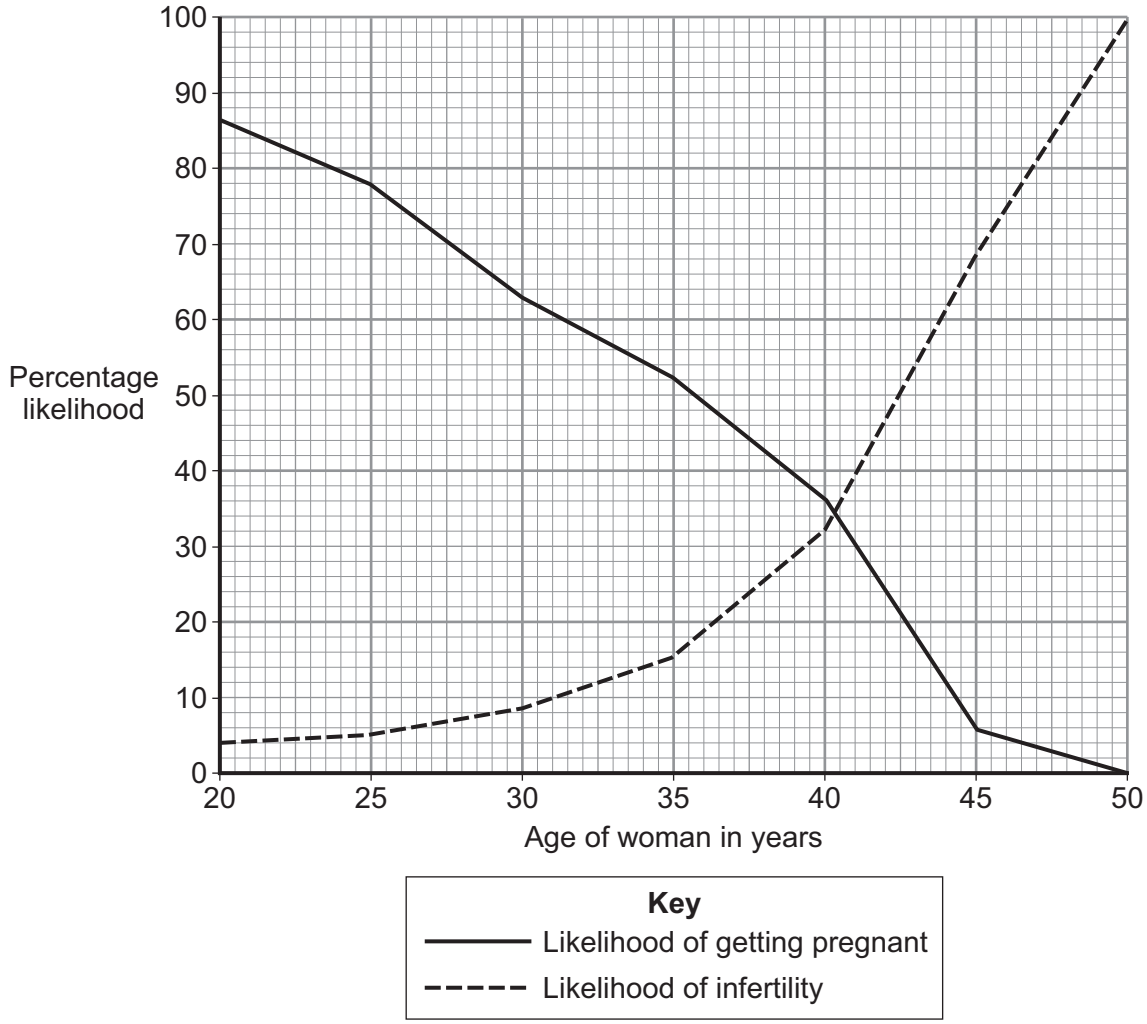
3

Turn over ▶

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5 The graph shows how the likelihood of getting pregnant and the likelihood of infertility change with a woman's age.

The data is for healthy women who have unprotected sexual intercourse during one year.



Do not write outside the box

5 (a) Use information from the graph to answer this question.

A woman in her mid-twenties is thinking about waiting until her late-thirties before she has children.
A doctor advises the woman not to wait.

Explain why the doctor gives this advice.

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(2 marks)

5 (b) The hormones FSH and LH are used in fertility treatment.

Give the function in fertility treatment of:

5 (b) (i) FSH

.....

.....

(1 mark)

5 (b) (ii) LH.

.....

.....

(1 mark)

5 (c) In the first stage of in-vitro fertilisation (IVF), eggs from the mother are fertilised with sperm from the father.

Describe the next stages of IVF.

.....

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(2 marks)

6

Do not write outside the box

6 A child saved apple seeds from an apple she ate. She planted the seeds in the garden. A few years later the apple trees she had grown produced apples.

6 (a) The apples from the new trees did **not** taste like the original apple.

Explain why.

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(2 marks)

6 (b) (i) Apple trees can be reproduced so that the apples from the new trees will taste the same as the apples from the parent trees.

Give **one** method used to reproduce apple trees in this way.

.....

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(1 mark)

6 (b) (ii) Explain why the method you have suggested in part **(b)(i)** will produce apples that taste the same as the apples from the parent trees.

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(2 marks)

5

Do not write outside the box

7 Many strains of bacteria have developed resistance to antibiotics.

The table shows the number of people infected with a resistant strain of one species of bacterium in the UK.

Year	2004	2005	2006	2007	2008
Number of people infected with the resistant strain	3499	3553	3767	3809	4131

7 (a) Calculate the percentage increase in the number of people infected with the resistant strain between 2004 and 2008.

Show clearly how you work out your answer.

.....

.....

Percentage increase = ...

(2 marks)

7 (b) Explain, in terms of natural selection, why the number of people infected with the resistant strain of the bacterium is increasing.

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(3 marks)

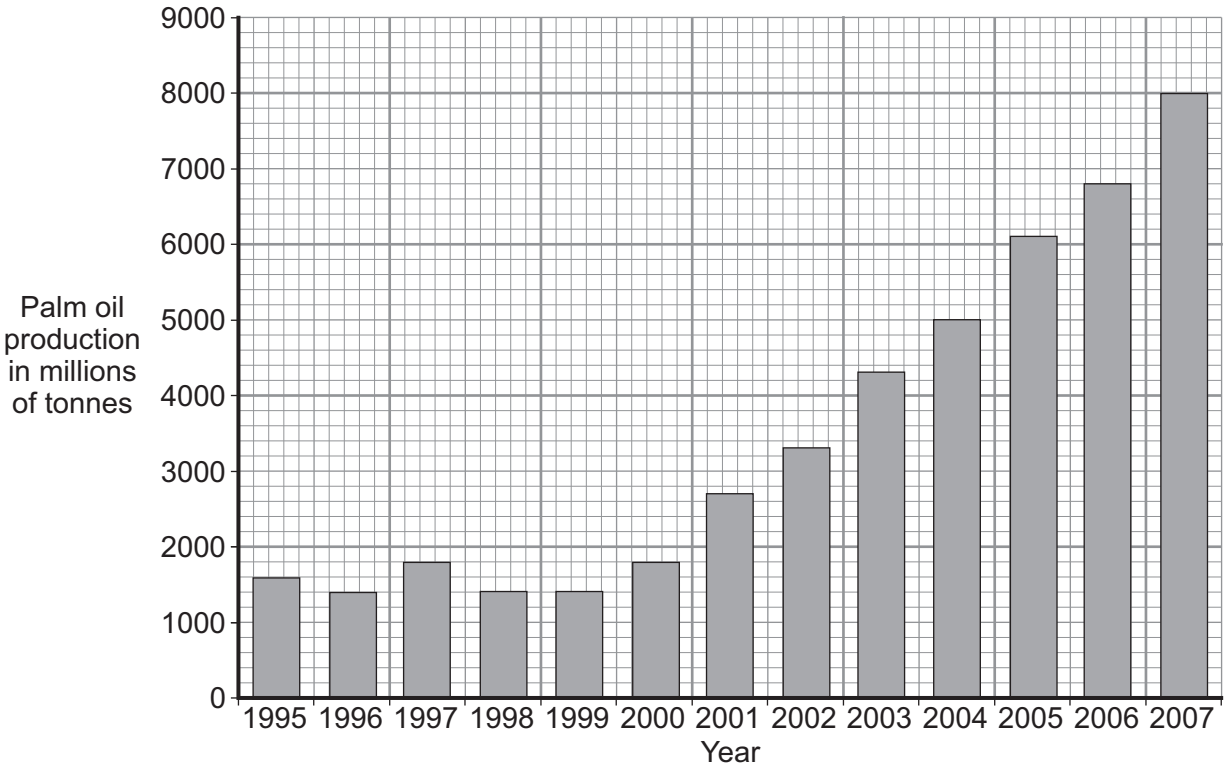
5

Turn over for the next question

Do not write outside the box

8 In South Asia, forests are being cleared to grow palm oil trees. The palm oil is mainly used to produce fuel for motor vehicles.

The graph shows the production of palm oil in one South Asian country.



8 (a) Calculate the mean increase in palm oil production per year for the five year period 2000 to 2005.

Show clearly how you work out your answer.

.....

.....

Mean increase = ... millions of tonnes per year
(2 marks)

Do not write outside the box

8 (b) Clearing forests and replacing the forests with palm oil trees to produce fuel for motor vehicles will affect the composition of the atmosphere.

Explain how.

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(5 marks)

7

END OF QUESTIONS

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Question 2 Hominid "Family Tree" © Anne and Bernard Spitzer, American Museum of Natural History

Question 4 Photograph: © Thinkstock

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Version : 10/08/2012



General Certificate of Secondary Education

Science B 4462 / Biology 4411

BLY1H Unit Biology 1

Mark Scheme

2012 examination – June series

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Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the students' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of students' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this Mark Scheme are available to download from the AQA Website: www.aqa.org.uk

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MARK SCHEME

Information to Examiners

1. General

The mark scheme for each question shows:

- the marks available for each part of the question
- the total marks available for the question
- the typical answer or answers which are expected
- extra information to help the Examiner make his or her judgement and help to delineate what is acceptable or not worthy of credit or, in discursive answers, to give an overview of the area in which a mark or marks may be awarded.

The extra information is aligned to the appropriate answer in the left-hand part of the mark scheme and should only be applied to that item in the mark scheme.

At the beginning of a part of a question a reminder may be given, for example: where consequential marking needs to be considered in a calculation; or the answer may be on the diagram or at a different place on the script.

In general the right hand side of the mark scheme is there to provide those extra details which confuse the main part of the mark scheme yet may be helpful in ensuring that marking is straightforward and consistent.

2. Emboldening

2.1 In a list of acceptable answers where more than one mark is available 'any **two** from' is used, with the number of marks emboldened. Each of the following lines is a potential mark.

2.2 A bold **and** is used to indicate that both parts of the answer are required to award the mark.

2.3 Alternative answers acceptable for a mark are indicated by the use of **or**. (Different terms in the mark scheme are shown by a / ; eg allow smooth / free movement.)

3. Marking points

3.1 Marking of lists

This applies to questions requiring a set number of responses, but for which students have provided extra responses. The general principle to be followed in such a situation is that 'right + wrong = wrong'.

Each error/contradiction negates each correct response. So, if the number of error/contradictions equals or exceeds the number of marks available for the question, no marks can be awarded.

However, responses considered to be neutral (indicated as * in example 1) are not penalised.

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Example 1: What is the pH of an acidic solution? (1 mark)

Student	Response	Marks awarded
1	4,8	0
2	green, 5	0
3	red*, 5	1
4	red*, 8	0

Example 2: Name two planets in the solar system. (2 marks)

Student	Response	Marks awarded
1	Neptune, Mars, Moon	1
2	Neptune, Sun, Mars, Moon	0

3.2 Use of chemical symbols / formulae

If a student writes a chemical symbol / formula instead of a required chemical name, full credit can be given if the symbol / formula is correct and if, in the context of the question, such action is appropriate.

3.3 Marking procedure for calculations

Full marks can be given for a correct numerical answer, as shown in the column 'answers', without any working shown.

However if the answer is incorrect, mark(s) can be gained by correct substitution / working and this is shown in the 'extra information' column;

3.4 Interpretation of 'it'

Answers using the word 'it' should be given credit only if it is clear that the 'it' refers to the correct subject.

3.5 Errors carried forward

Any error in the answers to a structured question should be penalised once only.

Papers should be constructed in such a way that the number of times errors can be carried forward are kept to a minimum. Allowances for errors carried forward are most likely to be restricted to calculation questions and should be shown by the abbreviation e.c.f. in the marking scheme.

3.6 Phonetic spelling

The phonetic spelling of correct scientific terminology should be credited **unless** there is a possible confusion with another technical term.

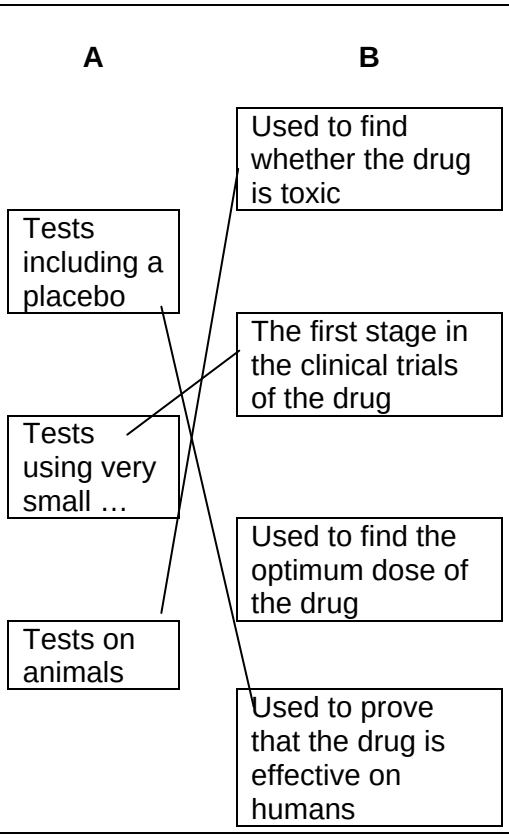
3.7 Brackets

(…..) are used to indicate information which is not essential for the mark to be awarded but is included to help the examiner identify the sense of the answer required.

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BLY1H

Question 1

question	answers	extra information	mark
1(a)		**1** mark for each correct line mark each line from left hand box two lines from left hand box cancels mark for that box	3

Question 1 continues on the next page . . .

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BLY1H

Question 1 cont'd

question	answers	extra information	mark
1(b)	any **three** from: • reference to reliability, eg only a small number of mice tested **or** trial too short **or** investigation not repeated • reference to control, eg mice given caffeine not coffee **or** 6 cups (equivalence) is more than 1 dose • (and) the effect on mice might not be same as on humans • (also) text suggests that the treatment improves memory loss (rather than delays it) **or** mice already have memory loss **or** experiment only showed improvement in memory **or** does not show **delays** Alzheimer's **or** experiment not done on old mice	Students have been informed that the headline is not justified allow only tested on mice accept text suggests disease cured allow reference to the fact that mice engineered to have it	3
Total			**6**

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BLY1H

Question 2

question	answers	extra information	mark
2(a)	3.75	accept answers in range 3.6 – 3.9	1
2(b)	(Paranthropus) aethiopicus		1
2(c)	(Homo) ergaster		1
2(d)	any **two** from: • Homo erectus fossils found in other parts of the world • (too many) gaps in fossil record • Homo erectus on different branch of 'tree' **or** no evidence of other 'humans' developing from Homo erectus **or** no link shown between Homo erectus to Homo sapiens / modern humans **or** (fossils show that) H. sapiens evolved from H. heidelbergensis / H. mauritanicus / H. ergaster	ignore references to H. floresiensis or not enough data allow **only** 50 fossils found in China ignore the two species were alive at the same time allow diagram shows they are not closely related	2

Question 2 continues on the next page . . .

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BLY1H

Question 2 continued

question	answers	extra information	mark
2(e)	any **two** from: • 'religious' reasons • insufficient evidence at that time • Darwin was not a respected / well known scientist • mechanism of inheritance / variation not known at that time	 allow people did not wish to believe they had evolved from apes allow took a long time to get evidence **or** communications not as good at that time ignore **no** evidence / could not prove it ignore references to Lamarck allow (people) did not know about genes / genetics / DNA / chromosomes / mutations	2
Total			**7**

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BLY1H

Question 3

question	answers	extra information	mark
3(a)(i)	diet not balanced	allow lacks a nutrient / named nutrient / food group allow 'wrong kinds of food' ignore not enough nutrients ignore lack of food / unhealthy diet	1
3(a)(ii)	any **two** from: • too fat • too thin / stunted growth / weight loss • deficiency disease / named deficiency disease / deficiency symptom • allow tiredness / weakness / insufficient energy • allow weak / brittle bones / osteoporosis as symptoms of vitamin D / calcium deficiency • allow bloated stomach • allow reduced resistance to infection / weak immune system	accept two deficiency diseases / symptoms for **2** marks accept muscle wastage ignore irregular periods ignore anorexia / diabetes / arthritis / heart disease	2

Question 3 continues on the next page . . .

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BLY1H

Question 3 continued

question	answers	extra information	mark
3(b)(i)	Zambia		1
3(b)(ii)	any **two** from: • irregular period • reduced resistance to infection • tiredness / weakness / weight loss / stunted growth / muscle wastage	ignore starvation / death allow weak immune system do **not** accept anorexia ignore deficiency diseases	2
Total			**6**

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BLY1H

Question 4

question	answers	extra information	mark
4	there are no / few predators of the lionfish **or** spines protect lionfish from predation **or** no / fewer disease organisms	allow warning colouration / poisonous	1
	predators / prey in Atlantic do not recognise lionfish **or** not fished by humans	allow high reproduction	1
	also there is abundant food in Atlantic **or** there is no / less competition in Atlantic	ignore adaptation to new environment	1
Total			**3**

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BLY1H

Question 5

question	answers	extra information	mark
5(a)	chance of getting pregnant decreases with age	ignore figures	1
	chance of infertility increases with age		1
5(b)(i)	causes eggs to mature	allow growth do **not** accept produced do **not** accept releases egg ignore references to oestrogen / LH / uterus / womb	1
5(b)(ii)	causes egg release	do **not** accept matures egg / growth of egg / produces egg ignore references to other hormones and uterus / womb	1
5(c)	embryo	allow (fertilised) egg divides	1
	insert (embryo) into womb / uterus	ignore electric shock	1
Total			**6**

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Question 6

question	answers	extra information	mark
6(a)	seeds produced by sexual reproduction / fusion of gametes / fertilisation	allow produced by pollination / crossing	1
	mixture of genes / genetic information / chromosomes / DNA **or** from two parents / apple trees		1
		if no other mark obtained allow **1** mark for apples had different genes / genetic information / chromosomes / DNA **or** mutation occurred ignore environmental effects / cloned	
6(b)(i)	cuttings / tissue culture	accept grafting allow adult cell cloning ignore cloning unqualified ignore genetic engineering ignore asexual reproduction	1
6(b)(ii)	asexual reproduction	allow produced by cloning / mitosis	1
	have identical genes / genetic information / chromosomes / DNA **or** no mixing of genes / genetic information /chromosomes /DNA		1
Total			**5**

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Question 7

question	answers	extra information	mark
7(a)	18.06 / 18 / 18.1	correct answer gains **2** marks if answer incorrect evidence of (4131 – 3499) ÷ 3499 x 100 **or** 632 ÷ 3499 x 100 **or** ((4131 ÷ 3499) x 100) – 100 **or** 0.18 gains **1** mark	2
7(b)	antibiotics kill non-resistant strain **or** resistant strain bacteria survive	accept resistant strain the successful competitor do **not** accept intentional adaptation ignore strongest / fittest survive ignore mutation ignore people do not finish antibiotic course	1
	resistant strain bacteria reproduce **or** resistant strain bacteria pass on genes		1
	population of resistant strain increases **or** proportion of resistant bacteria increases **or** people more likely to be infected by resistant strain (than non-resistant strain)	allow high numbers of resistant bacteria	1
Total			**5**

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Question 8

question	answers	extra information	mark
8(a)	860	correct answer gains **2** marks if answer incorrect evidence of (6100 – 1800) ÷ 5 **or** 4300 ÷ 5 **or** (900 + 600 + 1000 + 700 + 1100) ÷ 5 gains **1** mark allow ecf from 1 incorrect graph reading	2
8(b)		ignore references to oxygen / sulfur dioxide / nitrogen oxides / acid rain ignore global warming	
	Effects of deforestation		
	deforestation increases the amount of carbon dioxide in the atmosphere	award this point only if linked to deforestation	1
	any **two** from: • due to less photosynthesis **or** less carbon dioxide taken in **or** carbon dioxide not locked up in (forest) trees • due to burning of forest / from machinery • due to activity of microorganisms / decay		2
	Effects of growing palm for fuel		
	carbon dioxide released when palm oil used as fuel		1
	(eventually) CO_2 intake and output might balance out **or** burning palm oil carbon neutral	accept less carbon dioxide than from burning fossil fuels	1
Total			**7**

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Examiner's Initials	
Question	Mark
1	
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TOTAL	

General Certificate of Secondary Education
Higher Tier
January 2012

Science B
Unit Biology B1

BLY1H

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Biology
Unit Biology B1

Written Paper

Tuesday 24 January 2012 9.00 am to 9.45 am

For this paper you must have:
- a ruler.

You may use a calculator.

Time allowed
- 45 minutes

Instructions
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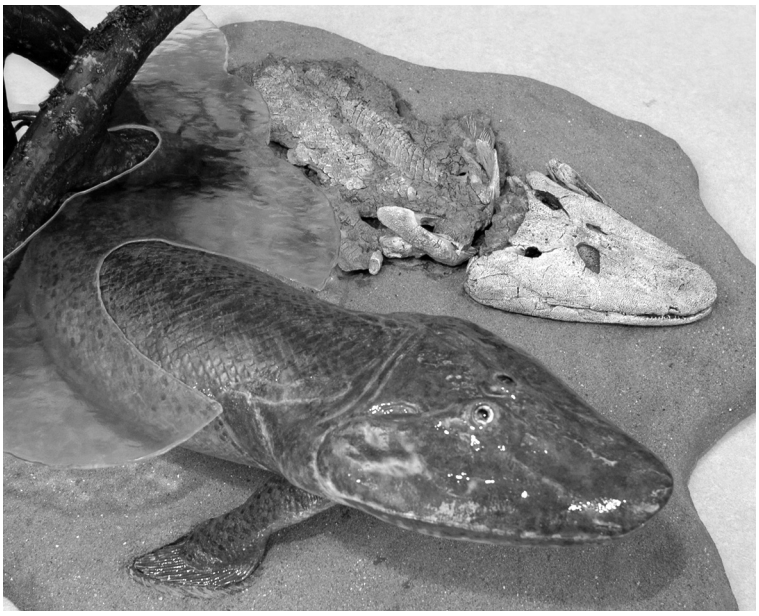
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Answer **all** questions in the spaces provided.

