Centre Number						Candidate Number				
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Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
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9	
TOTAL	

General Certificate of Secondary Education
Higher Tier
January 2012

Science B
Unit Biology B1

BLY1H

H

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
- 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.

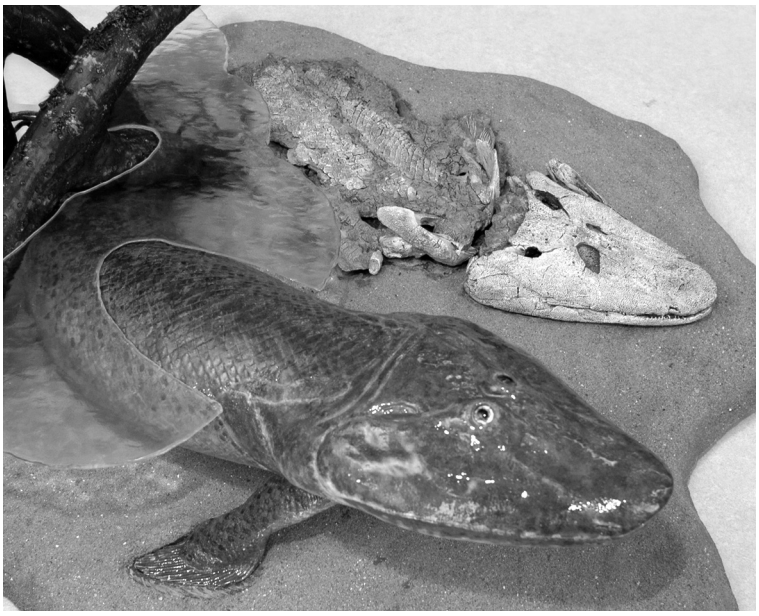
Information
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 45.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.

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

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

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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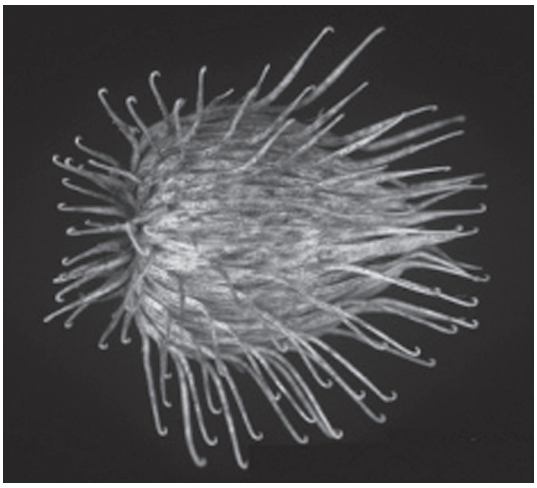
(2 marks)

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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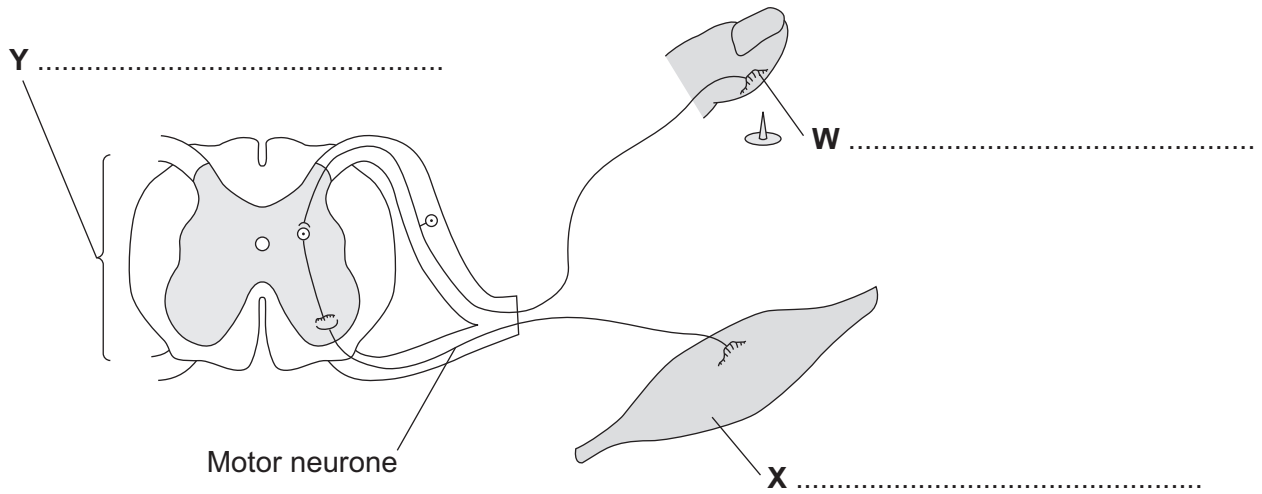
(2 marks)

4

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

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

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 .....

