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
Foundation Tier
June 2012

Science A

Unit Biology B1

BL1FP

F

Biology

Unit Biology B1

Tuesday 12 June 2012 9.00 am to 10.00 am

For this paper you must have:
- a ruler.

You may use a calculator.

Time allowed
- 1 hour

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 60.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.
- Question 8 should be answered in continuous prose. In this question you will be marked on your ability to:
  – use good English
  – organise information clearly
  – use specialist vocabulary where appropriate.

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

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

1 The nervous system allows humans to react to their surroundings.

1 (a) Sense organs have receptors. Receptors detect *changes in the environment*.

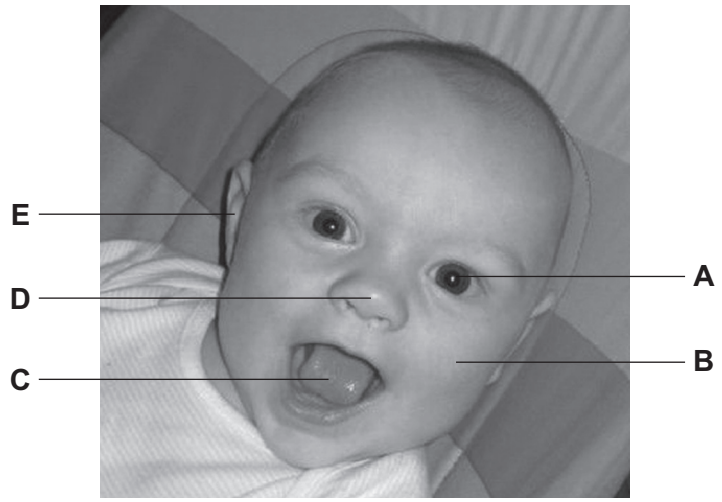
Which word describes *a change in the environment*?

Draw a ring around **one** answer.

an effector **a neurone** **a stimulus**

(1 mark)

1 (b) The photograph shows a baby.
Labels **A**, **B**, **C**, **D** and **E** show some of the baby's sense organs.



Answer each question by writing **one** letter, **A**, **B**, **C**, **D** or **E**, in each box.

1 (b) (i) Which sense organ has receptors sensitive to light? ☐

(1 mark)

1 (b) (ii) Which **two** sense organs have receptors sensitive to chemicals?

☐ and ☐

(2 marks)

1 (b) (iii) Which sense organ has receptors sensitive to changes in the baby's position? ☐

(1 mark)

1 (c) Information from sense organ **A** is passed along nerve cells.
The information is coordinated to produce a response.

Which organ in the body coordinates the information?

.....

(1 mark)