1 An animal called *Tiktaalik* became extinct about 360 million years ago.

The photograph shows the fossilised skeleton of *Tiktaalik* and a model of what scientists think *Tiktaalik* looked like.



1 (a) Scientists found only the fossilised skeleton of *Tiktaalik*.

Explain why.

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(2 marks)

1 (b) Scientists think that *Tiktaalik* lived mostly in water, but that it was one of the first animals to be able to move onto land.

Use evidence from the photograph to suggest why.

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(2 marks)

4

Do not write outside the box

2 Fruits contain seeds. Most plants produce fruits that are adapted for dispersing seeds. Seeds are dispersed so that young plants do not grow near their parents.

2 (a) Explain the advantage to plants of dispersing their seeds.

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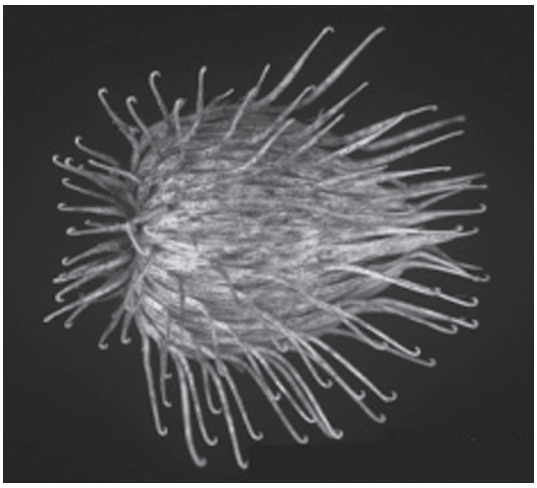
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(2 marks)

2 (b) The photograph shows cocklebur fruits.



The photograph is magnified.

Suggest how cocklebur fruits are adapted for dispersing their seeds.

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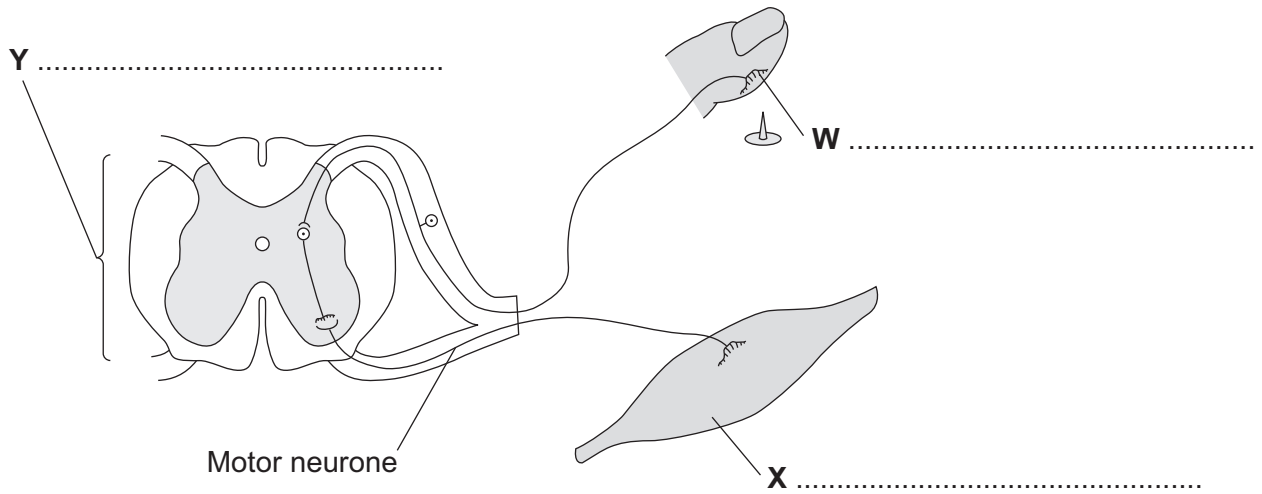
.....

(2 marks)

4

Do not write outside the box

3 The diagram shows the structures involved in a reflex action.



3 (a) On the diagram, name the structures labelled **W**, **X** and **Y**.

(3 marks)

3 (b) The control of blood sugar level is an example of an action controlled by hormones.

Give **two** ways in which a reflex action is different from an action controlled by hormones.

1 .....

.....

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2 .....

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(2 marks)

5

Do not write outside the box

4 Read the article.

> Parents all over the world advise children to 'wrap up warm or you'll catch a cold'.
>
> Scientists at Cardiff University recruited 180 volunteers to take part in an investigation to find out if the advice was true. The investigation took place during the city's common cold season.
>
> Half of the volunteers put their feet in bowls of ice cold water for 20 minutes. The other volunteers sat with their feet in empty bowls.
>
> Over the next few days, almost a third of the volunteers who put their feet into cold water developed colds. Fewer than one in ten of the other volunteers developed colds.

4 (a) Draw a ring around the correct answer to complete the sentence.

The advice 'wrap up warm or you'll catch a cold' is an example of

hearsay.

a hypothesis.

a prediction.

(1 mark)

4 (b) What was the experimental control in the investigation?

.....

(1 mark)

4 (c) The scientists did **not** prove that the advice 'wrap up warm or you'll catch a cold' is true.

Explain why.

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(3 marks)

5

Turn over ▶

Do not write outside the box

5 The concentration of cholesterol in the blood affects people's health.

5 (a) Give **two** factors that affect the concentration of cholesterol in the blood.

1 .....

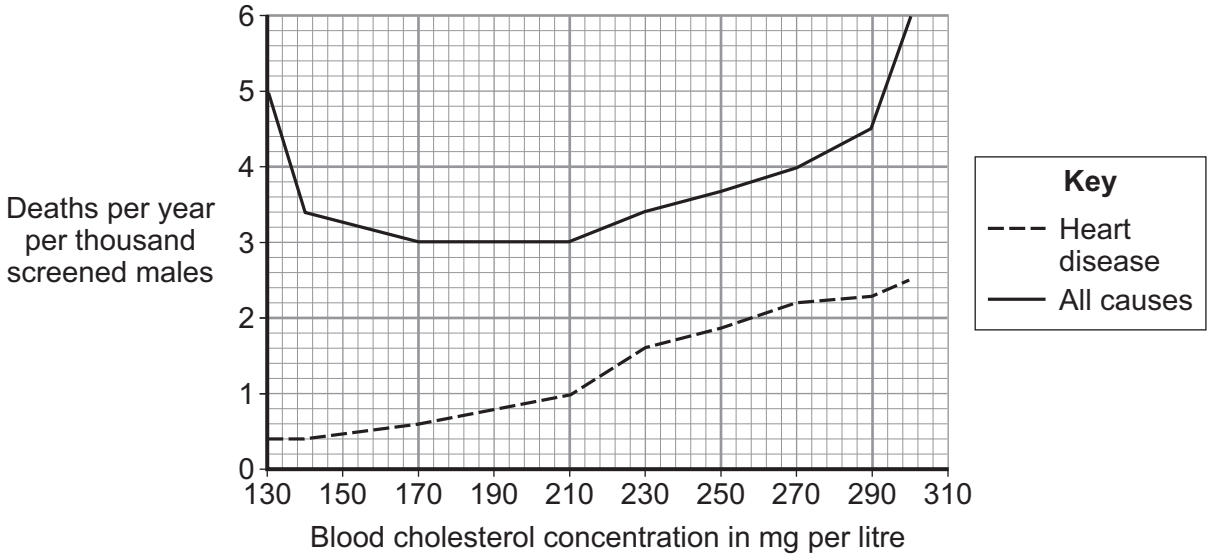
2 .....

(2 marks)

5 (b) Doctors screened men for blood cholesterol concentration.

The doctors then compared death rates from heart disease with deaths from all causes in this screened group.

The graph shows the results.



5 (b) (i) Which is the best conclusion that can be drawn from the data?

Tick (✓) **one** box.

There is a positive correlation between blood cholesterol concentration and deaths from all causes. ☐

There is a negative correlation between blood cholesterol concentration and deaths from all causes. ☐

Blood cholesterol concentration is only one of several factors affecting death from all causes. ☐

(1 mark)

5 (b) (ii) Based on the data in the graph **only**, which is the ideal range for blood cholesterol concentration?

Range ..... to..... mg cholesterol per litre.

(1 mark)

4

Do not write outside the box

6 Scientists have discovered that curry spices affect sheep and cattle. Curry spices can reduce the amount of methane that grazing animals give off.

'Bad' bacteria in the animal's stomach produce methane. About 12 % of the animal's food is changed into methane.

The curry spice coriander works like an antibiotic. Adding coriander to animal food reduces methane production by about 40 %.

6 (a) (i) Why does adding coriander to an animal's food reduce methane production?

.....

.....

(1 mark)

6 (a) (ii) Explain **one** advantage to a farmer of adding coriander to the animal's food.

.....

.....

.....

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(2 marks)

6 (b) Farm animals give off large amounts of methane.

Explain the effects of adding large amounts of methane to the atmosphere.

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(3 marks)

6

Do not write outside the box

7 (a) Animal breeders use sexual reproduction to produce new strains of animals.

How does sexual reproduction produce variation?

.....

.....

.....

.....

(2 marks)

7 (b) A salmon is a type of fish.

Scientists have created a GM (genetically modified) 'super' salmon.

The scientists transferred a gene from a fish called a pout into a salmon. The gene increases the secretion of growth hormone in the salmon. The GM salmon grows much faster than an ordinary salmon, reaching market size up to one year earlier.
Many more GM salmon will be grown in fish farms.

7 (b) (i) Describe how a gene can be transferred from a pout into a salmon.

.....

.....

.....

.....

.....

.....

(3 marks)

7 (b) (ii) The government might not allow the production of GM salmon.

Suggest **one** reason why.

.....

.....

(1 mark)

6

Do not write outside the box

8 (a) Explain how vaccination makes a person immune to a disease.

.....

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(4 marks)

8 (b) Scientists are trialling a 'nicotine vaccine' that might help **wean smokers off** the drug nicotine.
The trials so far have produced very mixed results.
Nicotine molecules are very small and can get through the protective layers around the brain.

8 (b) (i) How does nicotine cause a person to become addicted?

.....

.....

(1 mark)

8 (b) (ii) The 'nicotine vaccine' is made by attaching proteins to nicotine molecules. After 'vaccination' the body reacts to the nicotine in the same way as it reacts to pathogens.

Suggest how the 'nicotine vaccine' might help wean a smoker off nicotine.

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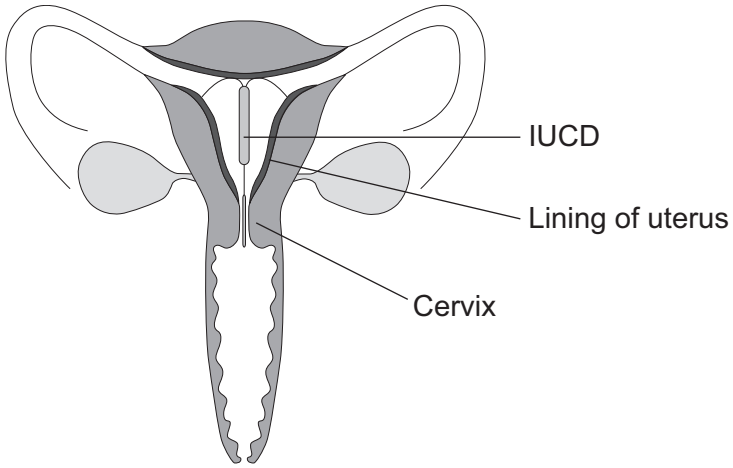
(2 marks)

7

Turn over ▶

Do not write outside the box

9 The diagram shows an intra-uterine contraceptive device (IUCD).



The IUCD is put inside the uterus (womb). The IUCD contains a hormone.
The hormone diffuses directly into the uterus. The supply of hormone in the IUCD lasts for about five years.

The hormone works by:

- causing the cervix to produce a thick plug of mucus
- causing the lining of the uterus to become very thin.

Do not write outside the box

For every 1000 women using the IUCD for one year about 2 women become pregnant. There are about 10 pregnancies for every 1000 women using the contraceptive pill for one year.

Evaluate the use of the IUCD compared with the contraceptive pill.

Use the information in this question and your own knowledge and understanding.

Remember to give a conclusion to your evaluation.

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(4 marks)

4

END OF QUESTIONS

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Version : 07/03/2012



General Certificate of Secondary Education

Science B 4462 / Biology 4411

BLY1H Unit Biology 1

Mark Scheme

2012 examination – January series

STEMUP.CO.UK

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the students' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of students' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this Mark Scheme are available to download from the AQA Website: www.aqa.org.uk

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MARK SCHEME

Information to Examiners

1. General

The mark scheme for each question shows:

- the marks available for each part of the question
- the total marks available for the question
- the typical answer or answers which are expected
- extra information to help the Examiner make his or her judgement and help to delineate what is acceptable or not worthy of credit or, in discursive answers, to give an overview of the area in which a mark or marks may be awarded.

The extra information is aligned to the appropriate answer in the left-hand part of the mark scheme and should only be applied to that item in the mark scheme.

At the beginning of a part of a question a reminder may be given, for example: where consequential marking needs to be considered in a calculation; or the answer may be on the diagram or at a different place on the script.

In general the right hand side of the mark scheme is there to provide those extra details which confuse the main part of the mark scheme yet may be helpful in ensuring that marking is straightforward and consistent.

2. Emboldening

2.1 In a list of acceptable answers where more than one mark is available 'any **two** from' is used, with the number of marks emboldened. Each of the following lines is a potential mark.

2.2 A bold **and** is used to indicate that both parts of the answer are required to award the mark.

2.3 Alternative answers acceptable for a mark are indicated by the use of **or**. (Different terms in the mark scheme are shown by a / ; eg allow smooth / free movement.)

3. Marking points

3.1 Marking of lists

This applies to questions requiring a set number of responses, but for which students have provided extra responses. The general principle to be followed in such a situation is that 'right + wrong = wrong'.

Each error/contradiction negates each correct response. So, if the number of error/contradictions equals or exceeds the number of marks available for the question, no marks can be awarded.

However, responses considered to be neutral (indicated as * in example 1) are not penalised.

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Example 1: What is the pH of an acidic solution? (1 mark)

Student	Response	Marks awarded
1	4,8	0
2	green, 5	0
3	red*, 5	1
4	red*, 8	0

Example 2: Name two planets in the solar system. (2 marks)

Student	Response	Marks awarded
1	Pluto, Mars, Moon	1
2	Pluto, Sun, Mars, Moon	0

3.2 Use of chemical symbols / formulae

If a student writes a chemical symbol / formula instead of a required chemical name, full credit can be given if the symbol / formula is correct and if, in the context of the question, such action is appropriate.

3.3 Marking procedure for calculations

Full marks can be given for a correct numerical answer, as shown in the column 'answers', without any working shown.

However if the answer is incorrect, mark(s) can be gained by correct substitution / working and this is shown in the 'extra information' column;

3.4 Interpretation of 'it'

Answers using the word 'it' should be given credit only if it is clear that the 'it' refers to the correct subject.

3.5 Errors carried forward

Any error in the answers to a structured question should be penalised once only.

Papers should be constructed in such a way that the number of times errors can be carried forward are kept to a minimum. Allowances for errors carried forward are most likely to be restricted to calculation questions and should be shown by the abbreviation e.c.f. in the marking scheme.

3.6 Phonetic spelling

The phonetic spelling of correct scientific terminology should be credited **unless** there is a possible confusion with another technical term.

3.7 Brackets

(…..) are used to indicate information which is not essential for the mark to be awarded but is included to help the examiner identify the sense of the answer required.

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BLY1H

Question 1

question	answers	extra information	mark
1(a)	(soft) body parts / other parts / named parts	accept flesh	1
	decayed / decomposed / rotted / eaten **or** bones do not decay / decompose / rot / get eaten	ignore disintegrated / dissolved ignore microorganisms	1
1(b)	any **one** aquatic feature from: eg • streamlined body shape • long tail • eyes on top of head • scales • fins / paddles / flippers / webbed feet	ignore gills	1
	any **one** terrestrial feature from: • (front) legs / limbs / hands • could lift front end upwards	ignore feet accept for **2** marks eg fin / flipper can be used for walking **or** fins like legs	1
Total			**4**

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BLY1H

Question 2

question	answers	extra information	mark
2(a)	(reduced) competition	ignore fighting	1
	for any **one** from:		1
	• light	ignore Sun	
	• water		
	• nutrients / ions / salts / minerals	ignore food	
	• space	allow less overcrowding	
	• colonise new areas		
2(b)	hooks	allow spines	1
	attach to animals / human clothing / animals carry fruits long distances	ignore wind dispersal	1
Total			**4**

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BLY1H

Question 3

question	answers	extra information	mark
3(a)	Y – spinal cord / central nervous system / CNS	do **not** accept spine ignore nerve / nervous system / coordinator ignore grey / white matter	1
	W – receptor / nerve ending	ignore sensory / neurone / stimulus	1
	X – effector / muscle	allow gland	1
3(b)	any **two** from: eg • reflex action quicker • effect of reflex action over shorter period • hormone involves blood system <u>and</u> reflex involves neurones / nerve cells • reflex involves impulses <u>and</u> hormone involves chemicals • reflex action affects only one part of the body	accept reverse argument for each marking point ignore nervous system / nerves ignore involves brain ignore outside / inside stimuli	2
Total			**5**

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BLY1H

Question 4

question	answers	extra information	mark
4(a)	hearsay		1
4(b)	(volunteers with feet in) <u>empty</u> bowls	accept bowl with no (iced) water do **not** accept mention of bowl with iced water	1
4(c)	any **three** from: • only some of those whose feet were in cold water caught colds • some controls caught colds • only feet were cold in experimental group • only kept feet in cold water for 20 minutes • insufficient evidence for 'proof' / only showed increased risk • don't know activities of individuals before / after the investigation (eg exposure to cold virus) / reference to immune system	ignore control variables, eg age, gender allow (control) not wrapped up warm allow small sample size allow investigation done in 'cold season'	3
Total			**5**

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BLY1H

Question 5

question	answers	extra information	mark
5(a)	any **two** from: • diet • heredity / genes / genetic makeup • reference to cholesterol production by liver	ignore exercise accept any reasonable reference to diet do **not** accept salt / blood pressure ignore age / gender / HDL / LDL	2
5(b)(i)	Blood cholesterol concentration is only one of several factors affecting death from all causes		1
5(b)(ii)	170 – 210	accept 210 - 170	1
Total			**4**

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BLY1H

Question 6

question	answers	extra information	mark
6(a)(i)	kills / gets rid of / reduces methane bacteria	allow kills / gets rid of / reduces bad bacteria ignore acts like antibiotic	1
6(a)(ii)	less food converted to methane	allow can keep more cattle without further environmental damage ignore energy	1
	more growth / meat / muscle / milk produced / more profit / fatter animals	ignore references to bacteria and disease	1
6(b)	absorbs energy / heat radiated by Earth	allow absorbs / traps energy / heat / from Earth do **not** allow absorbs energy / heat from Sun	1
	some energy / heat reradiated	ignore reflected do **not** allow reradiates energy / heat from Sun	1
	leading to global warming / enhanced greenhouse effect	accept effects of global warming eg melting ice caps accept methane is a greenhouse gas ignore references to ozone	1
Total			**6**

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BLY1H

Question 7

question	answers	extra information	mark
7(a)	fusion of gametes / named gametes	allow meet / join / fertilise	1
	results in mixing of genetic information / DNA / chromosomes	accept genetic information / DNA / chromosomes from two parents	1
7(b)(i)	use enzyme		1
	to cut gene from pout chromosome / DNA		1
	insert gene into salmon chromosome / DNA / egg / embryo / nucleus	accept use of plasmid as carrier ignore salmon / cell	1
7(b)(ii)	eg fear of gene transfer to wild salmon / extinction of wild salmon / fear of harmful effect on consumers / unsure of long term effects	ignore cruel / ethics / morals / religion / unnatural / economics	1
Total			**6**

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BLY1H

Question 8

question	answers	extra information	mark
8(a)	dead or inactive or weak form of pathogen / bacterium / virus / microorganism introduced	ignore disease / germ	1
	(stimulates) white cells / lymphocytes / leucocytes	accept B and T cells ignore phagocytes	1
	to produce antibodies	ignore antitoxins / antigens	1
	antibodies made quickly on re-infection / idea of memory cells	ignore already has antibodies ignore 'body remembers'	1
8(b)(i)	alters / causes chemical processes / body chemistry	ignore craving / withdrawal symptoms	1
8(b)(ii)	any **two** from: • combined molecule / vaccine stimulates antibody production • if nicotine taken, antibodies bind to nicotine molecules • making them too large to get to brain / making them ineffective	 ignore destroys nicotine allow prevents nicotine entering brain	2
Total			**7**

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Question 9

question	answers	extra information	mark
9	any **three** from:	max **2** if only advantages **or** only disadvantages discussed ignore 'side effects' unqualified ignore side effects produced by hormones	3
	advantages of IUCD over pill eg		
	• can't forget to take it / have to take pill every day	do **not** allow last 5 years unless qualified	
	• effect much longer than pill		
	• more effective in preventing pregnancy	do **not** allow reference to figures unless qualified	
	• stops sperm entering uterus		
	disadvantages of IUCD over pill eg		
	• pain / uncomfortable / risk of infection / may damage uterus		
	• prevents fertilised egg developing / 'embryo rights'	allow kills embryo	
	• needs replacement by doctor / nurse / professional **or** access to IUCD is more difficult than pill **or** IUCD is harder to come off than pill		
	argued conclusion	must include a preference and a reference to **both** advantages and disadvantages **or** one is better in a given situation but the other is better in a different situation	1
Total			**4**

UMS Conversion Calculator: www.aqa.org.uk/umsconversion

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Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
8	
TOTAL	

General Certificate of Secondary Education
Higher Tier
June 2011

Science B
Unit Biology B1

BLY1H

H

Biology
Unit Biology B1

Written Paper

Tuesday 7 June 2011 1.30 pm to 2.15 pm

You will need no other materials.
You may use a calculator.

