Write your name here

Surname	Other names

Pearson Edexcel GCSE

Centre Number | | | | | |

Candidate Number | | | | |

Biology

Unit B3: Using Biology

Foundation Tier

Monday 15 June 2015 – Morning
Time: 1 hour

Paper Reference
5BI3F/01

You must have:
Calculator, ruler

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*

Information

- The total mark for this paper is 60.
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed
  – *you should take particular care with your spelling, punctuation and grammar, as well as the clarity of expression, on these questions.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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P 4 4 6 7 6 A 0 1 1 6

PEARSON

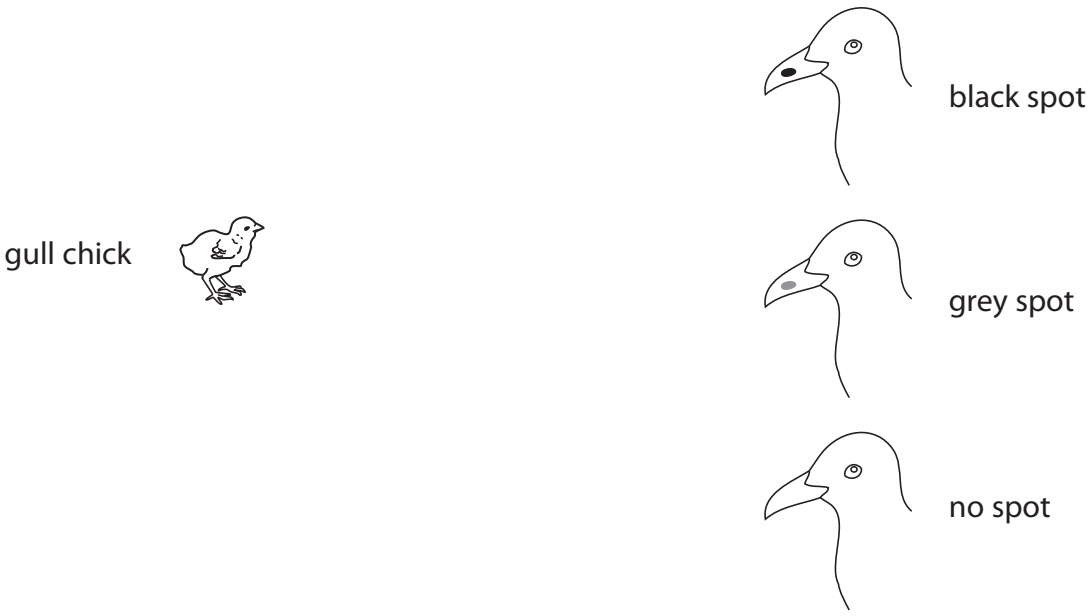
Answer ALL questions

Some questions must be answered with a cross in a box ☒.
If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

Animal behaviour

1 A scientist investigated the behaviour of a newly-hatched gull chick.

She painted a coloured spot on the beaks of plastic adult gulls, as shown in the diagram.



She observed how many times the chick pecked at the spot on each beak.

The results were recorded in a tally chart.

	number of pecks	
spot colour	**tally**	**total**
black	𝍸 𝍸 ||||	14
grey	𝍸 ||	
no spot	|||	3

(a) (i) State the number of pecks at the grey spot.

(1)

..... pecks

(ii) Describe the effect of spot colour on the behaviour of the gull chick.

(2)

(iii) Complete the sentence by putting a cross (☒) in the box next to your answer.

The type of behaviour shown by the gull chick is

(1)

- ☒ **A** conditioning
- ☒ **B** courtship
- ☒ **C** innate
- ☒ **D** imprinting

(iv) Live adult gulls have a red spot on their beaks.

The investigation was repeated but an additional plastic gull was included. This gull had a red spot painted on its beak.

Suggest how this might affect the results of the investigation.

(1)

(b) In some seaside towns adult gulls are becoming a problem because they steal food from people on the beach.

Suggest why adult gulls are showing this behaviour.

(2)

(Total for Question 1 = 7 marks)

Microorganisms and food

2 The photograph shows a potato with powdery scab disease.

This disease causes damage to the potato skin.

In an investigation, equal numbers of two varieties of potato were planted in a field.

The potato plants were harvested and checked for the disease.