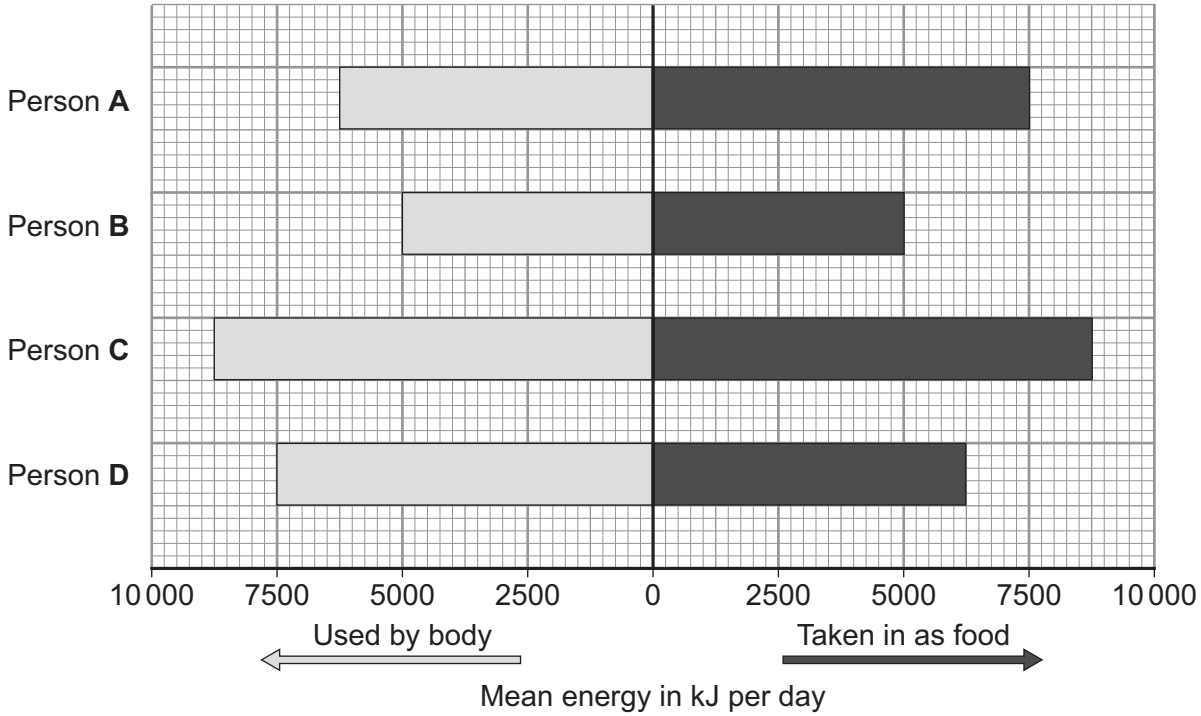
6

Turn over for the next question

2 Scientists measured the amount of energy used by four people, **A**, **B**, **C** and **D**.

The scientists also measured the amount of energy taken in as food by each person.

The chart shows the scientists' results.



2 (a) (i) What was the mean amount of energy used by **D**?

..... kJ per day
(1 mark)

2 (a) (ii) The amount of energy used by **D** is different from the amounts of energy used by **A**, **B** and **C**.

Suggest **two** reasons why.

.....

.....

.....

.....
(2 marks)

2 (b) The data in the bar chart was collected over twelve months.

Which person, **A**, **B**, **C** or **D**, would gain body mass over the twelve months? ☐

Give a reason for your answer.

.....

.....

.....

.....

(2 marks)

2 (c) In the UK many people are obese.
Doctors advise obese people to lose mass.

Suggest **two** different ways an obese person could lose mass.

.....

.....

.....

.....

(2 marks)

7

Turn over for the next question

3 Green plants are found at the start of all food chains.

3 (a) Complete the sentences.

3 (a) (i) The source of energy for green plants is radiation from the ..... .

(1 mark)

3 (a) (ii) Green plants absorb some of the light energy that reaches them for a process called ..... .

(1 mark)

3 (b) Draw a ring around the correct answer to complete each sentence.

3 (b) (i) This process transfers light energy into

chemical
sound
electrical

energy.

(1 mark)

3 (b) (ii) The process uses the gas

carbon dioxide.
oxygen.
water.

(1 mark)

3 (b) (iii) The process produces carbon-containing compounds called

carbohydrates.
minerals.
salts.

(1 mark)

3 (c) The amount of living material (biomass) at each stage in a food chain is less than at the previous stage.

The diagram shows a food chain.

oak tree ⟶ **caterpillar** ⟶ **blue-tit** ⟶ **hawk**

Give **two** ways in which biomass is lost in this food chain.

Tick (✓) **two** boxes.

As carbon dioxide from the caterpillar ☐

As food eaten by the hawk ☐

As oxygen from the oak tree ☐

As faeces (droppings) from the blue-tit ☐

(2 marks)

7

Turn over for the next question

4 When animals die, they usually fall to the ground and decay.
In 1977 the body of a baby mammoth was discovered.
The baby mammoth died 40 000 years ago and its body froze in ice.

The picture shows the mammoth.

4 (a) Explain why the body of the baby mammoth did **not** decay.

.....

.....

.....

.....

(2 marks)

4 (b) Mammoths are closely related to modern elephants.
The pictures show these two animals.

What scientists think a mammoth looked like

Modern elephant

Mammoths are *extinct*. What does *extinct* mean?

.....

.....