Time allowed
- 45 minutes

Instructions
- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 45.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.

Advice
- In all calculations, show clearly how you work out your answer.

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Do not write outside the box

Answer **all** questions in the spaces provided.

1 Animals in a habitat compete with each other.

1 (a) Give **two** factors for which animals may compete.

1 .....

2 .....

(2 marks)

1 (b) The photographs show a mule deer and a white-tailed deer.



Mule deer

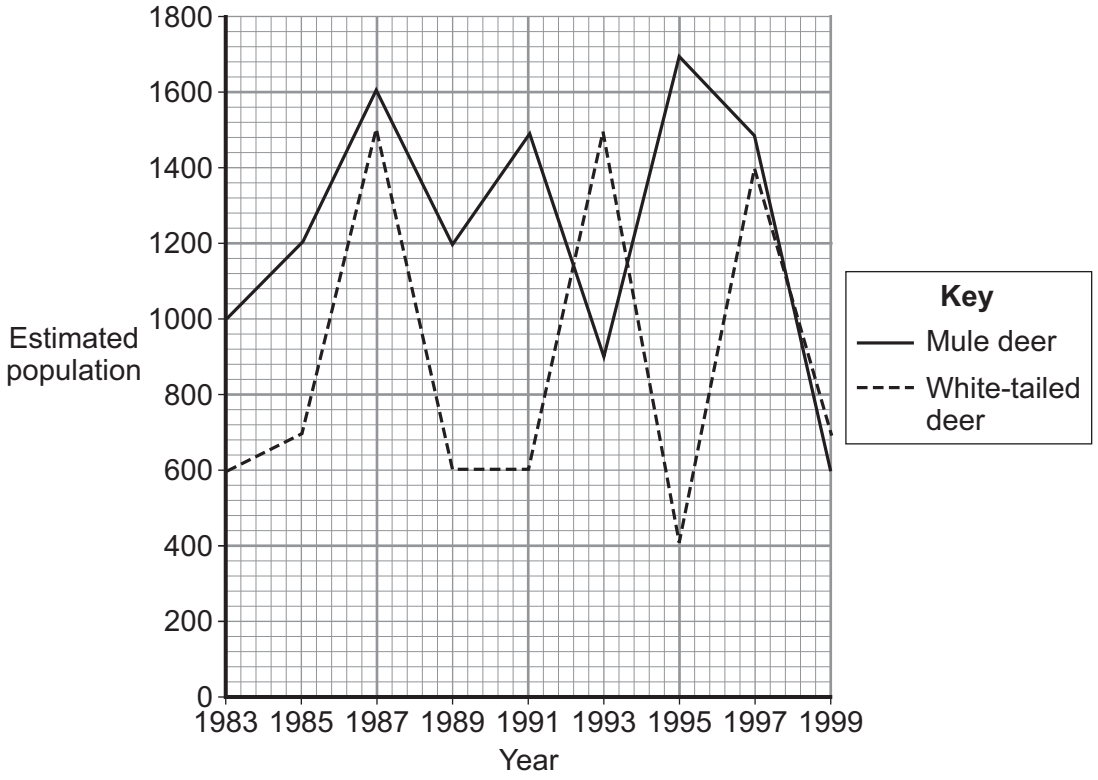


White-tailed deer

Mule deer and white-tailed deer live together in the same national park in the USA.

The graph shows changes in the populations of the two deer species between 1983 and 1999.

Do not write outside the box



1 (b) (i) Describe the changes in the population of white-tailed deer between 1991 and 1995.

.....

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.....

.....

(2 marks)

1 (b) (ii) Use information from the graph to suggest an explanation for changes in the population of white-tailed deer between 1991 and 1995.

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(2 marks)

6

Turn over ▶

Do not write outside the box

2 Scientists have trialled a new statin called rosuvastatin.

- 17 802 people took part in the trial.
- All of these people had high levels of a protein called CRP in their blood.
- The higher the level of CRP in the blood, the higher the risk of heart attack.
- None of these people had heart conditions at the beginning of the investigation.
- None of these people had high LDL (low density lipoprotein) levels.
- All of these people were aged 50 or above.
- Half the people were given a rosuvastatin tablet each day; the other half were given a placebo.
- The trial was stopped 7 months early when it was found that the people given rosuvastatin were 54% less likely to have a heart attack than people given the placebo.

2 (a) Give **two** control variable in this investigation.

1 .....

2 .....

(2 marks)

2 (b) What would the placebo be in the investigation?

.....

.....

(1 mark)

2 (c) The trial gave reliable results.

Give **one** reason why.

.....

.....

(1 mark)

2 (d) The trial was stopped 7 months early.

Give **one** reason why.

.....

.....

(1 mark)

Do not write outside the box

2 (e) The manufacturers of rosuvastatin paid for the trial.

However, the manufacturers took no part in the trial.

Suggest **one** reason why the manufacturers did not take part in the trial.

.....

.....

(1 mark)

2 (f) The table shows some of the results of the trial.

Substance	**Concentration in blood in mg per 100 cm^3 after 3 years of trial**	
	People given rosuvastatin	People given placebo
LDL cholesterol	53	106
HDL cholesterol	50	49
Saturated fats	106	123

Rosuvastatin reduces the risk of heart attacks.

Use the data in the table to explain why.

.....

.....

.....

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(2 marks)

8

Turn over for the next question

Do not write outside the box

3 The body's immune system protects us from disease.

Describe the different ways in which white blood cells protect us from infectious diseases.

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(4 marks)

4

Do not write outside the box

4 Governments are encouraging *sustainable development*.

4 (a) Explain what is meant by *sustainable development*.

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(2 marks)

4 (b) The government has asked families in the UK to reduce their impact on the environment.

Give **three** different ways in which families can do this.

1 .....

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2 .....

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3 .....

.....

(3 marks)

5

Turn over for the next question

Do not write outside the box

5 Some *recreational* drugs are dangerous.

Class A drugs include heroin and cocaine. Class A drugs are very addictive.

5 (a) It is difficult to stop using addictive drugs.

Explain why.

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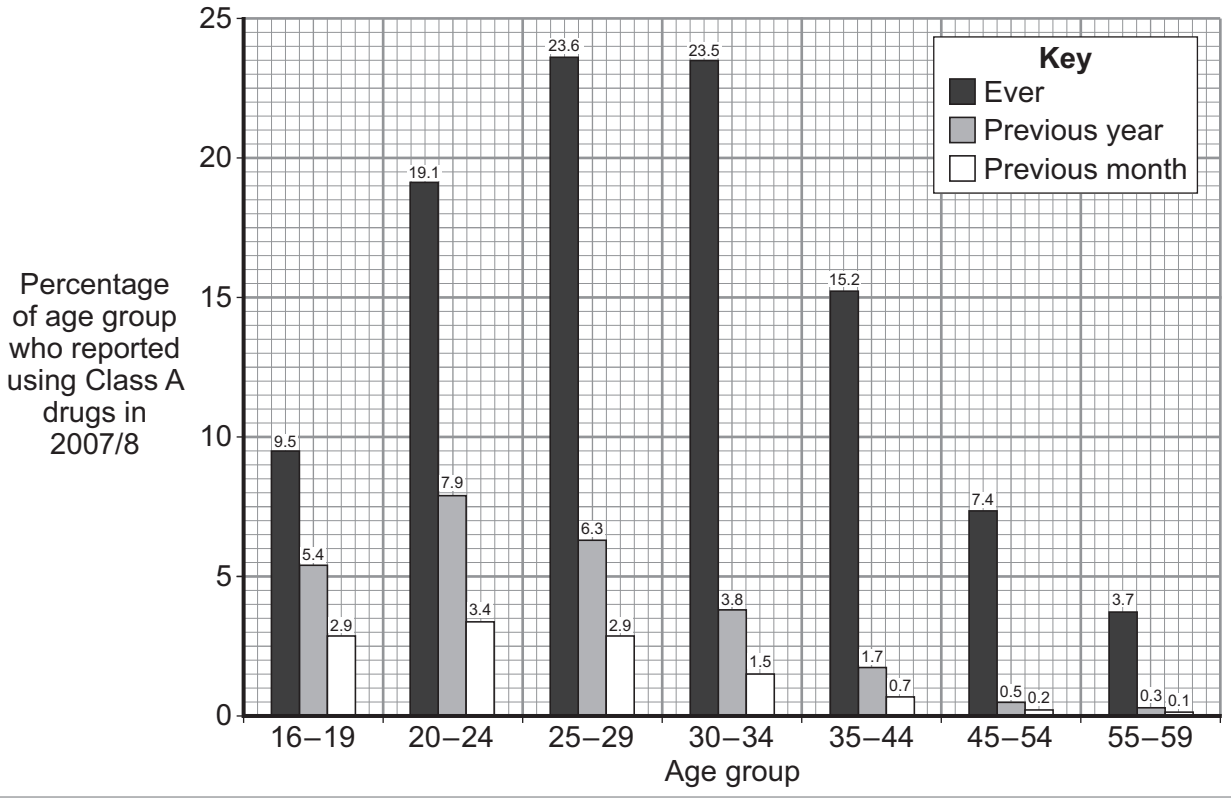
(2 marks)

5 (b) As part of the British Crime Survey, a large, random selection of the UK population is interviewed in their own home about drug use.

People in the sample:

- answer questions about drug use
- answer questions on a lap top
- do not give their names.

The bar chart shows the percentages of people aged 16–59 by age group who reported using any Class A drug ever, in the previous year and in the previous month.



Do not write outside the box

5 (b) (i) Describe how the percentage of people who have ever used Class A drugs is related to age.

.....

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.....

.....

(2 marks)

5 (b) (ii) The percentage of people who reported using Class A drugs in the previous month is highest amongst 16–29 year-olds.

Suggest **two** reasons for this.

1 .....

.....

2 .....

.....

(2 marks)

5 (b) (iii) The data in the bar chart is unlikely to be completely accurate.

Explain why.

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(2 marks)

8

Turn over for the next question

Do not write outside the box

6 Soay sheep live wild on an island off the north coast of Scotland. No people live on the island.



Over the last 25 years, the average height and mass of the wild Soay sheep have decreased.

The scientists think that climate change might have affected the size of the sheep.

Suggest an explanation for the evolution of the wild Soay sheep over the last 25 years.

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(4 marks)

4

Do not write outside the box

7 Organisms can be produced by asexual reproduction and by sexual reproduction.

7 (a) Give **two** differences between asexual reproduction and sexual reproduction.

1 .....

.....

2 .....

.....

(2 marks)

7 (b) Adult cell cloning is a type of asexual reproduction.

Explain why.

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(2 marks)

4

Turn over for the next question

Do not write outside the box

8 Hormones can be used as contraceptives.

8 (a) Explain **one** way in which a hormone can prevent conception (pregnancy).

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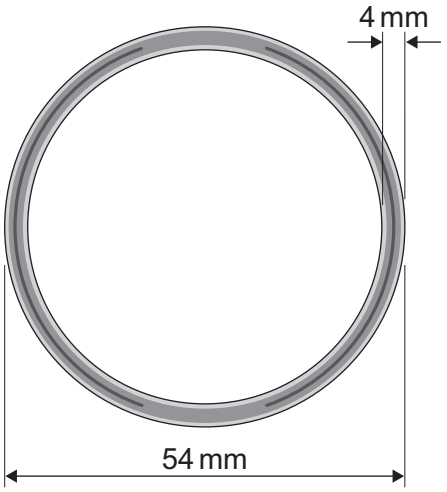
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(2 marks)

8 (b) Two methods of giving contraceptive hormones to a woman are the vaginal ring and the hormone implant.

Vaginal ring

The vaginal ring is a flexible ring 54 mm in diameter containing hormones.



The woman puts in and takes out the vaginal ring herself; there is no 'wrong' way to put the ring in.
Each ring is designed for one cycle of use, which is three weeks of continuous ring use, followed by one week without the ring.
About 0.3% of women become pregnant in the first year of ring use.
4% of women stop using the ring because of vaginal discomfort.

Do not write outside the box

Hormone implant

A health professional puts the hormone implant under the skin of the woman's arm.
The implant releases contraceptive hormones for three years before the implant needs to be replaced.
The hormone implant is 100% effective.
About 2% of women stop using the hormone implant, mainly because of irregular menstrual bleeding.

Evaluate the use of the vaginal ring compared with the hormone implant.

Remember to give a conclusion to your evaluation.

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(4 marks)

6

END OF QUESTIONS

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Version : 04/08/2011



General Certificate of Secondary Education

Science B 4462 / Biology 4411

BLY1H Unit Biology 1

Mark Scheme

2011 examination – June series

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Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

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MARK SCHEME

Information to Examiners

1. General

The mark scheme for each question shows:

- the marks available for each part of the question
- the total marks available for the question
- the typical answer or answers which are expected
- extra information to help the Examiner make his or her judgement and help to delineate what is acceptable or not worthy of credit or, in discursive answers, to give an overview of the area in which a mark or marks may be awarded.

The extra information is aligned to the appropriate answer in the left-hand part of the mark scheme and should only be applied to that item in the mark scheme.

At the beginning of a part of a question a reminder may be given, for example: where consequential marking needs to be considered in a calculation; or the answer may be on the diagram or at a different place on the script.

In general the right hand side of the mark scheme is there to provide those extra details which confuse the main part of the mark scheme yet may be helpful in ensuring that marking is straightforward and consistent.

2. Emboldening

2.1 In a list of acceptable answers where more than one mark is available 'any **two** from' is used, with the number of marks emboldened. Each of the following lines is a potential mark.

2.2 A bold **and** is used to indicate that both parts of the answer are required to award the mark.

2.3 Alternative answers acceptable for a mark are indicated by the use of **or**. (Different terms in the mark scheme are shown by a / ; eg allow smooth / free movement.)

3. Marking points

3.1 Marking of lists

This applies to questions requiring a set number of responses, but for which candidates have provided extra responses. The general principle to be followed in such a situation is that 'right + wrong = wrong'.

Each error/contradiction negates each correct response. So, if the number of error/contradictions equals or exceeds the number of marks available for the question, no marks can be awarded.

However, responses considered to be neutral (indicated as * in example 1) are not penalised.

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Example 1: What is the pH of an acidic solution? (1 mark)

Candidate	Response	Marks awarded
1	4,8	0
2	green, 5	0
3	red*, 5	1
4	red*, 8	0

Example 2: Name two planets in the solar system. (2 marks)

Candidate	Response	Marks awarded
1	Pluto, Mars, Moon	1
2	Pluto, Sun, Mars, Moon	0

3.2 Use of chemical symbols / formulae

If a candidate writes a chemical symbol / formula instead of a required chemical name, full credit can be given if the symbol / formula is correct and if, in the context of the question, such action is appropriate.

3.3 Marking procedure for calculations

Full marks can be given for a correct numerical answer, as shown in the column 'answers', without any working shown.

However if the answer is incorrect, mark(s) can be gained by correct substitution / working and this is shown in the 'extra information' column;

3.4 Interpretation of 'it'

Answers using the word 'it' should be given credit only if it is clear that the 'it' refers to the correct subject.

3.5 Errors carried forward

Any error in the answers to a structured question should be penalised once only.

Papers should be constructed in such a way that the number of times errors can be carried forward are kept to a minimum. Allowances for errors carried forward are most likely to be restricted to calculation questions and should be shown by the abbreviation e.c.f. in the marking scheme.

3.6 Phonetic spelling

The phonetic spelling of correct scientific terminology should be credited **unless** there is a possible confusion with another technical term.

3.7 Brackets

(…..) are used to indicate information which is not essential for the mark to be awarded but is included to help the examiner identify the sense of the answer required.

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BLY1H

Question 1

question	answers	extra information	mark
1(a)	any **two** from: • food / feeding • mates / mating • territory / space / land / shelter / nesting sites • status (within group)	 ignore water ignore homes / place to live / habitat / resources	2
1(b)(i)	rises to 1480 to 1500 **or** rises by 880 to 900 **or** rises until 1993 falls to 400 to 440 **or** falls by 1040 to 1100	 ignore incorrect figures if 1993 given if neither mark gained then allow **1** mark for rise followed by fall **or** fell by 160 to 200	1 1
1(b)(ii)	rises because: - less competition from mule deer **or** mule deer population falling **or** fewer mule deer falls because: - more competition from mule deer **or** mule deer population rising **or** more mule deer	ignore reference to food / breeding ignore reference to predation / disease ignore more / less suited to environment if neither mark gained then correct reference to competition gains **1** mark	1 1
Total			**6**

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BLY1H

Question 2

question	answers	extra information	mark
2(a)	any **two** from: • (high) CRP / protein • (no) heart condition • (not high) LDL • over 50 / age • number of tablets (each day)	allow health ignore time ignore placebo / rosuvastatin ignore number of people	2
2(b)	any **one** from: • tablet with no drug • tablet that has no effect • tablet without chemicals • tablet that people thought contained statin **or** reference to psychological effect	allow fake (pill) / dummy (pill) / sugar / chalk (pill) allow drug that has no effect ignore vitamin / mineral pill ignore control / different statin	1
2(c)	17802 / large number of people **or** enough people	ignore control group / fair test / control variables ignore time / repeats	1

Question 2 continues on the next page

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Question 2 continued . . .

question	answers	extra information	mark
2(d)	any **one** from: • placebo group at risk of heart attack **or** to allow statin to be given to everyone • statin group 54% less likely to get heart attack **or** showed that statin worked **or** showed trial (very) successful • sufficient information gained / results conclusive • unethical / unfair to carry on trial	ignore cost ignore reliable ignore got results early	1
2(e)	to avoid bias **or** show impartiality **or** show results independent	allow manufacturers could cheat ignore reliability ignore could be sued / blamed if trial went wrong ignore manufacturer would know which group got statin / placebo	1
2(f)	any **two** from: • reduction in LDL • reduction in (saturated) fats • reduces deposition of fat / cholesterol / LDL in walls of blood vessels **or** blood vessels less likely to be blocked with fat / cholesterol / LDL	allow improves LDL:HDL balance **or** LDL and HDL concentrations equal ignore less cholesterol ignore more HDL do **not** accept less HDL	2
Total			**8**

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BLY1H

Question 3

question	answers	extra information	mark
3	(wbc) ingest / digest pathogens / bacteria / viruses	allow eat germs ignore swallow germs ignore ingest the disease ignore attack / kill the disease	1
	(wbc) produce antibodies		1
	(wbc) produce antitoxins		1
	any **one** from: • (antibodies) destroy or kill pathogens / bacteria / viruses / germs • (antitoxins) counteract / destroy /neutralise toxins / poisons • reasonable reference to memory cells **or** rapid production of antibodies upon re-infection	 ignore destroy / kill disease ignore attack / fight pathogens ignore attack / killing toxins	1
Total			**4**

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BLY1H

Question 4

question	answers	extra information	mark
4(a)	improving quality of life **or** meeting (current) needs		1
	without compromising future **or** without harming environment	allow preserving natural resources ignore reference to using renewables / planting trees and other examples	1
4(b)	any **three** from eg: • using public transport / walk / cycle / car share • recycling • using energy efficient appliances • switching off appliances when not in use • insulating home **or** reducing household temperatures • using less water by eg showering instead of bath • using renewable energy **or** reducing use of fossil fuels • using local resources **or** growing own food	ignore litter / pollution / rubbish award only one mark for recycling allow references to using less energy / electricity **only if** there is reference to specific example of how reduction can be achieved ignore planting trees	3
Total			**5**

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BLY1H

Question 5

question	answers	extra information	mark
5(a)	alters chemical reaction in the body **or** changes brain / body functioning **or** brain / body does not function correctly without drug	ignore references to dependence	1
	withdrawal symptoms	allow crave / craving	1
5(b)(i)	(rises to a) maximum at 25–29 / 30–34 / 25–34		1
	(falls to) minimum at 55–59		1
		if neither mark gained allow **1** mark for indicating high usage anywhere in the 20–44 range	
5(b)(ii)	any **two** from reference to eg: • (peer) pressure / fashionable • experiment / try new things • ease of obtaining drugs	ignore references to maturity / disposable income / stress	2
5(b)(iii)	some people will be dishonest / afraid to admit use	ignore sample not accurate	1
	(because) class A drugs illegal **or** because they will get into trouble		1
Total			**8**

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Question 6

question	answers	extra information	mark
6	mutation **or** variation **or** range of sizes	do **not** accept deliberate mutation **or** factor caused mutation	1
	warm(er) / dry(er) now	allow global warming	1
	if warmer more smaller lambs / sheep survive winter **or** if warmer sheep do not need fat / wool / fur to keep warm **or** if warmer smaller sheep can lose heat more readily / do not overheat / keep cool (so survive) **or** if warmer smaller sheep have larger SA / V ratio (so survive) **or** if dryer smaller lambs / sheep need less grass (to survive)	award 'survival' point only if linked to warmer / dryer conditions do **not** accept smaller sheep retain more heat do **not** accept smaller sheep have smaller SA / V ratio ignore small sheep feed easier on grass	1
	small sheep breed / pass genes / mutations / characteristics to next generation	do **not** accept if Lamarckian ignore competition / predation / human influence	1
Total			**4**

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BLY1H

Question 7

question	answers	extra information	mark
7(a)	any **two** from: • no fusion in asexual **or** sexual involves fusion **or** no mixing of genetic information in asexual **or** mixing of genetic information in sexual **or** asexual involves splitting (of one individual) • no gametes in asexual **or** sexual involves gametes • only one parent in asexual **or** sexual involves two parents • no variation in asexual **or** asexual produces clones **or** sexual leads to variations	assume it refers to asexual accept no fertilisation in asexual **or** fertilisation in sexual accept genes / alleles / chromosomes / genetics for genetic information accept named gametes allow offspring of sexual have characteristics of both parents for this point ignore sexual intercourse ignore external / internal ignore plants / animals ignore mitosis / meiosis	2
7(b)	nucleus of egg removed **or** involves empty egg cell so only one nucleus **or** one set of genetic information / genes / chromosomes **or** so genetic information / genes / chromosomes from one parent only		1 1
Total			**4**

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BLY1H
Question 8

question	answers	extra information	mark
8(a)	inhibit FSH production	ignore LH production ignore wrong hormone	1
	so egg does not mature	ignore egg production / egg release / egg development	1
8(b)	any **three** comparisons: eg • ease of insertion compared ie ring easily inserted by woman whereas implant needs professional **or** no damage to skin with ring	comparisons must be made ie two separate lists will gain no marks unless the lists are linked by eg whereas / however / on the other hand **and** the points are made in the same order in both lists	3
	• length of delivery compared eg 3 weeks for ring whereas 3 years for implant **or** delivery longer for implant **or** woman has to remember to insert ring whereas does not have to remember to insert implant	ignore cost	
	• effectiveness compared eg 0.3% failure with ring whereas nil for implant **or** implant more effective		
	• number giving up compared eg 4% for ring whereas 2% for implant **or** fewer women give up using implant **or** ring might cause vaginal discomfort whereas implant may cause irregular menstrual bleeding		
	reasoned conclusion (normally at the end)	ie must state 'better because....'	1
Total			**6**

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Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
8	
TOTAL	

General Certificate of Secondary Education
Higher Tier
January 2011

Science B
Unit Biology B1

BLY1H

H

Biology
Unit Biology B1

Written Paper

Thursday 13 January 2011 9.00 am to 9.45 am

You will need no other materials.
You may use a calculator.