The results are shown in the table.

potato variety	number of potatoes harvested	number of potatoes affected by powdery scab disease	percentage affected by powdery scab disease (%)
Charlotte	200	2	1
Pentland Javelin	350	140	

(a) (i) Calculate the percentage of Pentland Javelin potatoes affected by powdery scab disease.

(2)

..... %

(ii) Using the information in the table, suggest a reason why a farmer would grow Charlotte potatoes.

(1)

.....

.....

(iii) Using the information in the table, suggest a reason why a farmer would grow Pentland Javelin potatoes.

(1)

.....

.....

.....

(b) Complete the sentence by putting a cross (☒) in the box next to your answer.

Microorganisms that cause diseases such as powdery scab are known as

(1)

☒ **A** antibodies

☒ **B** antigens

☒ **C** lymphocytes

☒ **D** pathogens

(c) Suggest **one** reason for the difference in the number of potatoes affected by powdery scab disease.

(1)

.....

.....

(d) Powdery scab disease is caused by a fungus.

The fungus *Fusarium* is used to produce mycoprotein.

Explain **one** advantage of using mycoprotein as a food source.

(2)

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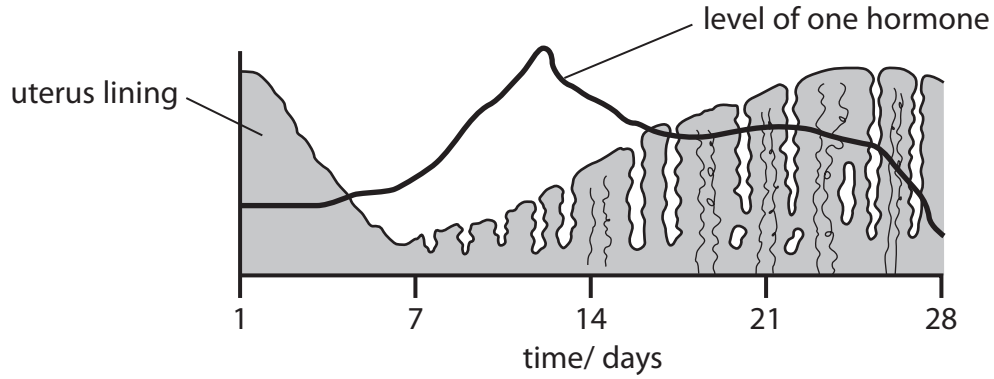
(Total for Question 2 = 8 marks)

3 (a) The diagram shows changes in the thickness of the uterus lining during one menstrual cycle and the level of one hormone involved.



(i) Complete the sentence by putting a cross (☒) in the box next to your answer.

This hormone causes the uterus lining to thicken.

This hormone is

(1)

☒ **A** chymosin

☒ **B** oestrogen

☒ **C** progesterone

☒ **D** sucrase

(ii) Complete the sentence by putting a cross (☒) in the box next to your answer.

In this menstrual cycle ovulation is most likely to occur on

(1)

☒ **A** day 1

☒ **B** day 7

☒ **C** day 14

☒ **D** day 21

(b) During ovulation an egg is released.

Explain the changes to an egg immediately after a sperm enters it.

(2)

(c) A sperm has a tail for motility.

Explain **one** other feature of a sperm cell.

(2)

(d) The kidneys and bladder are part of the human urinary system.

(i) Kidneys remove waste products, including urea, from the body.

Use words from the box to complete the sentences.

(3)

collecting duct	fats	sugars	glomerulus
liver	amino acids	urethra	

Urea is produced in the ..... .

Urea is produced when excess ..... are broken down.

Urea travels to the kidney and is filtered from the blood in the ..... .

(ii) Glucose is filtered from the blood but is not normally present in urine.

Explain what happens in the nephron to make sure that glucose is not present in urine.

(2)

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(Total for Question 3 = 11 marks)