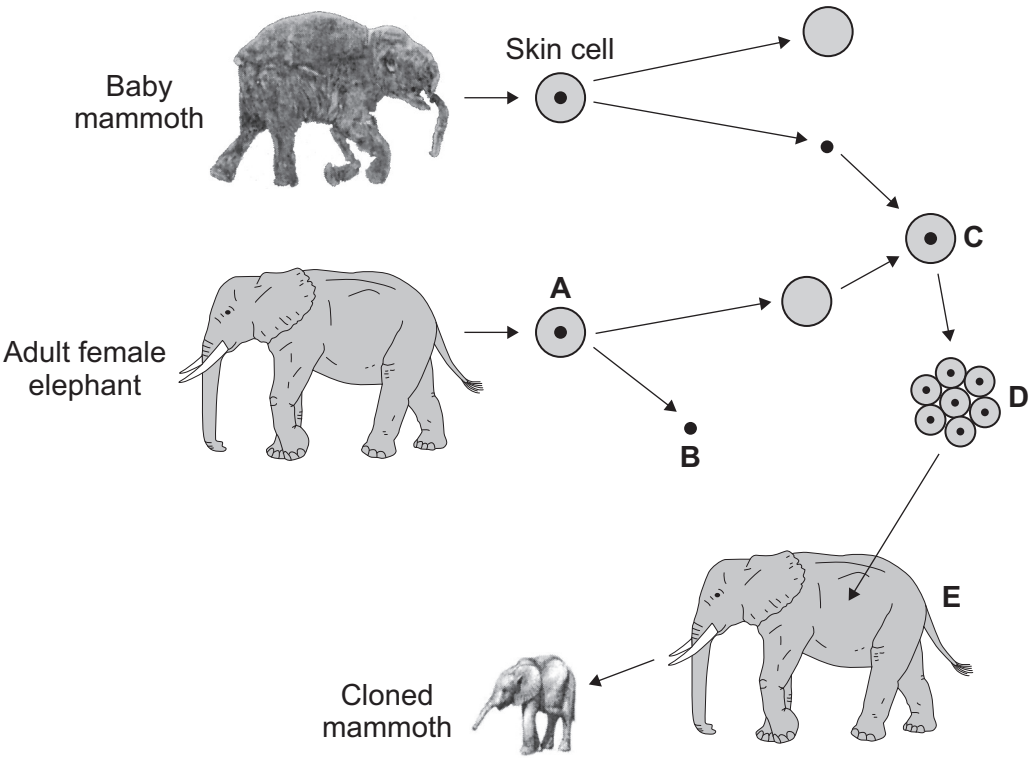
(1 mark)

Question 4 continues on the next page

4 (c) Scientists believe they may be able to use adult cell cloning to recreate a living mammoth.

The scientists will use a skin cell from the baby mammoth.

The diagrams show how the skin cell will be used.



In each question, draw a ring around the correct answer.

4 (c) (i) What type of cell is cell **A**?

skin cell **egg cell** **sperm cell**

(1 mark)

4 (c) (ii) Part **B** is removed from cell **A**.

What part of the cell is part **B**?

nucleus **cytoplasm** **cell membrane**

(1 mark)

4 (c) (iii) After cell **C** is formed, it divides into embryo cells.

What is done to cell **C** to make it divide?

Cell **C** is

- treated with enzymes.
- mixed with sperm cells.
- given an electric shock.

(1 mark)

4 (c) (iv) The embryo cells form a ball of cells. The ball of cells will be put into female elephant, **E**.

Which part of elephant **E** is the ball of cells put into?

womb **stomach** **ovary**

(1 mark)

4 (d) The scientists expect any offspring of the adult cell cloning to look like a mammoth and **not** like an elephant.

Why?

.....

.....

(1 mark)

8

Turn over for the next question

5 Thalidomide is a drug that was developed in the 1950s.
In the 1950s some pregnant women took thalidomide to prevent morning sickness during pregnancy.

Today, thalidomide is **not** used to prevent morning sickness.

5 (a) (i) Give **one** medical use of thalidomide, today.

.....

.....

(1 mark)

5 (a) (ii) Today, before a woman is given thalidomide, she is

- checked to see if she is pregnant
- told to use two different methods of contraception at the same time.

Give the reason why:

the woman is checked to see if she is pregnant

.....

.....

the woman is told to use two different methods of contraception at the same time

.....

.....

(2 marks)

5 (b) The information is about two types of contraceptive pill used by women.