Time allowed
- 45 minutes

Instructions
- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 45.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.

Advice
- In all calculations, show clearly how you work out your answer.

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Answer **all** questions in the spaces provided.

1 Desert plants are adapted for survival in a dry climate.

1 (a) Joshua trees live in deserts.



Joshua trees have two different types of root:

- a system of shallow roots spread out over a large area
- roots about 1 m in diameter, shaped like bulbs, deep in the soil.

Explain the advantage to the Joshua tree of having:

1 (a) (i) shallow roots spread out over a large area

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(2 marks)

1 (a) (ii) large, bulb-like roots deep in the soil.

.....

.....

(1 mark)

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1 (b) Creosote bushes also live in deserts.



The leaves of creosote bushes:

- are covered with a layer of wax
- fold together during the day.

Explain how the leaves of the Creosote bush help it to survive in deserts.

.....

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(3 marks)

6

Turn over for the next question

Do not write outside the box

2 In the winter wild birds cannot find food easily.
A student carried out an investigation to find the best kind of food to put out for wild birds in winter.

- She nailed six black dishes to a piece of wood.
- She put 100g of a different type of seed into each dish.
- She placed the piece of wood in her garden.
- She observed the birds that visited each of the dishes before school, after school and at weekends.
- At the end of the investigation, she weighed the amount of each type of seed remaining.
- She also calculated the percentage of each type of seed that was eaten by the birds.

2 (a) Name **two** control variables in this investigation.

1 .....

2 .....

(2 marks)

2 (b) **Table 1** shows the number of bird visits to each dish of seeds that she recorded.

Table 1

Bird species	Number of visits to each dish of seeds					
	Corn	Niger	Safflower	Sunflower	Peanut	Millet
Morning Dove	12	10	6	13	2	10
Red-bellied Woodpecker	1	0	0	1	4	0
Dark-eyed Junco	3	6	1	4	0	3
Northern Cardinal	0	0	1	1	2	0
American Goldfinch	0	31	5	18	0	0
House Finch	1	5	23	19	1	3
House Sparrow	16	1	0	4	0	11
Total visits	33	53	36	60	9	27

2 (b) Which type of seed had visits from the greatest number of **different** bird species?

.....

(1 mark)

Do not write outside the box

2 (c) **Table 2** shows:

- the percentage of each type of seed eaten
- the percentage of fat in each type of seed.

Table 2

Type of seed	Percentage eaten	Percentage of fat
Corn	68	2
Niger	77	40
Safflower	86	3
Sunflower	91	35
Peanut	4	48
Millet	99	2

2 (c) (i) The girl concluded that the most popular seeds for the birds were the seeds with the highest percentage of fat.

Was her conclusion justified by the data in **Table 2**?

Draw a ring round your answer. **Yes / No**
Give a reason for your answer.

.....

.....

(1 mark)

2 (c) (ii) Most winter bird food for sale in shops contains niger and sunflower seeds.
Use the information in **Table 1** and **Table 2** to suggest **two** reasons why.

1 .....

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2 .....

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(2 marks)

6

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3 In-vitro fertilisation (IVF) is used to help some women get pregnant.

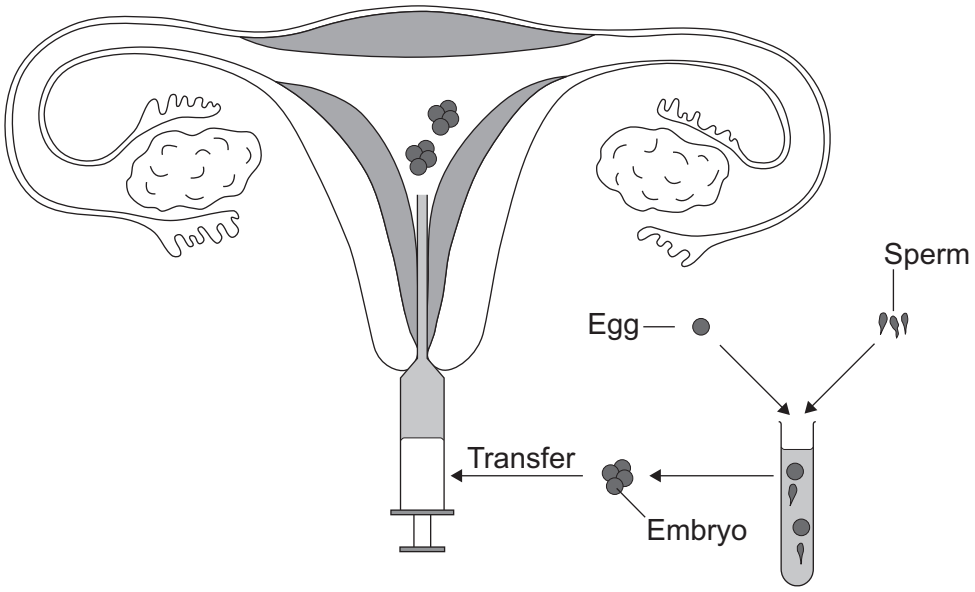
3 (a) Name the **two** hormones used in IVF treatment.

1 .....

2 .....

(2 marks)

3 (b) The diagram shows the process of IVF.



Describe the process of IVF. Use information from the diagram to help you.

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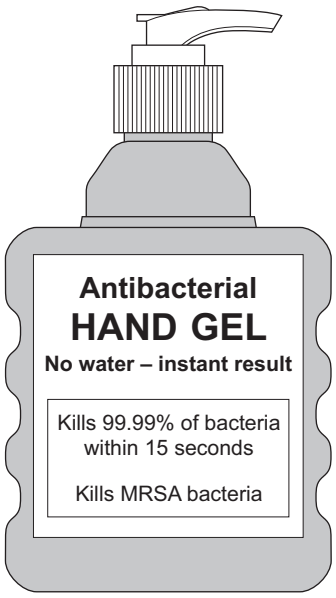
(4 marks)

6

Do not write outside the box

4 MRSA strains of bacteria are causing problems in many hospitals.

4 (a) The diagram shows a hand-gel dispenser.



Hand-gel dispensers are now placed at the entrance of most hospital wards.

Explain why.

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(2 marks)

4 (b) Explain, as fully as you can, how MRSA strains of bacteria became difficult to treat.

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(3 marks)

5

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5 Scientists estimate that about one third of cancers in the UK may be linked to obesity.

5 (a) Name **two** diseases linked to obesity.

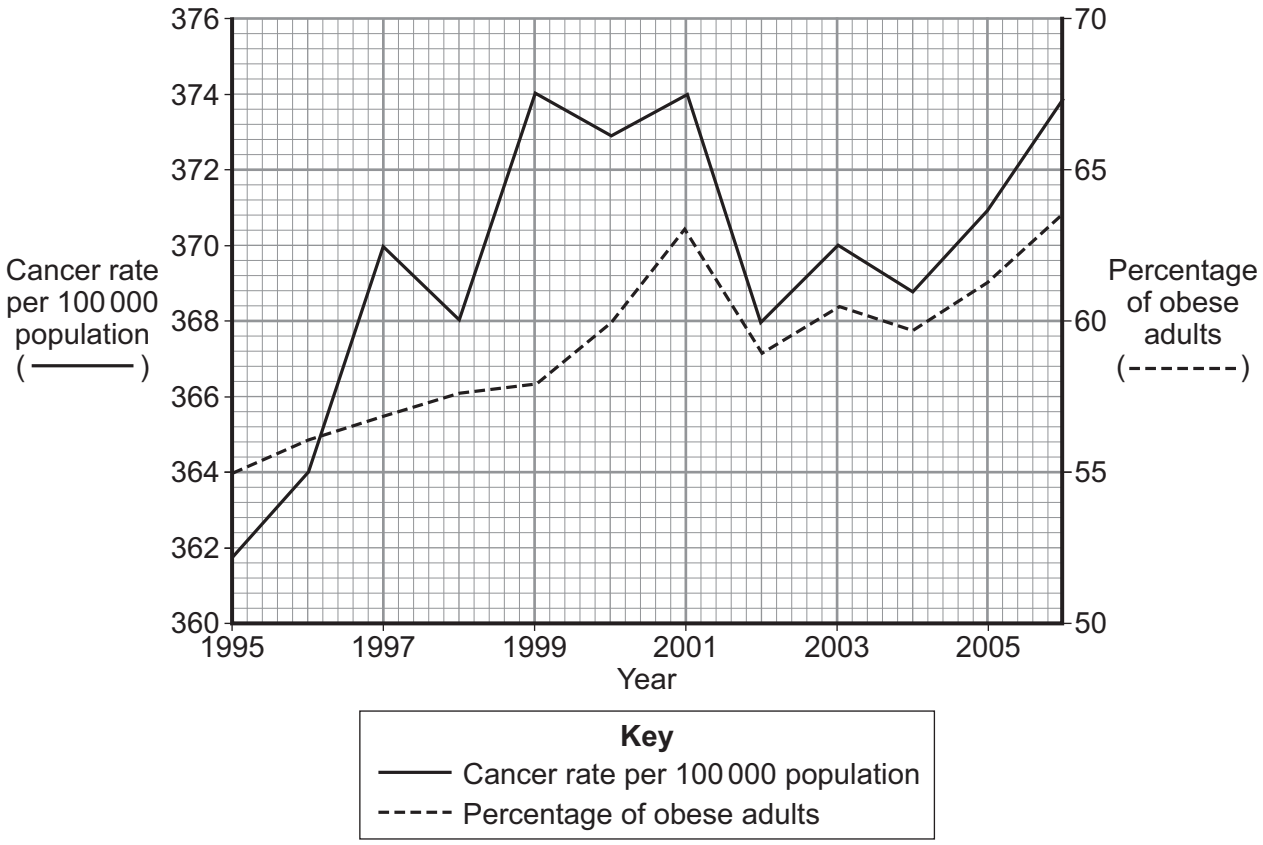
Do **not** give cancer as one of your answers.

1 .....

2 .....

(2 marks)

The graph shows the changes in the cancer rate and the changes in the percentage of obese adults in the UK from 1995 to 2006.



Do not write outside the box

5 (b) Does the data in the graph prove that obesity causes cancer?

Draw a ring round your answer. **Yes** / **No**

Explain the reason for your answer.

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(2 marks)

5 (c) Exercise helps a person to lose weight.

Explain why.

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(2 marks)

6

Turn over for the next question

Do not write outside the box

6 Many recreational drugs harm the body.

6 (a) Some people become dependent on a recreational drug.

What happens to people's bodies when they become dependent on a drug?

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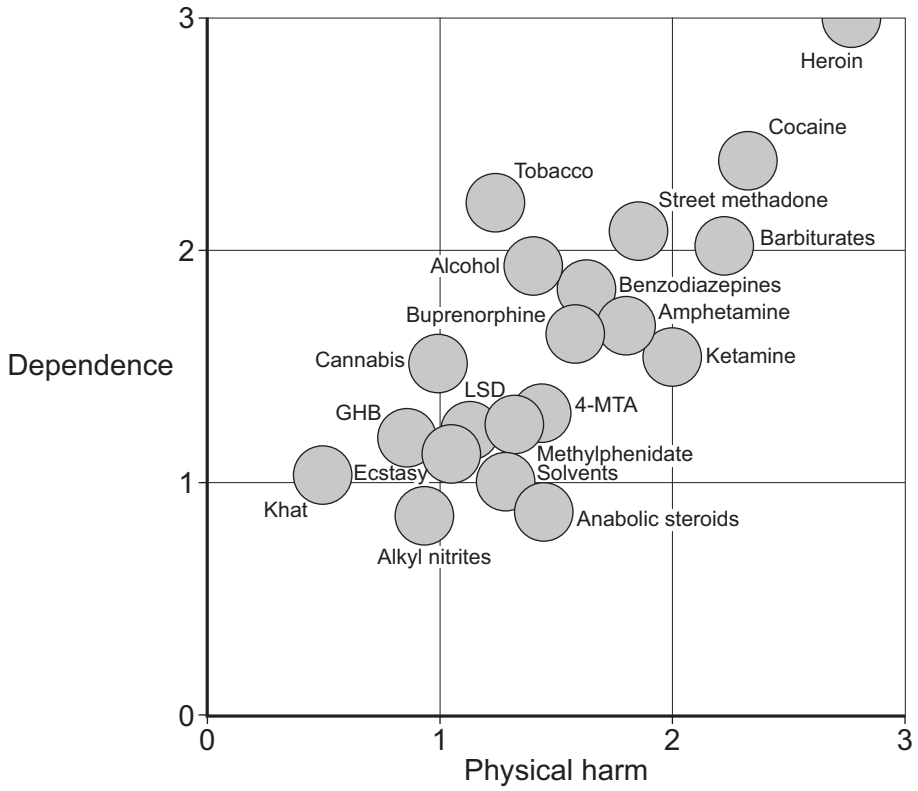
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(2 marks)

The scattergram shows the dependence and the physical harm caused by recreational drugs.



Do not write outside the box

6 (b) Describe fully the relationship between physical harm and dependence on a drug.

Use data from the scattergram to help you.

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(2 marks)

6 (c) (i) Based on the data in the graph, would you expect the overall effect of alcohol on the health of the UK population to be more than the effect of heroin?

Draw a ring round your answer. **Yes** / **No**

Explain the reason for your answer.

.....

.....

(1 mark)

6 (c) (ii) In fact the overall effect of alcohol on the health of the UK population **is** much more than the effect of heroin.

Suggest an explanation for this.

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(2 marks)

7

Turn over for the next question

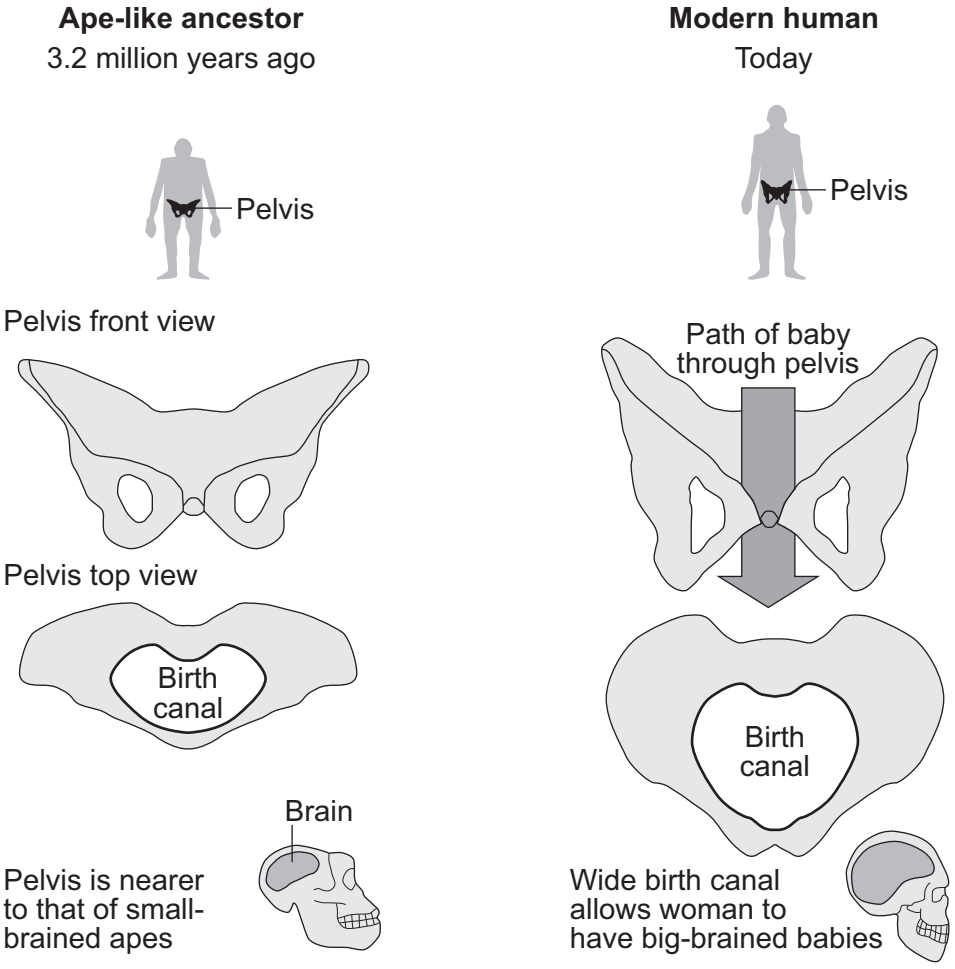
Do not write outside the box

7 Humans have evolved from ape-like ancestors by natural selection.

The drawing shows the pelvis of an ape-like ancestor and a modern human.

The skull and brain of the new born baby are also shown to the same scale.

Modern humans are much more intelligent than their ape-like ancestors.



Do not write outside the box

Suggest an explanation for the evolution of the size and shape of the pelvis of modern humans.

Use information from the drawing to help you.

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(4 marks)

4

Turn over for the next question

Do not write outside the box

8 Scientists have brought an extinct species of mountain goat, the Pyrenean ibex, 'back to life'. These scientists used skin cells from preserved Pyrenean ibex in cloning experiments.

The Scientists:
- removed the nuclei from domestic goat egg cells
- transferred cell nuclei from the skin cells of the Pyrenean ibex into domestic goat egg cells
- used the domestic goats as surrogate mothers for the embryos that developed.

The scientists made 439 cloned embryos, but only 57 were suitable for transfer into the surrogate goat mothers. Only seven of the goats got pregnant and only one live offspring was born.

Some biologists are very worried about using cloning to preserve endangered animals, because cloned animals often have developmental problems. Some endangered animals are difficult to breed in captivity. For these animals cloning is another way to continue the genetic line.

The biggest threats to endangered animals today are habitat loss, illegal hunting, pollution and climate change. Many scientists say that cloning is not as important as trying to preserve the wild places on Earth. The wild places are being lost very quickly and the animals and plants living in the wild places are dying out.

8 (a) The Pyrenean ibex was 'brought back to life'.

How is this process different from using adult cell cloning to clone a pet animal?

.....

.....

(1 mark)

Do not write outside the box

8 (b) Evaluate the use of adult cell cloning to conserve endangered species.

Use the information given and your own knowledge and understanding.

Remember to give a conclusion to your evaluation.

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(4 marks)

5

END OF QUESTIONS

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Question 7 www.independent.co.uk, Steve Connor, 'The brainboxes born 1.2m years ago', 14 November 2008

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Version : 28/02/2011

General Certificate of Secondary Education

Science B 4462 / Biology 4411

BLY1H Unit Biology

Mark Scheme

2011 examination – January series

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However, responses considered to be neutral (indicated as * in example 1) are not penalised.

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Example 1: What is the pH of an acidic solution? (1 mark)

Candidate	Response	Marks awarded
1	4,8	0
2	green, 5	0
3	red*, 5	1
4	red*, 8	0

Example 2: Name two planets in the solar system. (2 marks)

Candidate	Response	Marks awarded
1	Pluto, Mars, Moon	1
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(…..) are used to indicate information which is not essential for the mark to be awarded but is included to help the examiner identify the sense of the answer required.