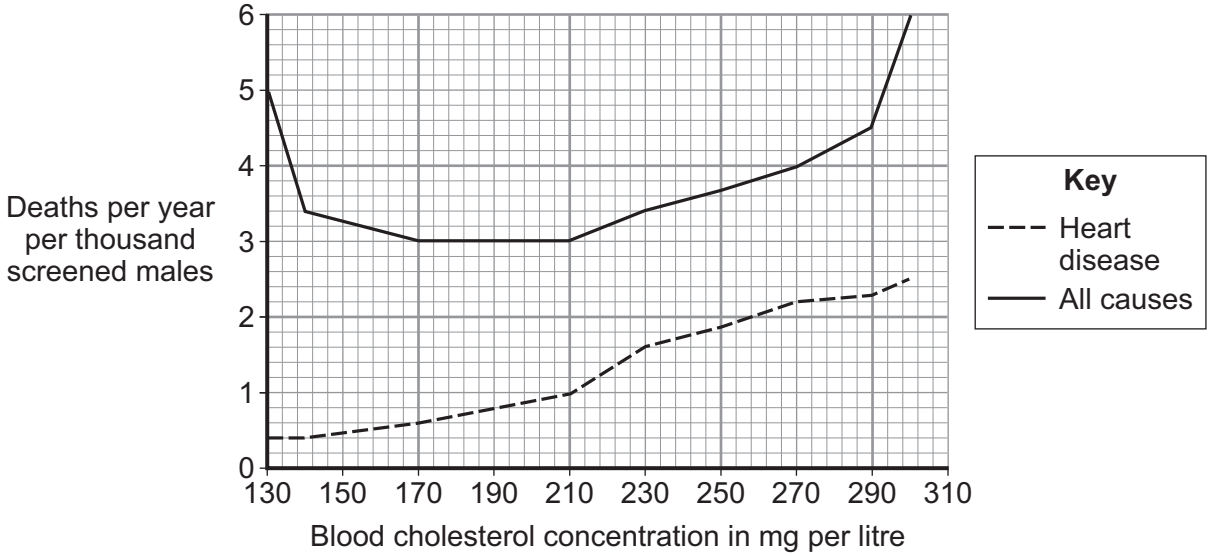
2 .....

(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

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?

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(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

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

How does sexual reproduction produce variation?

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(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.

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(3 marks)

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

Suggest **one** reason why.

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(1 mark)

6

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?

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.....

(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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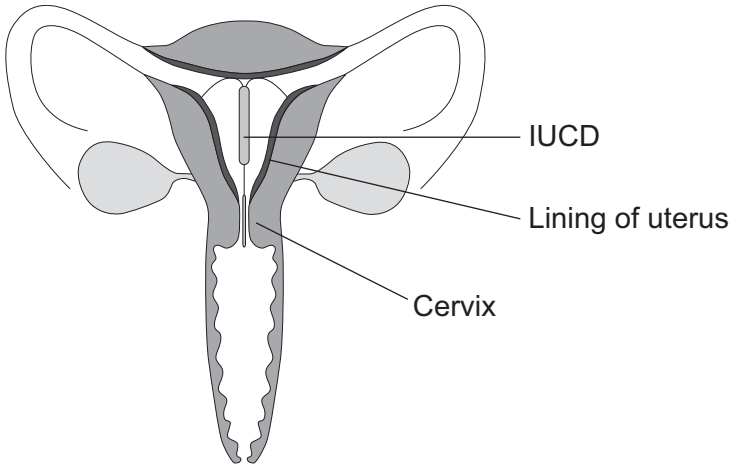
(2 marks)

7

Turn over ▶

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.

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

There are no questions printed on this page

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