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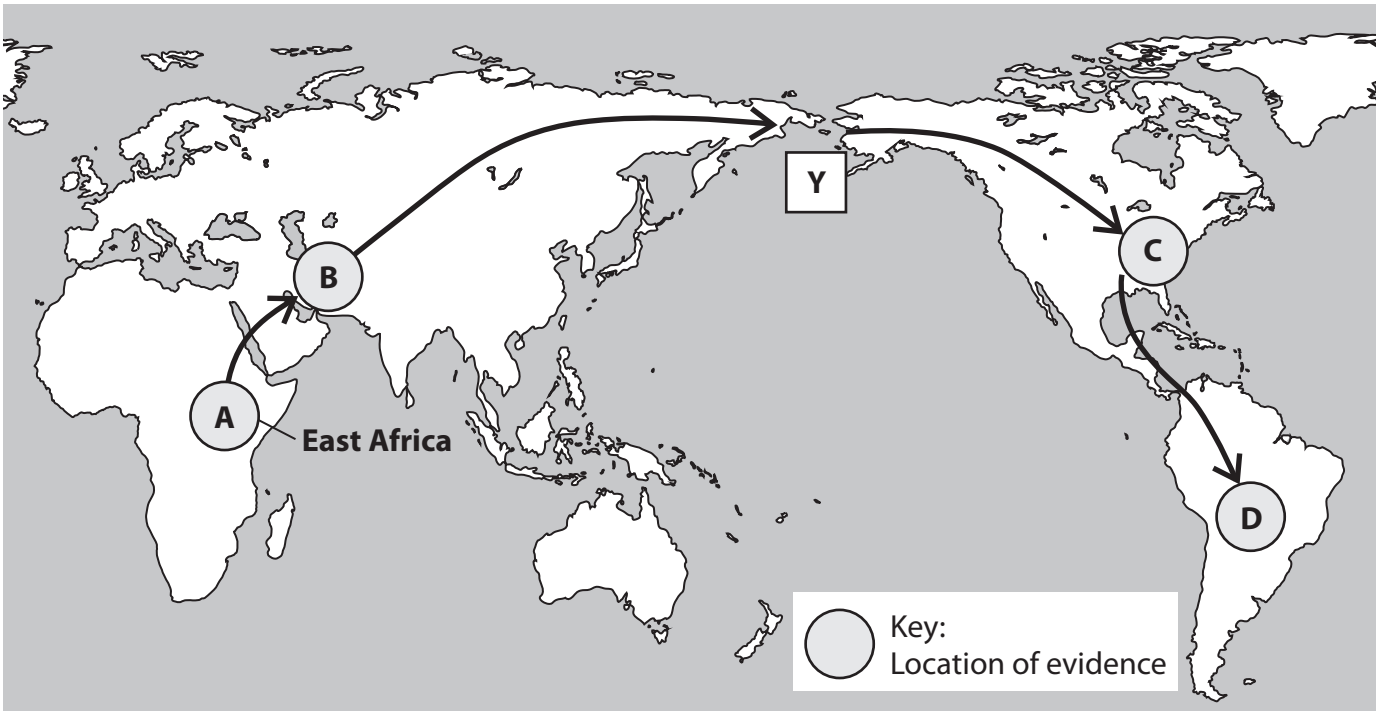
Question 4 is on the next page.

Human evolution

4 Human ancestors are thought to have originated in East Africa.

The 'Out of Africa' theory suggests that human migration followed the route shown on the map.

Evidence for this theory has been found along the route.



The evidence from the four locations is shown in the table.

evidence		approximate age/ years
arrow head		15 000
flake tool		20 000
jaw bone		50 000
hand axe		190 000

(a) Complete the sentence by putting a cross (☒) in the box next to your answer.

The hand axe, shown in the table, is most likely to have been found at location

(1)

☒ **A**

☒ **B**

☒ **C**

☒ **D**

(b) Describe how the ages of the stone tools could be estimated.

(2)

.....

.....

.....

.....

(c) Use words from the box to complete the sentences.

(2)

Ardi	billion	Leakey
million	Lucy	thousand

Some of the earliest human-like remains are estimated to be about

4.4 ..... years old. These fossils were named ..... .

(d) Suggest how climate change may have helped early humans cross the Bering Sea at point **Y** on the map.

(3)

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(e) Early humans developed methods of communication.

State **two** ways in which early humans communicated.