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BLY1H

Question 1

question	answers	extra information	mark
1(a)(i)	increased water uptake	ignore nutrients / food allow quicker water uptake allow collects water over larger area	1
	(after) rain	accept ideas in terms of more successful competitor	1
1(a)(ii)	water storage **or** stability **or** safety from predators	ignore absorption of water from soil	1
1(b)	reduces water loss / evaporation	accept reduces transpiration allow stops water loss	1
	wax protects plant **or** reflects heat **or** keeps plant cool **or** unpalatable	ignore reflects light	1
	folding reduces surface area **or** folding reduces warming	accept enclosed stomata **or** less exposure of stomata **or** increased humidity **or** less water concentration gradient allow prevents burning ignore less likely to be damaged	1
Total			**6**

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BLY1H

Question 2

question	answers	extra information	mark
2(a)	any **two** from: • colour of dish **or** all dishes black • (same) amount of each seed • position of dishes **or** all dishes in same place / garden • time observed / visited / left	ignore size of dish ignore wood	2
2(b)	sunflower		1
2(c)(i)	(No) named seed does not fit pattern **or** millet / safflower / corn eaten a lot but have little fat **or** the seed with the highest percentage eaten has least fat	 accept converse	 1
2(c)(ii)	table 1 mark • highest number of visitors **or** large range of visitors table 2 mark • high percentage eaten **or** contain high fat for energy / insulation	allow separate references to sunflower and niger allow most popular allow most eaten	 1 1
Total			**6**

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BLY1H

Question 3

question	answers	extra information	mark
3(a)	FSH / follicle stimulating hormone LH / luteinizing hormone	allow FHS either order	1 1
3(b)	any **four** from: • egg(s) collected from ovary • *(eggs)* mixed with sperm **or** fertilisation occurs • fertilised egg divides • embryo formed • *(*embryos*)* inserted into womb / uterus • FSH matures egg **and** LH releases eggs	 allow eggs and sperm put into tube ignore references to vagina 	4
Total			**6**

BLY1H

Question 4

question	answers	extra information	mark
4(a)	kills / destroys bacteria / MRSA prevents / reduces transfer	do **not** allow germs allow stops MRSA entering ward	1 1
4(b)	mutation (causes) resistance to antibiotics	do **not** accept antibiotics causes mutation allow not effective ignore immunity 	1 1 1
Total			**5**

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BLY1H

Question 5

question	answers	extra information	mark
5(a)	any **two** from: • arthritis • diabetes • high blood pressure • heart / blood vessel disease	ignore descriptions ignore cholesterol	2
5(b)	(No) any **two** from: • patterns for cancer and obesity not identical • data only shows a link • some other factor(s) involved	allow descriptions of differences from graph	2
5(c)	any **two** from: • increases metabolic rate • exercise needs energy **or** exercise increases energy used by body • fat (stores) used / broken down **or** less food / energy converted into body mass / fat	accept increase BMR ignore increased respiration allow fat burned ignore burns energy / calories	2
Total			**6**

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BLY1H

Question 6

question	answers	extra information	mark
6(a)	drugs alter chemical processes in body person suffers withdrawal symptoms without drug		1 1
6(b)	(overall trend is) higher harm – greater dependence **or** greater dependency – higher harm **or** data show a correlation (but) wide spread of dependence at each harm 'level' **or** wide spread of harm at each dependence level	positive correlation gains **two** marks allow data do not give a straight line graph because wide spread	1 1
6(c)(i)	(no) heroin much more harmful / dependent	it or not mentioned = alcohol may use figures eg alcohol only has harm 1.5 heroin 2.75	 1
6(c)(ii)	many more people use alcohol less harmful effect multiplied	allow since alcohol legal drug / easier to obtain	1 1
Total			**7**

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BLY1H

Question 7

question	answers	extra information	mark
7	a mutation occurs **or** variation in size / shape of pelvis	allow idea that walking upright needs larger pelvis to bear weight	1
	large / wide birth canal / pelvis allowed passage of wide skull / brain	do **not** allow pelvis became larger to enable birth of larger-skulled babies	1
	link between brain size and intelligence		1
	those with larger pelvis / brain more likely to survive / reproduce		1
Total			**4**

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BLY1H

Question 8

question	answers	extra information	mark
8(a)	two species / types involved		1
8(b)	any **three** from: pros (max **two** pros) • useful if species difficult to breed • prevents extinction / continues genetic line cons (max **two** cons) • low success rate **or** figures given • development problems • diverts attention from habitat conservation / poaching / pollution / climate change • cloning reduces gene pool conclusion argued conclusion	full marks only if at least **one** pro, **one** con and an attempt at a conclusion ignore reference to ethical issues / cruelty must include references to **both** pros and cons and must be at end of answer	3 1
Total			**5**

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Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
8	
TOTAL	

General Certificate of Secondary Education
Higher Tier
June 2010

Science B
Unit Biology B1

BLY1H

H

Biology
Unit Biology B1

Written Paper

Wednesday 9 June 2010 1.30 pm to 2.15 pm

You will need no other materials.
You may use a calculator.

Time allowed
- 45 minutes

Instructions
- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 45.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.

Advice
- In all calculations, show clearly how you work out your answer.

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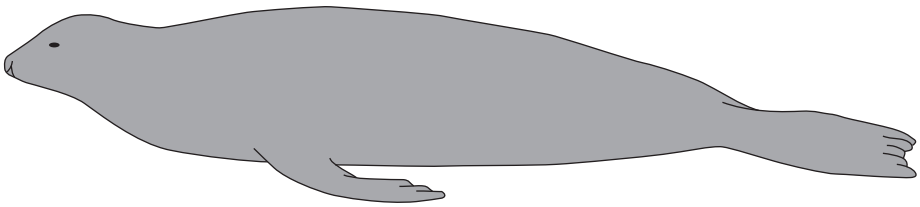
Do not write outside the box

Answer **all** questions in the spaces provided.

1 Seals are adapted for life in the sea.
Use information from the drawings to answer the questions.

This drawing shows seal **X**.

Seal X



1 (a) Give **two** ways in which seal **X** is adapted for swimming.

1 .....

.....

2 .....

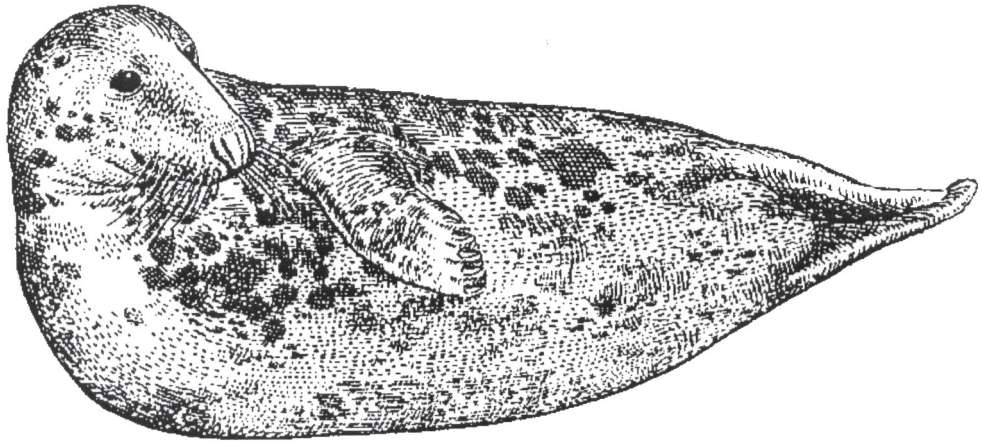
.....

(2 marks)

Do not write outside the box

1 (b) This drawing shows seal **Y**, drawn to the same scale as seal **X**.

Seal Y



Seal **Y** lives in much colder seas than seal **X**.

Explain **one** way in which seal **Y** is adapted for surviving in cold seas.

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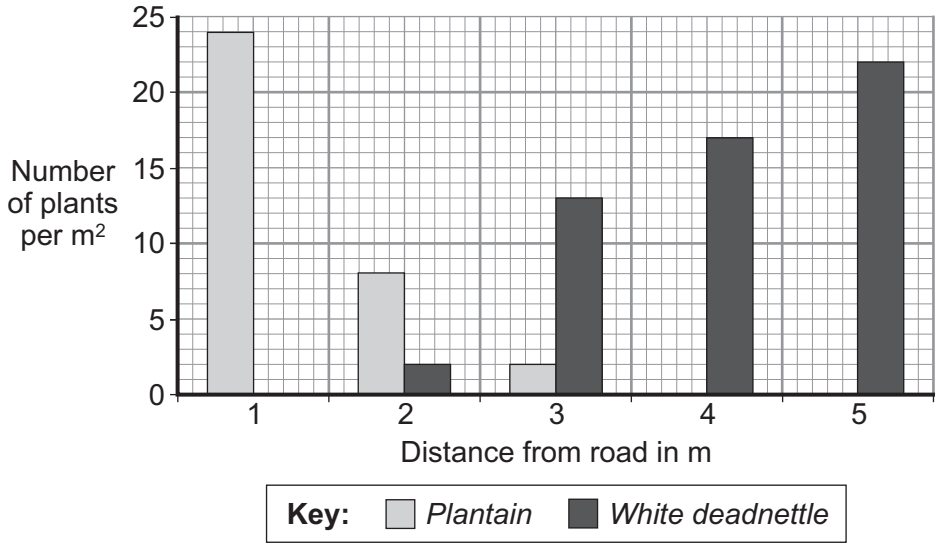
(2 marks)

4

Turn over for the next question

Do not write outside the box

2 Students investigated the distribution of two plant species near a busy road. The bar chart shows their results.



2 (a) (i) Name the piece of apparatus used in sampling a 1 m^2 piece of land.

.....

(1 mark)

2 (a) (ii) Describe how this piece of apparatus could be used to obtain the data shown in the bar chart.

.....

.....

.....

.....

.....

(2 marks)

2 (a) (iii) Describe the pattern shown in the data for the *Plantain* plants.

.....

.....

.....

(1 mark)

Do not write outside the box

2 (b) Suggest explanations for:

2 (b) (i) the distribution of the *White deadnettle* plants

.....

.....

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(2 marks)

2 (b) (ii) the distribution of the *Plantain* plants.

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(2 marks)

8

Turn over for the next question

Do not write outside the box

There are no questions printed on this page

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ANSWER IN THE SPACES PROVIDED

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3 Influenza is an infectious disease. The influenza virus often mutates. This has made the World Health Organisation worried about another influenza *pandemic*.

3 (a) What is meant by a *pandemic*?

.....

.....

(1 mark)

3 (b) Explain why a mutation of the influenza virus might cause another influenza pandemic.

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(3 marks)

4

Turn over for the next question

Do not write outside the box

4 Diet and exercise affect health.

4 (a) Many people are obese (very overweight).

Obesity can lead to heart disease.

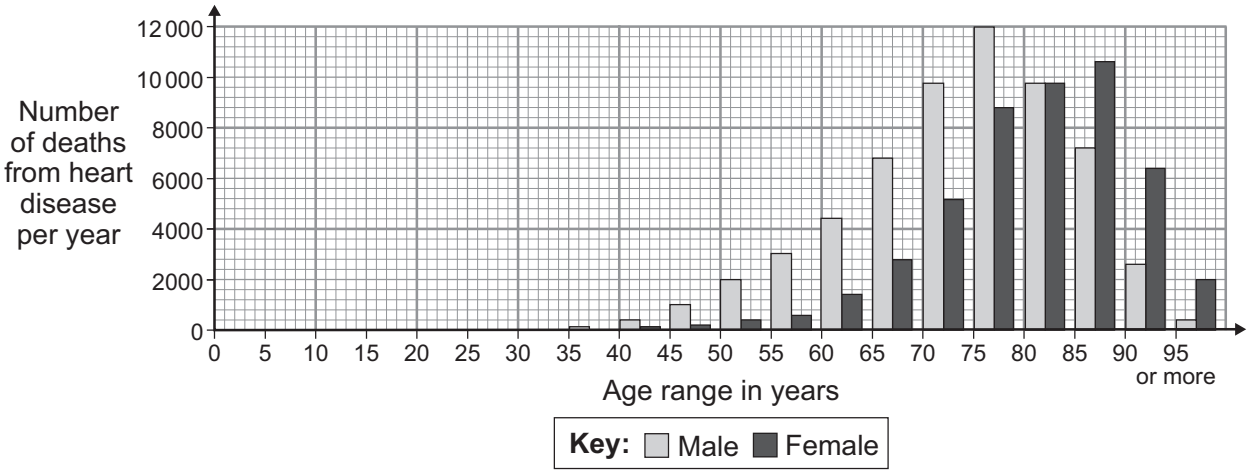
Other than heart disease, name **two** conditions which are linked to obesity.

1 .....

2 .....

(2 marks)

4 (b) The graph shows the number of deaths from heart disease each year in the UK.



The pattern for deaths from heart disease in men is different from the pattern in women.

4 (b) (i) Give **two** differences between the patterns for men and women.

1 .....

.....

2 .....

.....

(2 marks)

Do not write outside the box

4 (b) (ii) Suggest **two** reasons for the difference in the number of deaths from heart disease in men and women between the ages of 40 and 60.

1 .....

.....

2 .....

.....

(2 marks)

4 (c) Scientists have developed drugs to reduce the concentration of cholesterol in the blood.

Give the **three** main stages in testing a new drug before it is sold to the public.

1 .....

.....

2 .....

.....

3 .....

.....

(3 marks)

9

Turn over for the next question

Do not write outside the box

5 Drinking after exercise to replace the water lost in sweat is called rehydration. Scientists at a Spanish university investigated rehydration after exercise.

- 24 students took part in the investigation.
- All the students ran on a treadmill in a temperature of 40 °C until they were exhausted.
- 12 of the students were each given half a litre of beer to drink.
- The other 12 students were each given half a litre of tap water to drink.
- Both groups of students were then allowed to drink as much tap water as they wanted.
- The scientists measured how quickly each student rehydrated.
- The students who had been given beer rehydrated 'slightly better' than the ones given only water.

A newspaper reported the investigation.

The headline was

'Forget water after a workout ... drink some beer instead.'

The newspaper headline was **not** justified.

Explain why.

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(3 marks)

3

Do not write outside the box

6 Scientists have recently cloned a mouse that had died and been frozen for 16 years.

6 (a) Explain what is meant by a clone.

.....

.....

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.....

(2 marks)

6 (b) The scientists used an egg cell from a living mouse and the genetic material from a brain cell of the frozen mouse.

Describe how the process of adult cell cloning could be used to clone the frozen mouse.

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(3 marks)

6 (c) People could ask scientists to use this technique to clone long-dead relatives, whose bodies have been deep-frozen.

Most people would be opposed to cloning a human from a deep-frozen, long-dead relative.

Give **one** reason why.

.....

.....

(1 mark)

6

Do not write outside the box

7 The photograph shows a flamingo.



- Flamingos feed on organisms that live in mud at the bottom of lakes.
- Leopards prey on flamingos.
- Flamingos find it difficult to fly if their feathers get wet.

Flamingos have evolved very long legs.

How would each of the following theories explain the evolution of these long legs?

7 (a) Darwin's theory

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(3 marks)

Do not write outside the box

7 (b) Lamarck's theory.

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(2 marks)

5

Turn over for the next question

Do not write outside the box

8 A new fertility treatment that could allow women to have IVF in their lunch hour has been developed.

In standard IVF:

- Eggs are fertilised with sperm in a dish in a laboratory.
- Any resulting embryos are incubated and monitored in a laboratory for three to five days.
- The best embryo is transferred to the woman's womb.

Standard IVF treatment can also be used in cases where the male is infertile. In this treatment a sperm nucleus is injected into an egg. The average success rate for standard IVF treatment is 29.6 per cent.

In the *Invocell* technique:

- The *Invocell* device, shown below, is a sealed capsule that allows fertilisation to take place inside the woman's body, in the vagina.

The photograph of *Invocell* device is not reproduced here due to third-party copyright constraints.

- Eggs are removed from the ovaries while the woman is under sedation.
- The eggs and sperm are put into the *Invocell* capsule.
- The capsule is placed inside her vagina.
- After three days the capsule is removed and the best embryo is transferred to the woman's womb.

This IVF treatment can be performed in a doctor's surgery because at no time are eggs, sperm or embryo stored outside the body. No costs are involved for laboratory incubation.
The *Invocell* company tried the technique on 800 women with a success rate of 19.7 per cent.

Do not write outside the box

8 (a) In both IVF treatments a woman is given hormones to stimulate her ovaries.

Name the **two** hormones that stimulate the ovaries.

..... and .....

(2 marks)

8 (b) Evaluate the use of the *Invocell* technique compared with standard IVF treatment.

Remember to give a conclusion as part of your evaluation.

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(4 marks)

6

END OF QUESTIONS

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There are no questions printed on this page

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Question 4 DR MIKE LAKER, Understanding Cholesterol, Family Doctor Series

Question 7 Photo: © DLILLC/Corbis

Question 8 www.invo-bioscience.com

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Version: 09/08/2010

General Certificate of Secondary Education

Science B 4462 / Biology 4411

BLY1H Unit Biology 1

Mark Scheme

2010 Examination – June Series

STEMUP.CO.UK

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this Mark Scheme are available to download from the AQA Website: www.aqa.org.uk

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Marking Guidance for Examiners

GCSE Science Papers

1. General

The mark scheme for each question shows:

- the marks available for each part of the question
- the total marks available for the question
- the typical answer or answers which are expected
- extra information to help the Examiner make his or her judgement and help to delineate what is acceptable or not worthy of credit or, in discursive answers, to give an overview of the area in which a mark or marks may be awarded.

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BLY1H

Question 1

question	answers	extra information	mark
1(a)	any **two** from: • *s*treamlined / smooth • flippers • flattened / long / large / powerful tail	 allow description eg long and thin ignore slimy / oily skin unless qualified allow fins **or** webbed feet tail must be qualified to gain credit	2
1(b)	**1** mark for each adaptation and **1** mark for its correct linked advantage *eg* fat / blubber (1) insulates (1) **or** large mass to area ratio **or** small area to mass ratio (1) heat loss reduced (1)	correct advantage mark can be awarded if adaptation is attempted but not awarded the mark ignore skin / fur allow keeps warm ignore large body unqualified allow volume for mass ignore keeps warm	*2*
Total			**4**

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BLY1H

Question 2

question	answers	extra information	mark
2(a)(i)	quadrat / grid	allow suitable description in a(i) or a(ii) allow quadrant	1
2(a)(ii)	any **two** from: • use a transect / description • sample every metre • count plants (in quadrat)	 allow measure distance of the test or sample site from road ignore random placing of quadrat	2
2(a)(iii)	the nearer to the road, the more (plantain) plants	accept the more dead nettles the less plantains	1

Question 2 continues on the next page

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BLY1H

Question 2 continued

question	answers	extra information	mark
2(b)(i)	any **two** factors from: eg • grow better / survive away from road • sensitive to pollutant / named pollutant / dust / fumes • (roadside) weedkillers • trampling /damage / turbulence • grass cutting • competition • aspect eg hillier **or** give **one** mark for a factor and **one** mark for its effect eg dust (from road) (1) reduces photosynthesis (1) **or** 'loses' in competition (1) for light / water / nutrients / minerals / ions / space / soil (1)	ignore carbon dioxide as pollutant ignore food for plants	2

Question 2 continues on the next page

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BLY1H

Question 2 continued

question	answers	extra information	mark
2(b)(ii)	any **two** factors eg • can withstand pollution • competition • aspect eg flat **or** give **one** mark for a factor and **one** mark for its effect eg use carbon dioxide (from traffic) (1) enhances photosynthesis (1) **or** 'wins' in competition (1) for light / water / nutrients / minerals / ions / space (1)	ignore distribution allow grows better in polluted air ignore 'prefer' pollution ignore food for plants	2
Total			**8**

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BLY1H

Question 3

question	answers	extra information	mark
3(a)	worldwide **or** several countries (outbreak)	ignore affects large numbers of people	1
3(b)	any **three** from • new strain of flu / virus changes / virus different • vaccination not effective **or** new vaccine not yet developed • antiviral drugs not effective / not yet developed • *people* not immune to it • virus not recognised by white blood cells / antibodies **or** antibodies / antitoxins not effective • people / animals travel between countries / abroad spreading infection	 ignore mutation allow resistant / immune to vaccine allow drugs / treatment not effective do **not** allow antibiotics not effective allow people not resistant accept no antibodies / antitoxins ignore white blood cells / antibodies fighting off	*3*
Total			**4**

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BLY1H

Question 4

question	answers	extra information	mark
4(a)	any **two** from: • arthritis • diabetes • high blood pressure • strokes • allow breathing difficulties	 allow damaged joints accept high blood sugar allow blocked blood vessels / thrombosis ignore cancer ignore high cholesterol	2
4(b)(i)	any **two** from: • lower number of women deaths up to age of 75-80 • higher number of women deaths after 80 • men's peak higher • men's peak at an earlier age • men's death start earlier than women • more men than women die of heart disease	to gain marks there must be a comparison ignore comparison at single age ignore women die older **or** men die younger	2

Question 4 continues on the next page

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BLY1H

Question 4 continued

question	answers	extra information	mark
4(b)(ii)	any **two** from: • men smoke more (cigarettes) • more men smoke • men under more stress • men less active • more men overweight / eat more / less diet conscious **or** different fat distribution • genetic factors • men might have lower metabolic rate • men less likely to visit doctor even though they have symptoms	 ignore alcohol ignore reference to body size ignore references to hormones	2
4(c)	laboratory tests / tests on tissues **or** tests on animals **or** tests for toxicity tests for side effects on volunteers / healthy people / small numbers widespread testing **or** testing for optimum dose ***or*** test on patients / sick people ***or*** test to see if it is effective	points can be in any order ignore computer simulations accept use of placebo	1 1 1
Total			**9**

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BLY1H

Question 5

question	answers	extra information	mark
5	only 24 students tested **or** only one test **or** reference to lack of controls eg gender / age		1
	students could drink as much water as they wanted **or** some students drank more water than others **or** some students drank water and beer		1
	differences only slight	ignore effects of beer or promotion of beer drinking	1
Total			**3**

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BLY1H

Question 6

question	answers	extra information	mark
6(a)	genetically identical / same DNA / same chromosomes	**gains 2 marks** accept identical without reference to genetic material for **1** mark	2
6(b)	remove nucleus from egg insert genetic material / nucleus / DNA / chromosomes from frozen mouse electric shock **or** allow to divide **or** insert into womb / uterus	allow use empty egg cell do **not** allow if reference to sperm	1 1 1
6(c)	ethical / religious / emotional reasons **or** not known if it is safe / long term effects not known	ignore playing God / unnatural / immoral	1
Total			**6**

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BLY1H

Question 7

question	answers	extra information	mark
7(a)	variation / range of leg sizes / mutation	do **not** allow intention to mutate	1
	ones with longer legs could feed in deeper water / get more food **or** long legged ones less likely to get feathers wet **or** long-legged ones could escape from leopards	allow reverse argument	1
	survive / breed / pass on genes	allow characteristics passed onto next generation	1
7(b)	flamingos stretched their legs (to be able to feed in deeper water/ keep feathers dry / escape from leopards)	It must be clear that the characteristic develops during the organisms lifetime ie it is not inherited from parents accept long legs are an acquired characteristic	1
	longer legs / acquired characteristic inherited by offspring	accept (acquired) genes for long legs passed on	1
Total			**5**

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BLY1H

Question 8

question	answers	extra information	mark
8(a)	FSH / follicle stimulating (hormone) LH / luteinising (hormone)	either order	1 1
8(b)	any **three** from: advantages of Invocell eg • low(er) cost • quick(er) • laboratory / incubator / equipment not needed • more convenient disadvantages of Invocell eg • low(er) success rate • embryo development cannot be monitored • can not be used where male is infertile • only tested on 800 women • (risk of) infection / pain in vagina argued conclusion	max **2** if only advantages **or** only disadvantages discussed allow reverse arguments ignore can be done in doctors surgery ignore sedation must include reference to **both** advantages and disadvantages and must be at end of answer	3 1
Total			**6**

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Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
8	
TOTAL	

General Certificate of Secondary Education
Higher Tier
January 2010

Science B
Unit Biology B1

BLY1H

H

Biology
Unit Biology B1

Written Paper

Thursday 14 January 2010 9.00 am to 9.45 am

For this paper you must have:
You may use a calculator.