Combined pill
- contains two hormones
- is taken for 21 days, then no pills are taken for 7 days
- > 99 % effective at preventing pregnancy
- increases chance of headaches
- increases chance of breast cancer
- decreases chance of cancer of the ovary

Mini-pill
- contains one hormone
- must be taken at the same time every day
- < 99 % effective at preventing pregnancy
- increases chance of breast cancer

5 (b) (i) Which **two** hormones does the combined pill contain?

Draw a ring around **two** answers.

LH **oestrogen** **progesterone** **FSH**

(2 marks)

5 (b) (ii) Give **two** advantages of taking the combined pill and **not** the mini-pill.

.....

.....

.....

.....

(2 marks)

5 (b) (iii) Give **one** advantage of taking the mini-pill and **not** the combined pill.

.....

.....

(1 mark)

8

Turn over for the next question

6 Insecticides are chemicals which kill insects.
Insecticides may be sprayed onto crops to increase crop yield.

6 (a) Killing insects on crops increases crop yield.

Suggest why.

.....

.....

(1 mark)

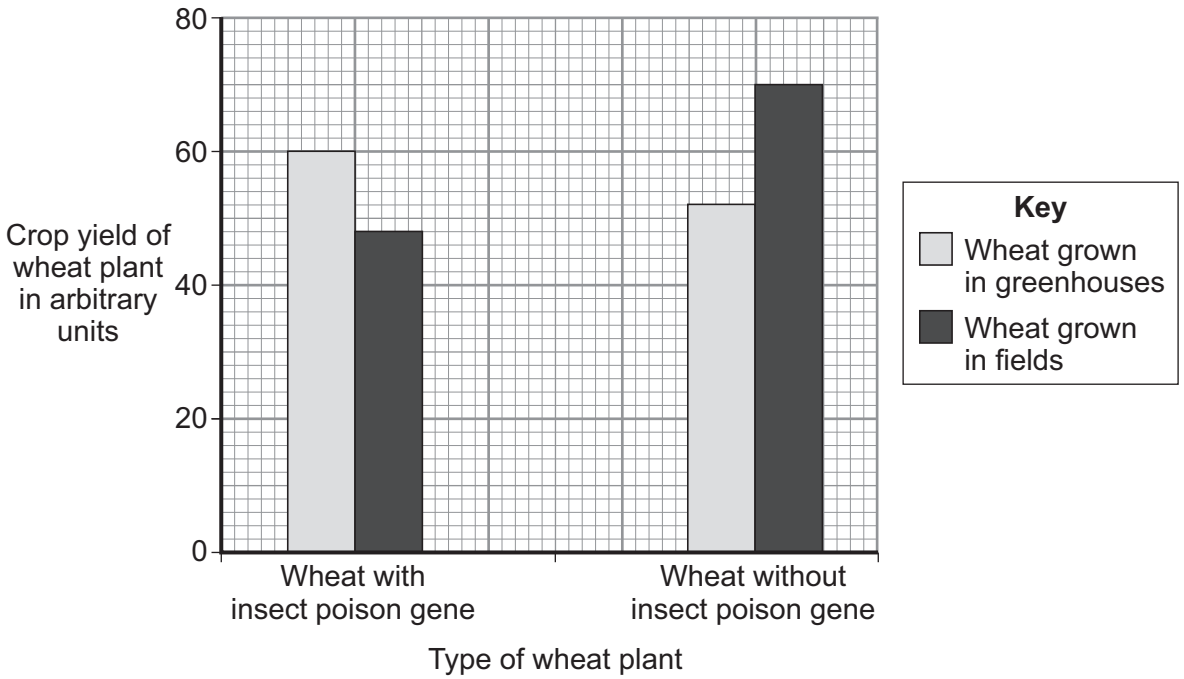
6 (b) A microorganism contains a gene which causes the production of an insect poison.

Scientists transferred the gene for production of the insect poison into wheat plants.
This makes genetically modified (GM) wheat.

The scientists:

- grew wheat plants with the insect poison gene in fields and in greenhouses
- grew wheat plants without the insect poison gene in fields and in greenhouses
- measured the crop yield of the wheat plants.

The bar chart shows the results.



6 (b) (i) What was the yield of the wheat with the insect poison gene grown in greenhouses?