(2)

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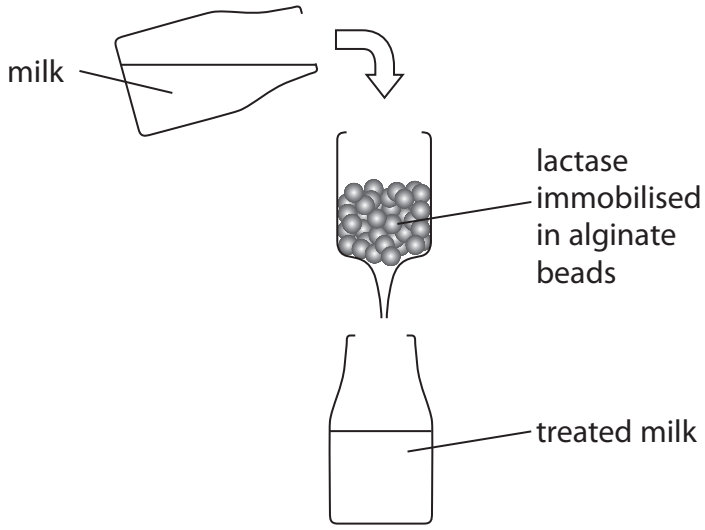
(Total for Question 4 = 10 marks)

Food production

5 The diagram shows how milk can be treated using the enzyme lactase.



(a) (i) Explain why milk is treated with lactase.

(2)

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(ii) The lactase enzyme stays in the alginate beads.

Suggest why this is an advantage.

(2)

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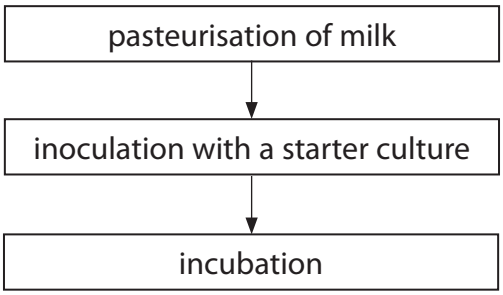
(b) Invertase is another enzyme used in food production.

Describe the use of invertase in the production of sweets.

(2)

*(c) The diagram shows some of the stages in the production of yogurt.



Describe these stages in the production of yogurt.

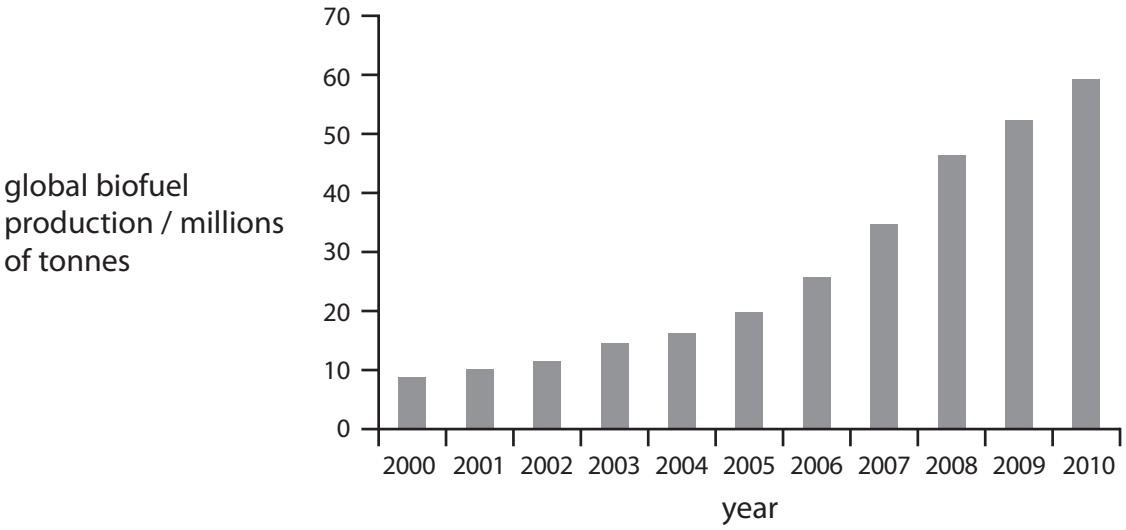
In your answer include references to microorganisms.

(6)

(Total for Question 5 = 12 marks)

Global population

6 The graph shows the global production of biofuel from 2000 to 2010.



(a) (i) Complete the sentence by putting a cross (☒) in the box next to your answer.

An example of a biofuel is

(1)

☒ **A** ethanol

☒ **B** flavonoid

☒ **C** resazurin

☒ **D** urea

(ii) Describe **two** advantages of using biofuel instead of fossil fuels.

(2)

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(b) Explain how an increasing human population has led to problems in food supply in some areas of the world.

(3)

*(c) Explain how the development of new plant varieties, the genetic modification of plants and the successful management of pests can be used to increase food production.

(6)

(Total for Question 6 = 12 marks)

TOTAL FOR PAPER = 60 MARKS