Time allowed
- 45 minutes

Instructions
- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Answers written in margins or on blank pages will not be marked.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 45.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.

Advice
- In all calculations, show clearly how you work out your answer.

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There are no questions printed on this page

DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED

Areas outside the box will not be scanned for marking

Answer **all** questions in the spaces provided.

1 The photograph shows a musk ox.



The musk ox lives in the Arctic. An adult musk ox is 2.5m long and 1.4m high at the shoulder. Adults usually have a mass of about 400kg.

Use this information and information from the photograph to explain **two** ways in which a musk ox is adapted for survival in the Arctic.

1 (a) (i) Adaptation 1 .....

(1 mark)

1 (a) (ii) How this adaptation helps the musk ox to survive in the Arctic.

.....

.....

(1 mark)

1 (b) (i) Adaptation 2 .....

(1 mark)

1 (b) (ii) How this adaptation helps the musk ox to survive in the Arctic.

.....

.....

(1 mark)

4

Turn over ▶

Areas outside the box will not be scanned for marking

2 Charles Darwin proposed the theory of natural selection.

2 (a) What is meant by natural selection?

.....

.....

.....

.....

(2 marks)

2 (b) The drawings show stages in the evolution of the human skeleton.

All the drawings are to the same scale.



Ape-like ancestor ⟶ Modern human

Use information from the drawings to describe **two** trends in the evolution of the human skeleton.

1 .....

.....

2 .....

.....

(2 marks)

Areas outside the box will not be scanned for marking

2 (c) Darwin said that humans had evolved from ape-like ancestors.
Many people disagreed with him at the time.

Give **two** reasons why.

1 .....

.....

2 .....

.....

(2 marks)

2 (d) Lamarck's theory of evolution stated that useful changes which occur in an organism during its lifetime will be inherited by its offspring.

Give **one** way in which Darwin's theory differs from Lamarck's.

.....

.....

(1 mark)

7

Turn over for the next question

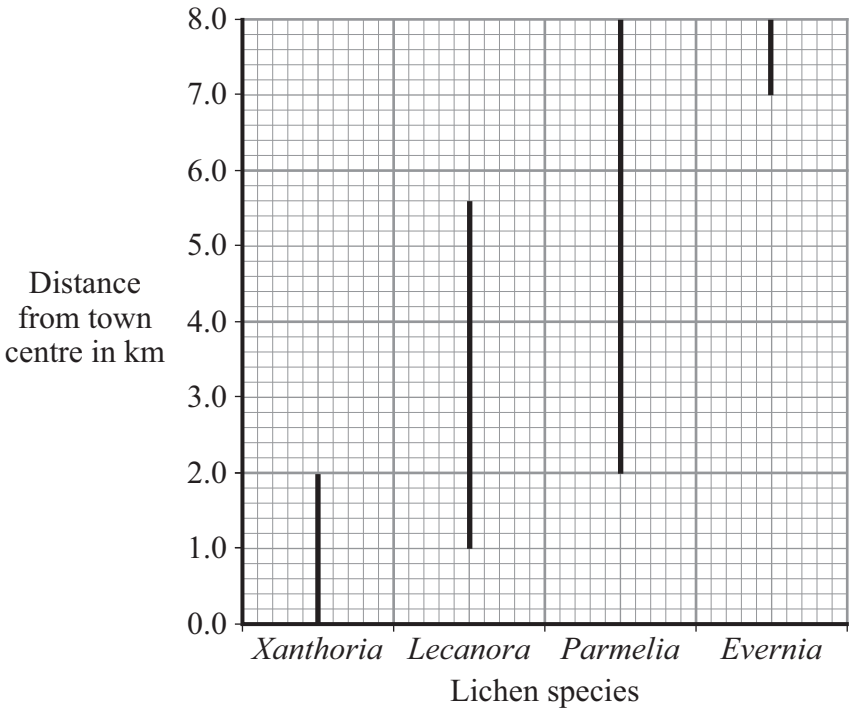
Areas outside the box will not be scanned for marking

3 Lichens are sensitive to the amount of sulfur dioxide in the atmosphere. They are used as indicator species for the amount of air pollution. Air pollution is generally higher in town centres than in the countryside.

Students investigated the relationship between lichen species and distance from a town centre.

- On a map, they drew a transect (line) from the centre of the town to the countryside.
- They examined sites every 200 metres along the transect (line).
- At each site, they recorded the lichen species growing on trees and walls up to a height of 2 metres.

The graph shows their results.
The lines on the graph indicate the range of each lichen species.



3 (a) Give **one** way in which the students could have obtained more accurate results.

.....

.....

(1 mark)

Areas outside the box will not be scanned for marking

3 (b) (i) Which lichen species was found over the greatest range?

.....

(1 mark)

3 (b) (ii) Which lichen species grows only in the least polluted air?

.....

(1 mark)

3 (c) One student concluded 'You can tell how much sulfur dioxide there is in the air by the amount of *Lecanora* growing'.

Give **two** reasons why this is **not** a valid conclusion.

1 .....

.....

2 .....

.....

(2 marks)

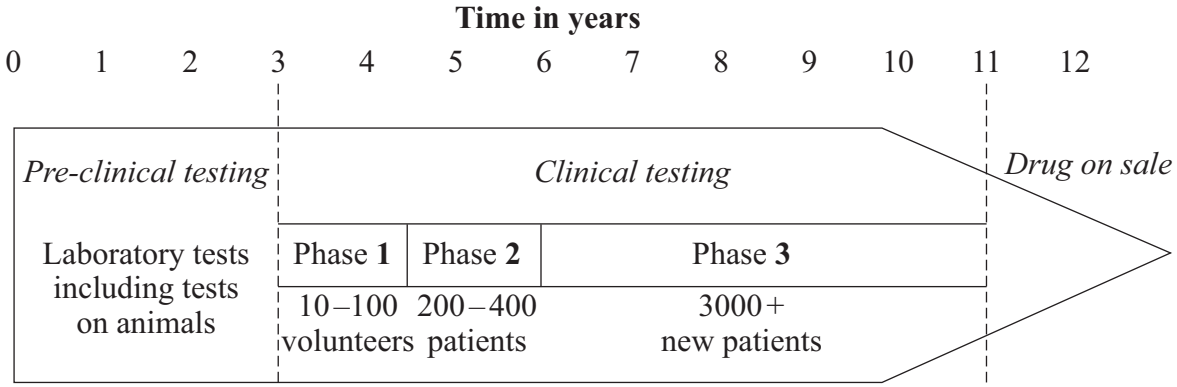
5

Turn over for the next question

Areas outside the box will not be scanned for marking

4 New drugs have to be thoroughly tested before they are sold.

The diagram shows a time line for the testing of a new drug.



4 (a) What is the main purpose of *pre-clinical testing*?

.....

.....

(1 mark)

4 (b) In Phase **1** of the *clinical testing*, very low doses of the new drug are used on a small number of volunteers.

4 (b) (i) What is the main purpose of Phase **1** testing?

.....

.....

(1 mark)

4 (b) (ii) In Phase **1** testing, healthy volunteers are used rather than patients.

Suggest **one** reason for this.

.....

.....

(1 mark)

4 (c) What is the main purpose of the Phase **2** and Phase **3** testing?

.....

.....

(1 mark)

Areas outside the box will not be scanned for marking

4 (d) During Phase **3** testing, many of the patients are given a *placebo*.

4 (d) (i) What is meant by a *placebo*?

.....

.....

(1 mark)

4 (d) (ii) During the testing, who knows which patients are receiving the placebo?

Tick (✓) **one** box.

Only the patients ☐

Only the doctors ☐

Both patients and doctors ☐

Neither patients nor doctors ☐

(1 mark)

6

Turn over for the next question

Areas outside the box will not be scanned for marking

5 A European Union report estimates that by 2011, one million children in the Union will be obese and have raised blood cholesterol levels.

5 (a) Body mass is dependent on the *metabolic rate* of the body.

What is meant by *metabolic rate*?

.....

.....

.....

.....

(2 marks)

5 (b) Cholesterol is carried around the body by the two types of lipoprotein: low-density lipoproteins (LDLs) and high-density lipoproteins (HDLs).

Describe the relationship between the two types of lipoproteins and heart health.

.....

.....

.....

.....

.....

.....

.....

.....

(3 marks)

5

Areas outside the box will not be scanned for marking

6 Influenza is caused by a virus.

6 (a) How do viruses cause illness?

.....

.....

(1 mark)

6 (b) A British company making a reality television show in the Peruvian Amazon has been accused of starting an influenza epidemic. This epidemic allegedly killed four members of a remote Indian tribe and left others seriously ill.

The members of the television crew did not show symptoms of influenza, but members of the Indian tribe died from the disease.

Suggest an explanation for this.

.....

.....

.....

.....

.....

.....

.....

.....

(3 marks)

4

Turn over for the next question

Areas outside the box will not be scanned for marking

7 The human menstrual cycle is controlled by hormones.

7 (a) Name the gland which produces:

7 (a) (i) FSH

.....

(1 mark)

7 (a) (ii) oestrogen.

.....

(1 mark)

7 (b) The diagram shows part of an advertisement for a fertility monitor. It measures the concentrations of oestrogen and LH in a woman's urine.

The fertility diagram is not reproduced here due to third-party copyright constraints.

7 (b) (i) What proportion of a 28 day menstrual cycle is the fertile period?

.....

.....

(1 mark)

Areas outside the box will not be scanned for marking

7 (b) (ii) A woman does not usually become pregnant after intercourse on day 9 of the cycle. However, she may become pregnant after intercourse on day 17 of the cycle.

Suggest an explanation for this.

.....

.....

.....

.....

.....

(2 marks)

7 (b) (iii) Most types of fertility monitor measure LH concentrations.
The fertility monitor shown in the diagram measures both oestrogen and LH concentrations.
The manufacturer states that women have more chance of becoming pregnant if they use the fertility monitor described above instead of an LH monitor.

Use information from the graph to suggest an explanation for this claim.

.....

.....

.....

.....

.....

(2 marks)

7 (c) What evidence from the graph indicates a causal relationship between oestrogen and LH production?

.....

.....

.....

.....

.....

(2 marks)

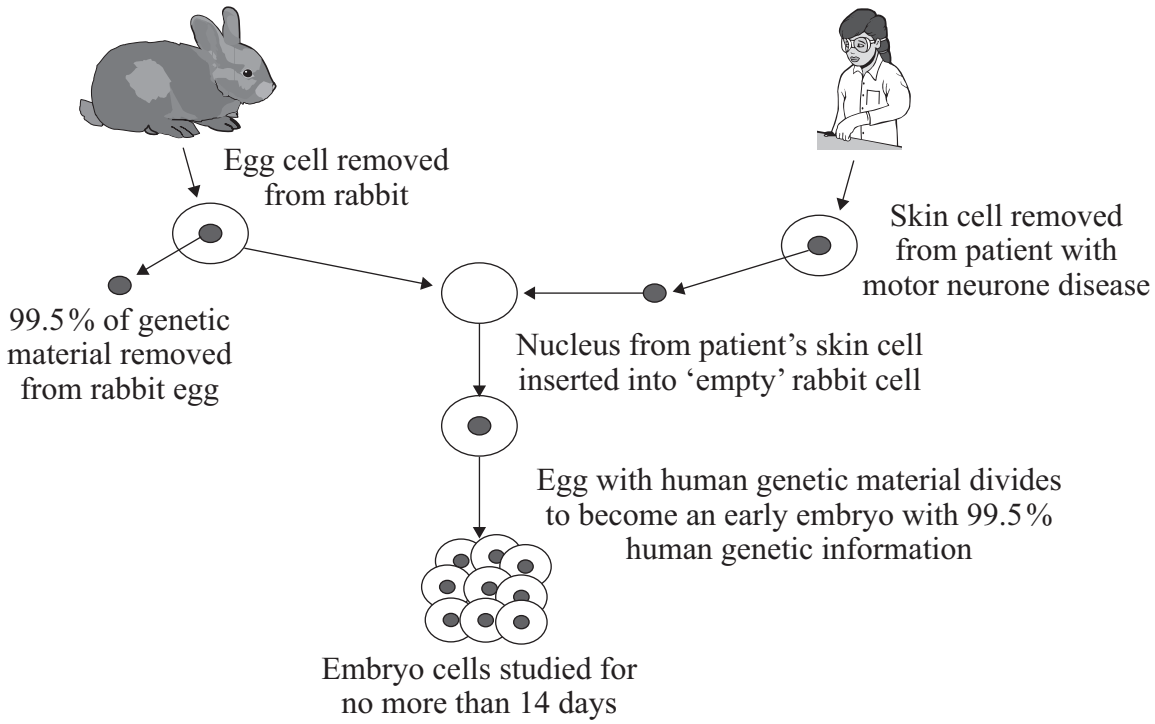
9

Turn over ▶

Areas outside the box will not be scanned for marking

8 Scientists in Korea have discovered a method of producing rabbit–human embryos. Rabbit–human embryos could provide cells for research into human diseases such as motor neurone disease. Rabbits produce large numbers of eggs. Rabbit–human embryos could overcome a shortage of human embryo cells for research.

The diagram shows how rabbit–human embryos are produced.



8 (a) Which structures in the nucleus contain 99.5 % of a cell's genetic information?

.....

(1 mark)

Areas outside the box will not be scanned for marking

8 (b) Use the above information and your own knowledge and understanding to evaluate how the production of rabbit–human embryos may help research into human diseases.

Remember to give a conclusion as part of your evaluation.

.....

.....

.....

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.....

.....

(4 marks)

5

END OF QUESTIONS

There are no questions printed on this page

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Version : 09/03/2010



General Certificate of Secondary Education

Science B 4462 / Biology 4411

BLY1H Unit Biology

Mark Scheme

2010 examination – January series

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Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this Mark Scheme are available to download from the AQA Website: www.aqa.org.uk

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Dr Michael Cresswell Director General

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MARK SCHEME

Information to Examiners

1. General

The mark scheme for each question shows:

- the marks available for each part of the question
- the total marks available for the question
- the typical answer or answers which are expected
- extra information to help the Examiner make his or her judgement and help to delineate what is acceptable or not worthy of credit or, in discursive answers, to give an overview of the area in which a mark or marks may be awarded.

The extra information is aligned to the appropriate answer in the left-hand part of the mark scheme and should only be applied to that item in the mark scheme.

At the beginning of a part of a question a reminder may be given, for example: where consequential marking needs to be considered in a calculation; or the answer may be on the diagram or at a different place on the script.

In general the right hand side of the mark scheme is there to provide those extra details which confuse the main part of the mark scheme yet may be helpful in ensuring that marking is straightforward and consistent.

2. Emboldening

2.1 In a list of acceptable answers where more than one mark is available 'any **two** from' is used, with the number of marks emboldened. Each of the following lines is a potential mark.

2.2 A bold **and** is used to indicate that both parts of the answer are required to award the mark.

2.3 Alternative answers acceptable for a mark are indicated by the use of **or**. (Different terms in the mark scheme are shown by a / ; eg allow smooth / free movement.)

3. Marking points

3.1 Marking of lists

This applies to questions requiring a set number of responses, but for which candidates have provided extra responses. The general principle to be followed in such a situation is that 'right + wrong = wrong'.

Each error/contradiction negates each correct response. So, if the number of error/contradictions equals or exceeds the number of marks available for the question, no marks can be awarded.

However, responses considered to be neutral (indicated as * in example 1) are not penalised.

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Example 1: What is the pH of an acidic solution? (1 mark)

Candidate	Response	Marks awarded
1	4,8	0
2	green, 5	0
3	red*, 5	1
4	red*, 8	0

Example 2: Name two planets in the solar system. (2 marks)

Candidate	Response	Marks awarded
1	Pluto, Mars, Moon	1
2	Pluto, Sun, Mars, Moon	0

3.2 Use of chemical symbols / formulae

If a candidate writes a chemical symbol / formula instead of a required chemical name, full credit can be given if the symbol / formula is correct and if, in the context of the question, such action is appropriate.

3.3 Marking procedure for calculations

Full marks can be given for a correct numerical answer, as shown in the column 'answers', without any working shown.

However if the answer is incorrect, mark(s) can be gained by correct substitution / working and this is shown in the 'extra information' column;

3.4 Interpretation of 'it'

Answers using the word 'it' should be given credit only if it is clear that the 'it' refers to the correct subject.

3.5 Errors carried forward

Any error in the answers to a structured question should be penalised once only.

Papers should be constructed in such a way that the number of times errors can be carried forward are kept to a minimum. Allowances for errors carried forward are most likely to be restricted to calculation questions and should be shown by the abbreviation e.c.f. in the marking scheme.

3.6 Phonetic spelling

The phonetic spelling of correct scientific terminology should be credited **unless** there is a possible confusion with another technical term.

3.7 Brackets

(…..) are used to indicate information which is not essential for the mark to be awarded but is included to help the examiner identify the sense of the answer required.

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Question 1

question	answers	extra information	mark
1	**1** mark for each adaptation and **1** mark for its correct **linked** advantage		max 4
	fur / long hair / thick coat (1) for insulation / reduces heat loss (1)	allow keeps warm for insulation point	
	large body / large mass / small SA:V ratio (1) retains heat / loses less heat (1)	ignore layer of fat ignore keeps warm	
	short legs (1) reduces surface area / heat loss (1)	reject short (height) / small (height) ignore keeps warm for this point	
	small ears (1) reduces surface area / heat loss (1)	ignore keeps warm for this point	
	horns (1) defence (1)		
	large shoulders (1) to move through snow (1)		
Total			**4**

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BLY1H

Question 2

question	answers	extra information	mark
2(a)	any **two** from • survival of fittest • amplification of fittest ie has adaptations to survive • go on to breed **or** genes / characteristics passed on to next generation	 allow examples allow examples NB best adapted organisms survive gains **2** marks	2
2(b)	any **two** from eg: • increased height • increased erectness / backbone or spine straighter • shorter arms • legs straighter • larger skull • larger pelvis **or** changing shape described • humans walk on two legs / feet	ignore unqualified change eg 'the skull changes shape' allow description of modern human characteristic eg 'modern humans stand up straight' allow description of ape-like characteristics eg ape-like ancestor walked on four legs	2
2(c)	any **two** from: • religious objections • insufficient evidence • mechanism of heredity not known did not know about genes / chromosomes / DNA / mutations • did not like the thought of being descended from apes	 ignore **no** evidence accept could not prove	2

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BLY1H

Question 2 continued

question	answers	extra information	mark
2(d)	Darwin's theory depends on differences in genes at birth / inborn variation / mutation	allow Darwin's theory depends on genetics ignore references to time	1
Total			**7**

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BLY1H

Question 3

question	answers	extra information	mark
3(a)	any **one** from eg: • shorter distance between samples • sample to greater height • specify the size of each site	 ignore repeat investigation / measurements ignore longer transect	1
3(b)(i)	Parmelia		1
3(b)(ii)	Evernia		1
3(c)	any **two** from: • Lecanora does not extend over whole range of transect / does not grow everywhere /does not grow in town centre / does not grow in countryside • Lecanora grows in a range of sulfur dioxide concentrations ***or*** Lecanora only grows in limited range of sulfur dioxide concentrations **or** Lecanora lives over large range of sulfur dioxide concentrations • other factors eg different pollutant might also influence growth of Lecanora • sulfur dioxide / pollutant concentration was not measured • amount of Lecanora not measured	 ignore Lecanora does not give accurate measure of sulfur dioxide concentration	2
Total			**5**

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BLY1H

Question 4

question	answers	extra information	mark
4(a)	testing for toxicity / see if it is safe / see if it is dangerous / to see if it works	ignore side effects unqualified	1
4(b)(i)	testing for side effects / testing for reactions (to drug)	ignore to see if it works do **not** accept dosage	1
4(b)(ii)	any **one** from • dose too low to help patient • higher risk for patient • might conflict with patient's treatment / patient on other drug • effect might be masked by patient's symptoms / side effects clearer	ignore immune system	1
4(c)	to find optimum dose	allow testing on larger sample **or** it makes results more reliable allow to find out if drug is effective / find out if drug works on ill people (not just if drug works)	1
4(d)(i)	(tablet / drug / injection) that does not contain drug	allow control / fake / false allow tablet / injection that does not affect body do **not** accept drug that does not affect body	1
4(d)(ii)	neither patients nor doctors		1
Total			**6**

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BLY1H

Question 5

question	answers	extra information	mark
5(a)	rate of (chemical) reactions / rate of energy release / rate of respiration in cells / tissues / organs	ignore references to digestion	1 1
5(b)	any **three** from: • LDL 'bad' cholesterol **or** LDL causes heart / blood vessel disease • amplification eg reference to LDL depositing fat / lipid in blood vessels **or** LDL causes narrowness of arteries • HDL 'good' cholesterol / helps to prevent heart / blood vessel disease • amplification eg HDL lowers blood cholesterol • balance important (for good heart health) / high HDL and low LDL desirable	must have at least one LDL point and one HDL point for all **3** marks allow deposits of cholesterol in blood vessels	3
Total			**5**

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BLY1H

Question 6

question	answers	extra information	mark
6(a)	produces toxins / damage cells / reproduce rapidly **or** reproduce in cells	ignore invade cells	1
6(b)	any **three** from: • TV crew immune / Indians not immune / Indians have weak(er) immune system • TV crew had / produced antibodies / Indians had no antibodies **or** antibody production faster in TV crew • TV crew had previous exposure to flu / had been vaccinated **or** Indian tribe had no previous exposure to flu / had not been vaccinated • Indians caught disease from TV crew **or** TV crew were carriers *(*of the virus*)*	ignore resistant allow immunised	3
Total			**4**

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BLY1H

Question 7

question	answers	extra information	mark
7(a)(i)	pituitary		1
7(a)(ii)	ovary		1
7(b)(i)	$\frac{7}{28}$ **or** $\frac{1}{4}$ **or** 0.25 **or** 25%	allow 7 days out of 28 1 week out of 4 weeks	1
7(b)(ii)	any **two** from: • day 17 in fertile period / close(r) to day of egg release **or** day 9 far away from day of egg release • day 9 sperm die before egg released • day 17 sperm still alive when egg released • day of ovulation may vary / irregular cycle ideas • relevant reference to build up of womb lining	do **not** accept egg released on / by day 17 allow sperm only live for a few days	2
7(b)(iii)	any **two** from: • oestrogen concentration rises before LH / oestrogen and LH peak at different times • oestrogen stimulates LH production / woman will know that LH near peak • wider fertile period detected • reference to oestrogen stimulating build up of womb lining		2

Question 7 continues on next page

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Question 7 continued

question	answers	extra information	mark
7(c)	curves show similar pattern / rise together with oestrogen rising / peaking before LH	ignore peak together	1 1
Total			**9**

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Question 8

question	answers	extra information	mark
8(a)	chromosomes	ignore gene / DNA	1
8(b)	**pros eg** any **two** from: • overcomes shortage of human eggs / rabbits produce lots of eggs • ethical / religious issues with using human embryos • reduces tests on (adult) humans • may provide cure for / cause of disease • embryo not allowed to develop beyond 14 days • no harm to rabbit • 99.5 % human genetic information so very similar to human or will react in the same way **cons eg** any **two** from: • ethical / religious objections to mixture of human and rabbit genes • ethical issues with experimenting with rabbits • ethical / religious objections to killing embryos • 0.5% of rabbit genetic information might affect results • 14 days too short a time to get results	to obtain **3** marks candidates must give **one** reasonable pro **and one** reasonable con ignore all embryos identical allow some people object to using rabbits / cruel to rabbits	max 2 max 2

Question 8b continues on next page

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Question 8b continued

	plus **conclusion eg** • possibility of cure does / does not outweigh ethical / religious objections • cure does not justify mixing human and animal genes / killing embryos	**Note:** the conclusion mark cannot be given unless both an advantage and a disadvantage have (already) been given do **not** award the mark if the conclusion only states that advantages outweigh disadvantages	1
Total			**5**

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Surname		Other Names	
Centre Number			Candidate Number				
Candidate Signature									

For Examiner's Use

General Certificate of Secondary Education
June 2009

SCIENCE
Unit Biology B1

BIOLOGY
Unit Biology B1

BLY1H

H

Higher Tier

Friday 12 June 2009 9.00 am to 9.45 am

For this paper you must have:
- a ruler.