..... arbitrary units
(1 mark)

6 (b) (ii) The yield from wheat without the insect poison gene grown in greenhouses was different from the yield you gave in **(b)(i)**.

Describe this difference in yield.

.....

.....

.....

.....

(2 marks)

6 (b) (iii) Look again at the bar chart.

What advice would you give to a farmer about the type of wheat to grow in fields?

Give a reason for your answer.

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(2 marks)

6 (c) Some people are concerned about the use of GM crops.

Why?

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(2 marks)

8

7 Scientists at a drug company developed a new pain-killing drug, drug **X**.

7 (a) Painkillers do **not** cure infectious diseases.

Why?

.....

(1 mark)

7 (b) The scientists compared drug **X** with two other pain-killing drugs, drug **A** and drug **B**. In their investigation the scientists:

- chose 600 volunteers. The volunteers were all in pain
- gave 200 of the volunteers a standard dose of drug **A**
- gave 200 of the volunteers a standard dose of drug **B**
- gave 200 of the volunteers a standard dose of drug **X**.

Over the next seven hours the volunteers recorded how much pain they felt.

To get valid results the three groups of volunteers should be matched for as many factors as possible.

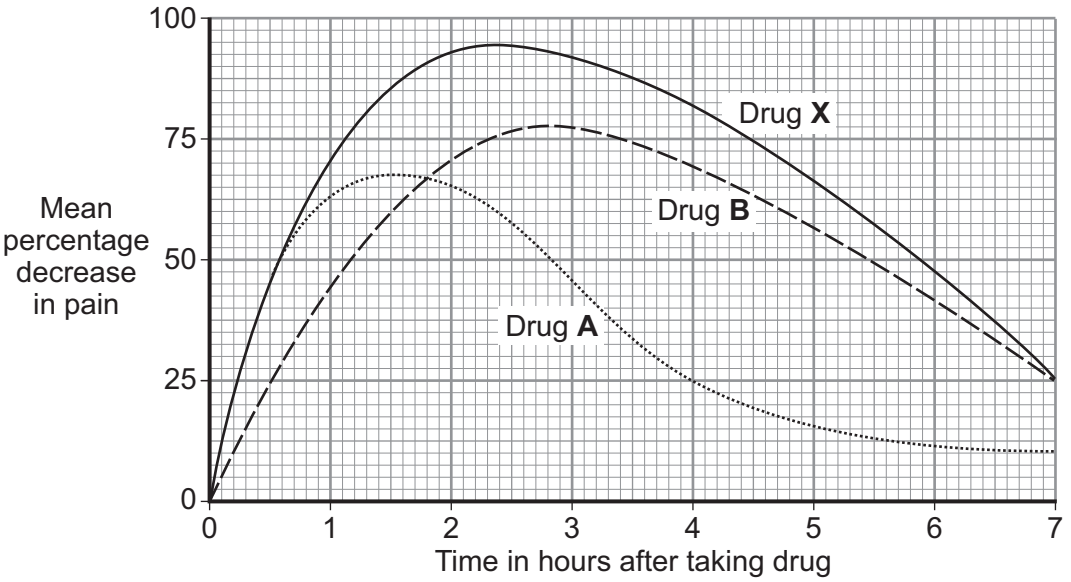
Suggest **two** of the factors that should be matched.

.....

.....

(2 marks)

7 (c) The graph shows the results of the investigation.



7 (c) (i) How much pain did the volunteers still feel, four hours after taking drug **A**?

..... percent
(1 mark)

7 (c) (ii) Give **one** advantage of taking drug **A** and **not** drug **B**.

.....

.....
(1 mark)

7 (c) (iii) Give **two** advantages of taking drug **B** and **not** drug **A**.

.....

.....

.....

.....
(2 marks)

7 (d) Drug **X** is much more expensive than both drug **A** and drug **B**.

A pharmacist advised a customer that it would be just as good to take drug **A** and drug **B** together instead of drug **X**.

Do you agree with the pharmacist's advice?

Give reasons for your answer.

.....

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(3 marks)

10

8 *In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate*.

Plants and animals have become adapted in many different ways to reduce the risk of being eaten by predators.

Describe these adaptations.

Give examples of animals and plants adapted in the ways you describe.

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(6 marks)

6

END OF QUESTIONS

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