You may use a calculator.

Time allowed: 45 minutes

Instructions
- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Answers written in margins or on blank pages will not be marked.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information
- The maximum mark for this paper is 45.
- The marks for questions are shown in brackets.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.

Advice
- In all calculations, show clearly how you work out your answer.

For Examiner's Use			
Question	Mark	Question	Mark
1		3	
2		4	
		5	
		6	
		7	
Total (Column 1) →			
Total (Column 2) →			
TOTAL			
Examiner's Initials			

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Areas outside the box will not be scanned for marking

Answer **all** questions in the spaces provided.

1 Swallows and swifts migrate between Britain and South Africa every year.

1 (a) **Photograph 1** shows a swallow.

Photograph 1



Swallows can fly very quickly.

Use information from the photograph to give **one** way in which the swallow is adapted for flying very quickly.

.....

.....

(1 mark)

1 (b) **Photograph 2** shows swifts.

Photograph 2



Swallows and swifts both feed on flying insects.
They both spend the summer in Britain and then migrate to South Africa in the autumn.

Suggest **one** reason why swallows and swifts do not stay in Britain in the winter.

.....

.....

(1 mark)

Areas outside the box will not be scanned for marking

1 (c) The table gives data about swallows and swifts.

	Swallows	**Swifts**
Arrival date in Britain	April	Early May
Leaving date from Britain	October	Early August
Food	Flying insects	Flying insects
Height at which the birds feed	Near ground level	Up to 350 m above ground level
Times at which birds feed	Mainly when it is light	Almost 24 hours per day

1 (c) (i) There is very little competition between swallows and swifts for food.

Use information from the table to suggest **two** reasons for this.

1 .....

.....

2 .....

.....

(2 marks)

(Extra space) .....

1 (c) (ii) Swallows and swifts do compete for some factors.

Suggest **one** of these factors.

.....

.....

(1 mark)

5

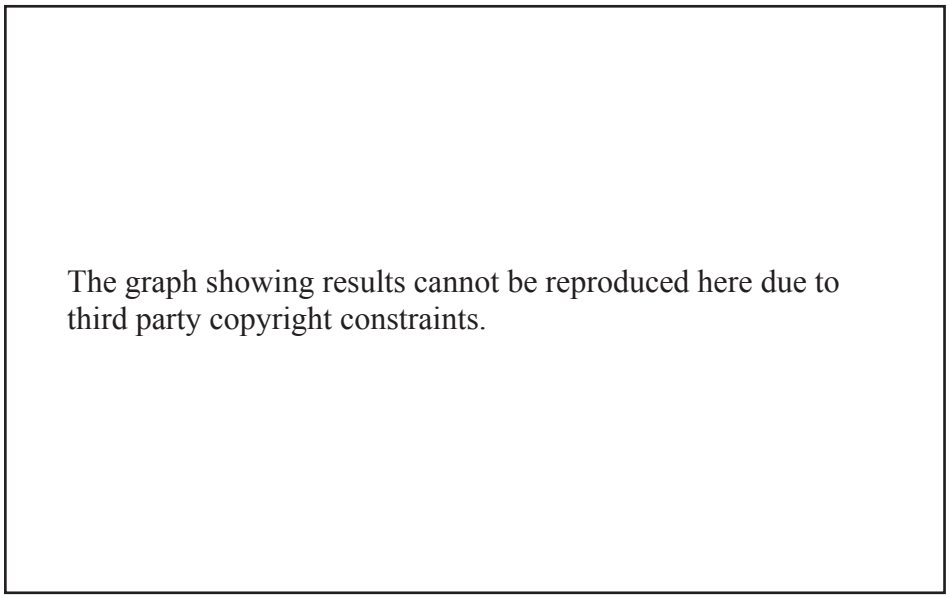
Areas outside the box will not be scanned for marking

2 Many people who are overweight try slimming programmes.

A research study evaluated four different slimming programmes over 6 months.

Scientists selected a group of 40 people for each slimming programme and a control group. Each of the five groups was matched for age, gender and mass.

The graph shows the results of the study.



2 (a) Give **two** control variables that were used in this study.

1.....

2.....

(2 marks)

2 (b) Give **two** conclusions that can be drawn from the results of this study.

1.....
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.....

2.....
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.....

(2 marks)

Areas outside the box will not be scanned for marking

2 (c) The costs of the four programmes were:

- Atkins book cost £3
- Rosemary Conley classes cost £140 for 6 months
- Weight Watchers classes cost £170 for 6 months
- Twice-daily Slim-Fast meal replacements cost £240 for 6 months.

Use this information and the graph to answer this question.

Which is the most cost effective of the four programmes?

.....

Explain the reason for your answer.

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.....

(2 marks)

(Extra space) .....

2 (d) Some slimming programmes include daily exercise.

Explain how daily exercise helps a person to lose mass.

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.....

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(2 marks)

(Extra space) .....

8

Turn over for the next question

Areas outside the box will not be scanned for marking

3 Many people use recreational drugs.

3 (a) Give **one** example of:

3 (a) (i) a legal recreational drug

.....

(1 mark)

3 (a) (ii) an illegal recreational drug.

.....

(1 mark)

3 (b) Some recreational drugs are addictive.

3 (b) (i) Give **one** example of a recreational drug that is very addictive.

.....

(1 mark)

3 (b) (ii) Explain how the action of a drug makes a person become addicted to it.

.....

.....

(1 mark)

Areas outside the box will not be scanned for marking

3 (c) Some doctors think that smoking cannabis causes depression.

Doctors investigated the cannabis smoking habits of 1500 young adults.

The table shows the percentage of cannabis smokers in the investigation who became depressed.

How many times the men or women had smoked cannabis in the last 12 months	**Percentage of men who became depressed**	**Percentage of women who became depressed**
Less than 5 times	9	16
More than 5 times, but less than once per week	10	17
1 – 4 times per week	12	31
Every day	15	68

From the data, give **two** conclusions that can be drawn about the relationship between cannabis and depression.

1 .....

.....

2 .....

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(2 marks)

(Extra space) .....

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6

Turn over for the next question

Areas outside the box will not be scanned for marking

4 Influenza is a disease caused by a virus.

4 (a) Explain why it is difficult to treat diseases caused by viruses.

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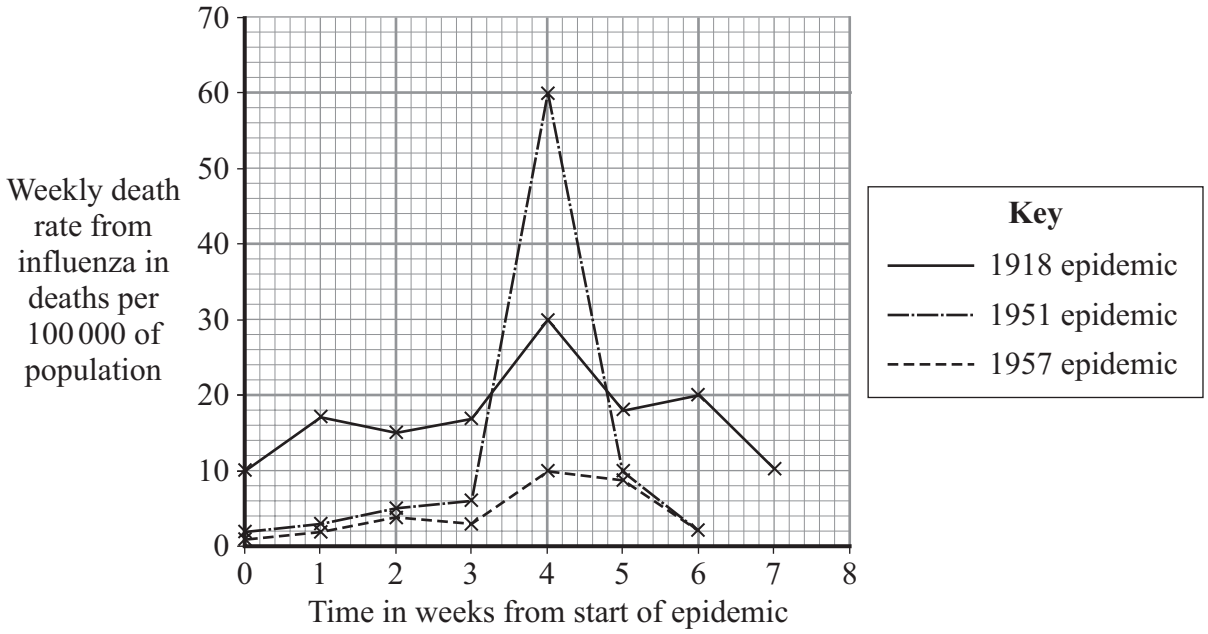
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(2 marks)

4 (b) In some years there are influenza epidemics.

The graph shows the death rate in Liverpool during three influenza epidemics.



4 (b) (i) The population of Liverpool in 1951 was approximately 700 000.

Calculate the approximate number of deaths from influenza in week 4 of the 1951 epidemic.

Show clearly how you work out your answer.

.....

.....

Number of deaths.....

(2 marks)

Areas outside the box will not be scanned for marking

4 (b) (ii) In most years, the number of deaths from influenza in Liverpool is very low.

Explain, in terms of the influenza virus and the body's immune system, why there were large numbers of deaths in years such as 1918 and 1951.

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(3 marks)

(Extra space) .....

7

Turn over for the next question

There are no questions printed on this page

DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED

Areas outside the box will not be scanned for marking

5 The photograph shows a snake eating a toad.



Cane toads were first introduced into Australia in 1935. The toads contain toxins and most species of Australian snake die after eating the toad.

The cane toad toxin does not affect all snakes the same way. Longer snakes are less affected by toad toxin.

Scientists investigated how red-bellied black snakes had changed in the 70 years since cane toads were introduced into their area. They found that red-bellied black snakes had become longer by around 3 – 5%.

Suggest an explanation for the change in the body length of the red-bellied black snakes since the introduction of the cane toads.

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(4 marks)

(Extra space) .....

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4

Areas outside the box will not be scanned for marking

6 Cattle give out methane.

6 (a) Explain how the methane given out by cattle is affecting the Earth's climate.

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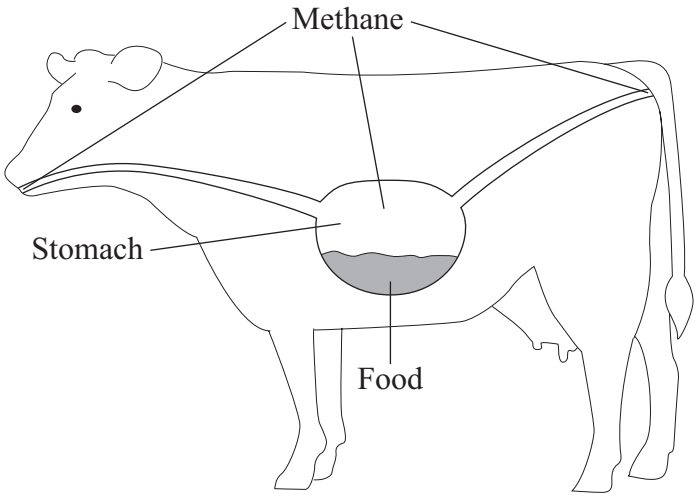
(3 marks)

(Extra space) .....

.....

6 (b) Scientists are investigating how to reduce methane emissions from cattle.

Most of this methane is emitted by the cows belching.



Scientists have found that less methane is belched if the cows eat high-sugar rye grass.

This rye grass has been produced by genetic engineering.

Areas outside the box will not be scanned for marking

6 (b) (i) Suggest how the high-sugar rye grass might have been produced by genetic engineering.

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.....

(3 marks)

(Extra space) .....

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6 (b) (ii) Some people might object to the growing of genetically-engineered, high-sugar rye grass for feeding cattle.

Give **two** reasons why.

1 .....

.....

.....

2 .....

.....

.....

(2 marks)

8

Turn over for the next question

Areas outside the box will not be scanned for marking

7 Two types of fertility treatment are in-vitro fertilisation (IVF) and in-vitro maturation (IVM).

7 (a) Describe the role of hormones in IVF treatment.

.....

.....

.....

.....

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(3 marks)

(Extra space) .....

.....

7 (b) Read the passage about fertility treatment.

During normal IVF, a woman undergoes several weeks of hormone injections. The treatment can lead to a condition called ovarian hyperstimulation syndrome resulting in a build-up of fluid in the lungs. Very rarely, it can cause death. The syndrome occurs in about 1 % of standard IVF cycles, but in about 10 % of the IVF cycles of some women. An IVF cycle may cost up to £4300.

In IVM, hormone treatment lasts for less than 7 days. Eggs are then collected from the ovaries while they are still immature. Each egg is then matured in a laboratory for up to 48 hours before being injected with a single sperm. A few days after fertilisation, the embryos are implanted into the mother's womb. The cost of each IVM cycle is £1700.

An IVM expert says: "In IVM treatment there's a small risk of abnormalities in the sex chromosomes and also of birth deformities and cancer in the babies. These risks are not massive but they are greater than in IVF."

Areas outside the box will not be scanned for marking

7 (b) Evaluate the use of IVM rather than IVF in treating infertility.

Remember to give a conclusion to your evaluation.

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(4 marks)

(Extra space) .....

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7

END OF QUESTIONS

There are no questions printed on this page

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Question 5 Hognose Snake Eating an American Toad © Joe McDonald/CORBIS

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ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Secondary Education

Science B 4462 / Biology 4411

BLY1H Unit 1 Biology

Mark Scheme

2009 examination – June series

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Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

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Dr Michael Cresswell Director General

MARK SCHEME

Information to Examiners

1. General

The mark scheme for each question shows:

- the marks available for each part of the question
- the total marks available for the question
- the typical answer or answers which are expected
- extra information to help the Examiner make his or her judgement and help to delineate what is acceptable or not worthy of credit or, in discursive answers, to give an overview of the area in which a mark or marks may be awarded.

The extra information is aligned to the appropriate answer in the left-hand part of the mark scheme and should only be applied to that item in the mark scheme.

At the beginning of a part of a question a reminder may be given, for example: where consequential marking needs to be considered in a calculation; or the answer may be on the diagram or at a different place on the script.

In general the right hand side of the mark scheme is there to provide those extra details which confuse the main part of the mark scheme yet may be helpful in ensuring that marking is straightforward and consistent.

2. Emboldening

2.1 In a list of acceptable answers where more than one mark is available 'any **two** from' is used, with the number of marks emboldened. Each of the following lines is a potential mark.

2.2 A bold **and** is used to indicate that both parts of the answer are required to award the mark.

2.3 Alternative answers acceptable for a mark are indicated by the use of **or**. (Different terms in the mark scheme are shown by a / ; eg allow smooth / free movement.)

3. Marking points

3.1 Marking of lists

This applies to questions requiring a set number of responses, but for which candidates have provided extra responses. The general principle to be followed in such a situation is that 'right + wrong = wrong'.

Each error/contradiction negates each correct response. So, if the number of error/contradictions equals or exceeds the number of marks available for the question, no marks can be awarded.

However, responses considered to be neutral (indicated as * in example 1) are not penalised.

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Example 1: What is the pH of an acidic solution? (1 mark)

Candidate	Response	Marks awarded
1	4,8	0
2	green, 5	0
3	red*, 5	1
4	red*, 8	0

Example 2: Name two planets in the solar system. (2 marks)

Candidate	Response	Marks awarded
1	Pluto, Mars, Moon	1
2	Pluto, Sun, Mars, Moon	0

3.2 Use of chemical symbols / formulae

If a candidate writes a chemical symbol / formula instead of a required chemical name, full credit can be given if the symbol / formula is correct and if, in the context of the question, such action is appropriate.

3.3 Marking procedure for calculations

Full marks can be given for a correct numerical answer, as shown in the column 'answers', without any working shown.

However if the answer is incorrect, mark(s) can be gained by correct substitution / working and this is shown in the 'extra information' column;

3.4 Interpretation of 'it'

Answers using the word 'it' should be given credit only if it is clear that the 'it' refers to the correct subject.

3.5 Errors carried forward

Any error in the answers to a structured question should be penalised once only.

Papers should be constructed in such a way that the number of times errors can be carried forward are kept to a minimum. Allowances for errors carried forward are most likely to be restricted to calculation questions and should be shown by the abbreviation e.c.f. in the marking scheme.

3.6 Phonetic spelling

The phonetic spelling of correct scientific terminology should be credited **unless** there is a possible confusion with another technical term.

3.7 Brackets

(…..) are used to indicate information which is not essential for the mark to be awarded but is included to help the examiner identify the sense of the answer required.

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BLY1H

Question 1

question	answers	extra information	mark
1(a)	streamlined / aerodynamic / swept-back / arrow-shaped / dart-shaped wings / tail **or** large / long wings	allow pointed / curved wings ignore pointed tail / beak ignore large tail	1
1(b)	no / fewer insects / food (in winter)	allow **too** cold ignore not adapted to cold ignore day length	1
1(c)(i)	any **two** from • feed / hunt at different heights **or** swifts feed higher up • feed / hunt at different times **or** swifts feed at night • arrive / depart at different times		2
1(c)(ii)	nesting sites / territory / habitat	allow homes / space ignore food unqualified allow well qualified food answers eg insects / food near the ground **or** insects / food when it's light **or** insects / food between early May and early August	1
Total			**5**

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BLY1H

Question 2

question	answers	extra information	mark
2(a)	any **two** from: • age • gender • mass • number in group • time		2
2(b)	any **two** from: • highest (mean) mass loss on Rosemary Conley **or** Rosemary Conley most effective • least (mean) mass loss in control group **or** mean gain in mass in control group • Slimfast least (mean) loss of programmes **or** Slimfast least effective • all diets resulted in mass loss • large range of mass loss • similar (mean) mass loss with all 4 diets • (mean) mass loss similar in Atkins and Weightwatchers • (only) in Rosemary Conley (did) all lose mass		2

Question 2 continues on the next page…

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BLY1H

Question 2 Continued

question	answers	extra information	mark
2(c)	(Atkins) costs least mass loss very similar to other diets **or** second highest mass loss **or** as effective as other diets		 1 1
2(d)	any **two** from: • (exercise) increases metabolic rate / respiration • (exercise) needs / uses energy / calories • (this) energy comes from food / fat • less food / energy/ calories converted to fat	ignore sweating allow burns fat / calories do **not** accept energy <u>for</u> respiration	2
Total			**8**

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BLY1H

Question 3

question	answers	extra information	mark
3(a)(i)	tobacco / nicotine / alcohol	accept solvent / glue / caffeine ignore cigarettes / coffee	1
3(a)(ii)	cannabis / heroin / cocaine	allow eg crack / weed / ecstasy / LSD / amphetamine / speed / steroids / GHB	1
3(b)(i)	heroin / cocaine / tobacco / nicotine	ignore alcohol / cigarettes / cannabis / caffeine / coffee	1
3(b)(ii)	alters body chemistry	ignore withdrawal symptoms / craving ignore non-chemical effects on nervous system	1
3(c)	any **two** from: • increase in cannabis smoking increases (%) depression • greater effect in women • depression linked with / not directly caused by cannabis • not all cannabis smokers get depression	 allow women become more depressed ignore cannabis causes depression	2
Total			**6**

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BLY1H

Question 4

question	answers	extra information	mark
4(a)	any **two** from • live inside / infect body cells • difficult for drugs to enter (body) cells / drug would kill (body) cell • antibiotics ineffective against viruses • viruses mutate **frequently**		2
4(b)(i)	420	correct answer with **or** without working if answer incorrect evidence of 'number of deaths' × 7 **or** 60 seen gains **1** mark ignore 6 000 000	2
4(b)(ii)	any **three** from: • virus / flu mutates • people no longer / not immune • white blood cells / memory cells / immune system do not recognise virus • relevant reference to antibodies / antigens • current vaccine ineffective **or** no vaccine available then **or** takes time to develop new vaccine • conditions less hygienic / lack of hygiene • people in poor health (following world wars)	 ignore resistance allow no tamiflu / anti-viral drugs allow people had 'weak' immune system	3
Total			**7**

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BLY1H

Question 5

question	answers	extra information	mark
5	any **four** from • mutation • produces longer snake **or** there is variation in snake length • longer snake less susceptible to toxin **or** longer snake survives • survivors reproduce • gene passed to next generation	do **not** accept 'had to mutate / decided to mutate' do **not** accept 'had to adapt and became longer' allow characteristic passed to next generation	4
Total			**4**

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BLY1H

Question 6

question	answers	extra information	mark
6(a)	any **three** from: • greenhouse gas • causes global warming / changes weather patterns • absorbs energy / infrared light / heat (radiated) from Earth • re-radiates (some) of this energy	ignore references to ozone layer accept absorbs radiation from Earth do **not** accept absorbs energy from Sun / sunlight allow reflects energy back to Earth	3
6(b)(i)	any **three** from: • remove gene • use of enzymes • from plant with high sugar production • insert gene into rye grass	ignore references to other methods eg tissue culture and embryo transplantation allow from bacteria	3
6(b)(ii)	any **two** from eg • concern about effect on (health) of cow • concern about effects on human (health) • concern about food chain effects **or** effects on ecosystem • effect on gene pool	ignore not natural **or** cost ignore ethical / religious arguments if no other marks awarded 'we don't know the long term effects' = 1 mark	2
Total			**8**

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BLY1H

Question 7

question	answers	extra information	mark
7(a)	any **three** from • FSH <u>used / given / injected</u> • LH <u>used / given / injected</u> • FSH causes eggs to mature • LH stimulates egg release	if oestrogen **or** progesterone <u>used</u> = max 2 if both oestrogen **and** progesterone <u>used</u> = max 1 ignore <u>effects</u> of oestrogen and progesterone	3

Question 7 continues on next page…

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BLY1H

Question 7 Continued

question	answers	extra information	mark
7(b)	max **two** pros for IVM / it from: • cheaper • less hormones used • ovarian hyperstimulation **or** the syndrome less likely • IVM treatment shorter	allow max **two** cons for IVF allow 'it's safer for the mother' ignore 'more risks' unqualified	2
	con for IVM • small risk of abnormal sex chromosomes / birth defects / baby cancer	allow max **one** pro for IVF allow 'more risk to baby' ignore 'more risks' unqualified	1
	evaluation eg IVM better because less risk to mother outweighs small risk to baby **or** IVF better because no risk to baby and a small risk to mother	must include an appreciation that there are two sides to the argument	1
Total			**7**

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Surname		Other Names	
Centre Number			Candidate Number				
Candidate Signature									

For Examiner's Use

General Certificate of Secondary Education
January 2009

SCIENCE B
Unit Biology B1

BLY1H

H

BIOLOGY
Unit Biology B1

Higher Tier

Monday 12 January 2009 9.00 am to 9.45 am

For this paper you must have:
- a ruler.

You may use a calculator.

Time allowed: 45 minutes

Instructions
- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Answers written in margins or on blank pages will not be marked.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information
- The maximum mark for this paper is 45.
- The marks for questions are shown in brackets.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.

Advice
- In all calculations, show clearly how you work out your answer.

For Examiner's Use			
Question	Mark	Question	Mark
1		5	
2		6	
3			
4			
Total (Column 1) →			
Total (Column 2) →			
TOTAL			
Examiner's Initials			

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Areas outside the box will not be scanned for marking

Answer **all** questions in the spaces provided.

1 The table gives information about the nutrients in a large cup of different hot drinks.

Drink	Kilojoules	Total fat in g	Saturated fat in g	Sodium equivalent in mg	Total carbohydrate in g	Sugars in g	Protein in g
Brewed coffee	28	0	0	0	1	0	0.3
White chocolate mocha with whole milk	1698	19.9	13.3	208	44	43	11.5
Cappuccino with skimmed milk	316	0	0	101	11	9	7.4
Café latte with whole milk	838	10.6	6.6	156	16	15	10.8
Café latte with skimmed milk	511	0	0	169	18	16	12.0
Americano	48	0	0	0	2	0	0.7

Use the information in the table to answer these questions.

1 (a) Which drink gives least energy?

.....

.....

(*1 mark*)

1 (b) What is the main difference between a café latte made with skimmed milk and a café latte made with whole milk?

.....

.....

(1 mark)

Areas outside the box will not be scanned for marking

1 (c) (i) Which is the most unhealthy drink?

.....

.....

(*1 mark*)

1 (c) (ii) Give **two** reasons for your answer.

1 .....

.....

.....

2 .....

.....

.....

(*2 marks*)

5

Turn over for the next question

Areas outside the box will not be scanned for marking

2 The MMR vaccine is used to protect children against measles, mumps and rubella.

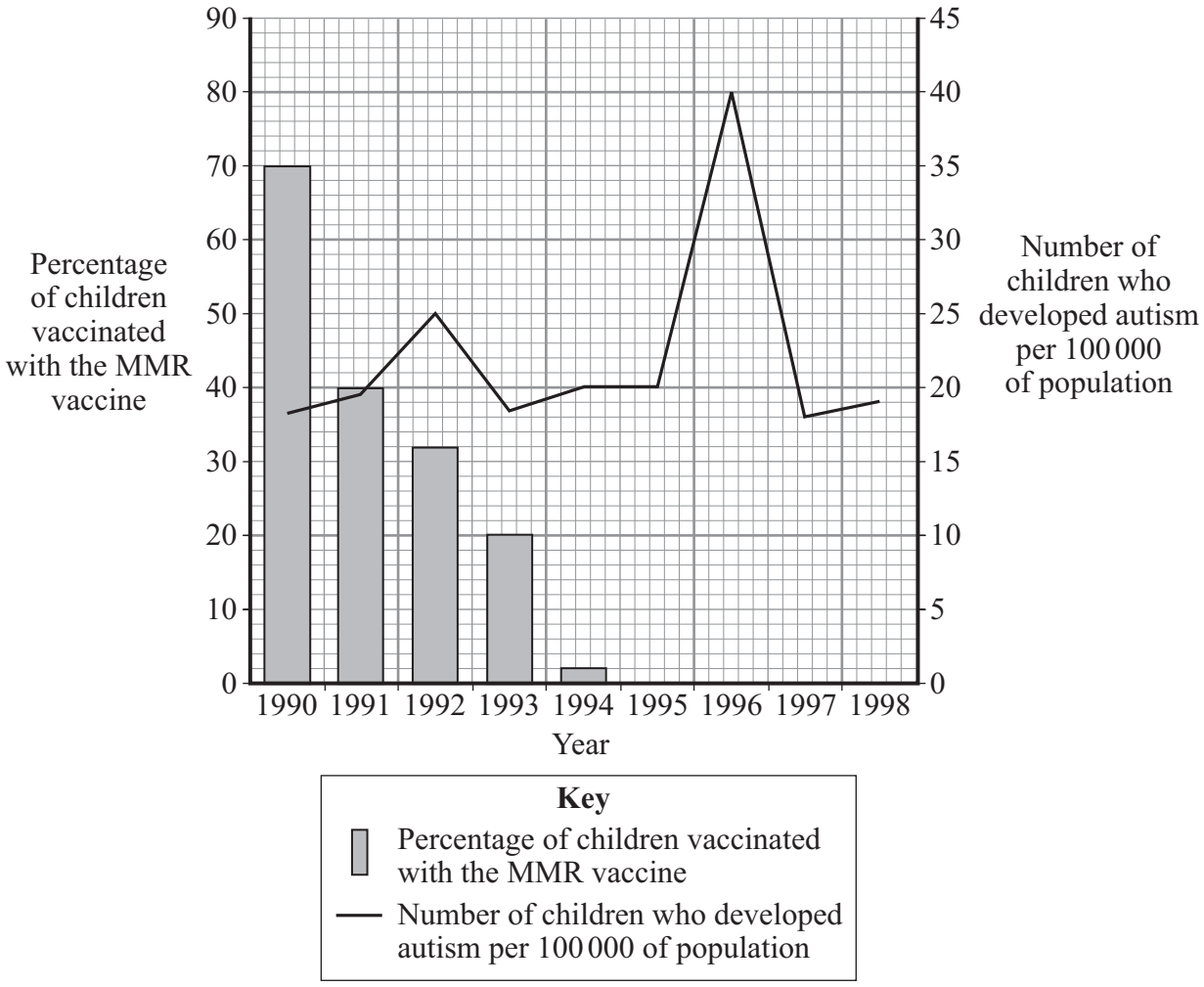
2 (a) Complete the sentences about vaccination.

Vaccines stimulate white blood cells to produce ..... .

This makes children ..... to the pathogen.
(2 marks)

2 (b) In the 1990s, many people thought that the MMR vaccine caused autism in some children. As a result, the Japanese government stopped using the MMR vaccine.

The graph gives information about the percentage of children in Japan vaccinated with the MMR vaccine and the number of children who developed autism during the 1990s.



Areas outside the box will not be scanned for marking

2 (b) (i) Describe how the percentage of children vaccinated with the MMR vaccine changed between 1990 and 1995.

.....

.....

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.....

(2 marks)

2 (b) (ii) Does the data in the graph support a link between MMR vaccination and autism?

Draw a ring around your answer. **Yes / No**

Explain the reason for your answer.

.....

.....

.....

.....

.....

(2 marks)

6

Turn over for the next question

Areas outside the box will not be scanned for marking

3 Nicotine is the addictive substance in tobacco.
People can be helped to stop smoking by giving them nicotine replacement therapy (NRT).

The table gives the results of trials of different types of NRT.

Type of NRT	Smokers given NRT		Smokers given placebo	
	Number of smokers in trial	Percentage of smokers who gave up smoking	Number of smokers in trial	Percentage of smokers who gave up smoking
Gum	7387	20	9319	12
Patch	7708	14	5969	8
Nasal spray	448	24	439	12
Inhaler	490	14	486	8
Tablet	243	20	245	13

3 (a) (i) What is a placebo?

.....

.....

(1 mark)

3 (a) (ii) Why was a placebo used in these NRT trials?

.....

.....

(1 mark)

3 (b) (i) In which trial was the data most reliable?

.....

(1 mark)

3 (b) (ii) Give the reason for your answer.

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(1 mark)

Areas outside the box will not be scanned for marking

3 (c) (i) Which type of NRT was most effective?

.....

(1 mark)

3 (c) (ii) Explain the reasons for your answer.

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(2 marks)

7

Turn over for the next question

Areas outside the box will not be scanned for marking

4 Reflex actions are rapid and automatic.

4 (a) Name the following structures in a reflex action.

4 (a) (i) The structure that detects the stimulus.

.....

(*1 mark*)

4 (a) (ii) The neurone that carries impulses to the central nervous system.

.....

(*1 mark*)

4 (a) (iii) The neurone that carries impulses away from the central nervous system.

.....

(*1 mark*)

4 (a) (iv) The structure that brings about the response.

.....

(*1 mark*)

4 (b) Describe what happens at a synapse when an impulse arrives.

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(2 marks)

Areas outside the box will not be scanned for marking

4 (c) Some people have a condition in which information from the skin does not reach the brain.

Explain why this is dangerous for the person.

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.....

(2 marks)

8

Turn over for the next question

Areas outside the box will not be scanned for marking

5 Global warming will affect living organisms.

5 (a) Explain, as fully as you can, how **agricultural** activities are contributing to global warming.

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(5 marks)

5 (b) Explain, as fully as you can, how natural selection leads to evolution.

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(3 marks)

Areas outside the box will not be scanned for marking

5 (c) Most penguins live in cold climates. The modern penguin best adapted for cold conditions is the emperor penguin.

Scientists have found fossils of a 'giant' penguin which they have called *Icadyptes*.

The diagram shows how the size of modern penguins compares with *Icadyptes*.

Diagram has not been reproduced due to third-party copyright constraints.

The scientists were surprised to discover that *Icadyptes* lived in warm seas at a time when the Earth's climate was much warmer than it is now.

Explain why the scientists were surprised that *Icadyptes* lived in warm seas.

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(2 marks)

10

Areas outside the box will not be scanned for marking

6 The use of cloned animals in food production is controversial.

It is now possible to clone 'champion' cows.
Champion cows produce large quantities of milk.

6 (a) Describe how adult cell cloning could be used to produce a clone of a 'champion' cow.

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(4 marks)

Areas outside the box will not be scanned for marking

6 (b) Read the passage about cloning cattle.

> The Government has been accused of 'inexcusable behaviour' because a calf of a cloned American 'champion' cow has been born on a British farm. Campaigners say it will undermine trust in British food because the cloned cow's milk could enter the human food chain.
>
> But supporters of cloning say that milk from clones and their offspring is as safe as the milk we drink every day.
>
> Those in favour of cloning say that an animal clone is a genetic copy. It is not the same as a genetically engineered animal. Opponents of cloning say that consumers will be uneasy about drinking milk from cloned animals.

Use the information in the passage and your own knowledge and understanding to evaluate whether the government should allow the production of milk from cloned 'champion' cows.

Remember to give a conclusion to your evaluation.

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(5 marks)

9

END OF QUESTIONS

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Version 1.0: 0109

ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Secondary Education

Science B 4462/ Biology 4411

BLY1H Unit Biology 1

Mark Scheme

2009 examination – January series

STEMUP.CO.UK

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

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Dr Michael Cresswell Director General

MARK SCHEME

Information to Examiners

1. General

The mark scheme for each question shows:

- the marks available for each part of the question
- the total marks available for the question
- the typical answer or answers which are expected
- extra information to help the Examiner make his or her judgement and help to delineate what is acceptable or not worthy of credit or, in discursive answers, to give an overview of the area in which a mark or marks may be awarded.

The extra information is aligned to the appropriate answer in the left-hand part of the mark scheme and should only be applied to that item in the mark scheme.

At the beginning of a part of a question a reminder may be given, for example:
where consequential marking needs to be considered in a calculation;
or the answer may be on the diagram or at a different place on the script.

In general the right hand side of the mark scheme is there to provide those extra details which confuse the main part of the mark scheme yet may be helpful in ensuring that marking is straightforward and consistent.

2. Emboldening

2.1 In a list of acceptable answers where more than one mark is available 'any **two** from' is used, with the number of marks emboldened. Each of the following lines is a potential mark.

2.2 A bold **and** is used to indicate that both parts of the answer are required to award the mark.

2.3 Alternative answers acceptable for a mark are indicated by the use of **or**. (Different terms in the mark scheme are shown by a / ; eg allow smooth / free movement.)

3. Marking points

3.1 Marking of lists

This applies to questions requiring a set number of responses, but for which candidates have provided extra responses. The general principle to be followed in such a situation is that 'right + wrong = wrong'.

Each error/contradiction negates each correct response. So, if the number of error/contradictions equals or exceeds the number of marks available for the question, no marks can be awarded.

However, responses considered to be neutral (indicated as * in example 1) are not penalised.

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Example 1: What is the pH of an acidic solution? (1 mark)

Candidate	Response	Marks awarded
1	4,8	0
2	green, 5	0
3	red*, 5	1
4	red*, 8	0

Example 2: Name two planets in the solar system. (2 marks)

Candidate	Response	Marks awarded
1	Pluto, Mars, Moon	1
2	Pluto, Sun, Mars, Moon	0

3.2 Use of chemical symbols / formulae

If a candidate writes a chemical symbol / formula instead of a required chemical name, full credit can be given if the symbol / formula is correct and if, in the context of the question, such action is appropriate.

3.3 Marking procedure for calculations

Full marks can be given for a correct numerical answer, as shown in the column 'answers', without any working shown.

However if the answer is incorrect, mark(s) can be gained by correct substitution / working and this is shown in the 'extra information' column;

3.4 Interpretation of 'it'

Answers using the word 'it' should be given credit only if it is clear that the 'it' refers to the correct subject.

3.5 Errors carried forward

Any error in the answers to a structured question should be penalised once only.

Papers should be constructed in such a way that the number of times errors can be carried forward are kept to a minimum. Allowances for errors carried forward are most likely to be restricted to calculation questions and should be shown by the abbreviation e.c.f. in the marking scheme.

3.6 Phonetic spelling

The phonetic spelling of correct scientific terminology should be credited **unless** there is a possible confusion with another technical term.

3.7 Brackets

(…..) are used to indicate information which is not essential for the mark to be awarded but is included to help the examiner identify the sense of the answer required.

COMPONENT NUMBER: BLY1H

COMPONENT NAME: Science B / Biology

STATUS: Final

DATE: January 2009

question	answers	extra information	mark
1(a)	brewed (coffee)	cancel if other coffees given	1
1(b)	less fat **or** less saturated fat **or** the amount of fat **or** fat levels **or** 0 / no fat **or** 0 / no saturated fat	it = latte with skimmed milk ignore less energy cancel if other nutrients given allow converse for latte with whole milk clearly identified eg 10.6 / 6.6	1
1(c)(i)	white chocolate mocha	apply list principle	1
1(c)(ii)	any **two** from: • high / most fat • high / most saturated fat • high / most energy • high / most sodium / salt • high / most sugar • leads to obesity / heart disease / high cholesterol / diabetes / arthritis / high blood pressure	allow 'too much' for high	2
Total			**5**

COMPONENT NUMBER: BLY1H

COMPONENT NAME: Science B / Biology

STATUS: Final

DATE: January 2009

question	answers	extra information	mark
2(a)	antibodies	allow antitoxins / memory cells do **not** allow antigens	1
	immune	ignore protection allow resistant	1
2(b)(i)	fell		1
	numerical qualification to zero / nothing / by 100%	allow stopped in 1995	1
2(b)(ii)	(no) % vaccination fell **or** when no vaccination	ignore circle	1
	but autism numbers did not fall / stayed high / increased **or** '(yes) might support it if time lag between vaccination and autism symptoms' / 'time lag for diagnosis' (1) 6 year time lag quantified (1)		1
Total			**6**

COMPONENT NUMBER: BLY1H

COMPONENT NAME: Science B / Biology

STATUS: Final

DATE: January 2009

question	answers	extra information	mark
3(a)(i)	does not contain drug / chemical	allow eg fake / sugar pill / dummy drug ignore control	1
3(a)(ii)	as control **or** to see if the effects are psychological **or** allows blind testing	allow 'to compare (with NRT)' ignore fair test	1
3(b)(i)	gum	allow gum placebo allow placebo	1
3(b)(ii)	high / highest number of participants / people **or** correct number given ie gum 16706, gum placebo 9319, placebo 16458		1
3(c)(i)	nasal spray		1
3(c)(ii)	highest <u>percentage</u> of people stopped / 24% stopped biggest difference between treatment and placebo	 allow 'highest by 4%' for **2** marks	1 1
Total			**7**

COMPONENT NUMBER: BLY1H

COMPONENT NAME: Science B / Biology

STATUS: Final

DATE: January 2009

question	answers	extra information	mark
4(a)(i)	receptor	allow named receptor eg light receptor ignore sensory neurone allow sense organ / named sensory organ eg skin / eye	1
4(a)(ii)	sensory (neurone)	allow afferent	1
4(a)(iii)	motor (neurone)	allow efferent	1
4(a)(iv)	effector / muscle / gland / named		1
4(b)	any **two** from: • impulse / information passes from one neurone to another **or** impulse / information passes across gap • chemical / transmitter involved • diffusion (across gap)		2
4(c)	brain / person not aware of pain / stimulus / can't feel possibility of (permanent / serious) damage / eg burning	allow brain/ person doesn't know / realise / unable to coordinate ignore reflex ignore information ignore danger	1 1
Total			**8**

COMPONENT NUMBER: BLY1H

COMPONENT NAME: Science B / Biology

STATUS: Final

DATE: January 2009

question	answers	extra information	mark
5(a)	any **five** from: • methane produced • by cattle • by rice • (more) greenhouse gas • CO_2 from tractors / machinery / food transport / fertiliser production • deforestation releases CO_2 • via decomposition / burning / less photosynthesis / reduced carbon sink • absorbs / reflects energy radiated from earth • energy / heat re-radiated back to earth	} must be linked to methane ignore CO_2 from animals ignore heat trapped	5
5(b)	variation / mutation individuals with characteristics most suited to environment survive genes passed to next generation **or** these individuals reproduce	allow survival of the fittest	1 1 1

Question 5 continued on next page…

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COMPONENT NUMBER: BLY1H

COMPONENT NAME: Science B / Biology

STATUS: Final

DATE: January 2009

Question 5 continued…

question	answers	extra information	mark
5(c)	any **two** from: • similar in size to Emperor penguin **or** bigger than all penguins • large size is adaptation to cold climate • since less heat loss per unit of body volume **or** smaller surface area / volume ratio		2
Total			**10**

COMPONENT NUMBER: BLY1H

COMPONENT NAME: Science B / Biology

STATUS: Final

DATE: January 2009

question	answers	extra information	mark
6(a)	any **four** from: • nucleus / DNA / chromosomes / genetic material removed (from egg) • from (unfertilised) egg / ovum • nucleus from body cell of champion (cow) • inserted into egg / ovum • electric shock • to make cell divide **or** develop into embryo • (embryo) inserted into womb / host / another cow	linked to second point allow 'empty egg cell' for first **two** marks do **not** allow fertilised egg allow egg from champion cow allow this point if wrong method eg embryo splitting	4

Question 6 continued on next page…

COMPONENT NUMBER: BLY1H

COMPONENT NAME: Science B / Biology

STATUS: Final

DATE: January 2009

Question 6 continued…

question	answers	extra information	mark
6(b)	any **four** from: Pros: • economic benefit eg increased yield / more profit • clone calf not genetically engineered • genetic material not altered • milk safe to drink / same as ordinary milk Cons: • consumer resistance • caused by misunderstanding process • not proved that milk is safe • ethical / religious argument • reduce gene pool / eg Conclusion: sensible conclusion for or against, substantiated by information from the passage and / or own knowledge	max **3** marks max **3** marks ignore 'God would not like it' **or** 'it's not natural' conclusion at end	4 1
Total			**9**