Write your name here

Surname	Other names

Centre Number | Candidate Number

Edexcel GCSE

Biology

Unit B3: Using Biology

Foundation Tier

Monday 20 May 2013 – Afternoon
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 ▶

P41934A

1/1/1/1/

P 4 1 9 3 4 A 0 1 2 0

PEARSON

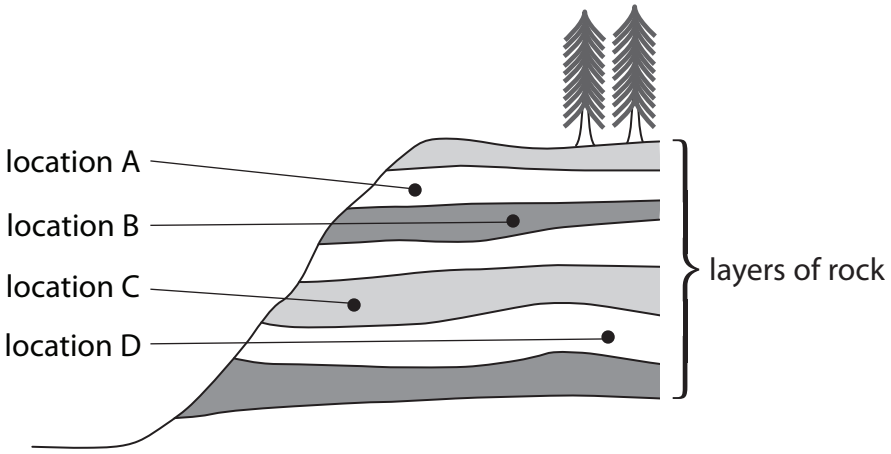
Answer ALL questions

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 ☒.

Human Evolution

1 Stone tools found in layers of rock can show evidence for human evolution.

The diagram shows four locations, A, B, C and D, where stone tools were found.



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

The oldest tools were most likely to be found at

(1)

☒ **A** location A

☒ **B** location B

☒ **C** location C

☒ **D** location D

(ii) Suggest **two** possible ways in which stone tools were used.

(2)

1 .....

.....

2 .....

.....

(b) The table gives information about some stages of human evolution.

	Australopithecus afarensis	***Homo habilis***	***Homo erectus***	***Homo sapiens***
				
lived between / millions of years ago	3.6 – 2.8	2.4 – 1.4	1.8 – 0.5	0.2 – to present day
average adult male height / m	1.5	1.2	1.6	1.8
average brain size / cm^3	400	650	1040	1350

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

The species which lived 2.1 million years ago is

(1)

☒ **A** *Australopithecus afarensis*

☒ **B** *Homo erectus*

☒ **C** *Homo habilis*

☒ **D** *Homo sapiens*

(ii) Using the information in the table, describe the changes in body structure that have occurred during human evolution.

(2)

.....

.....

.....

.....

(iii) A fossil bone from a different early human, *Australopithecus africanus*, was dated to be 2.5 million years old.

Using the information in the table, suggest the brain size of *Australopithecus africanus*.

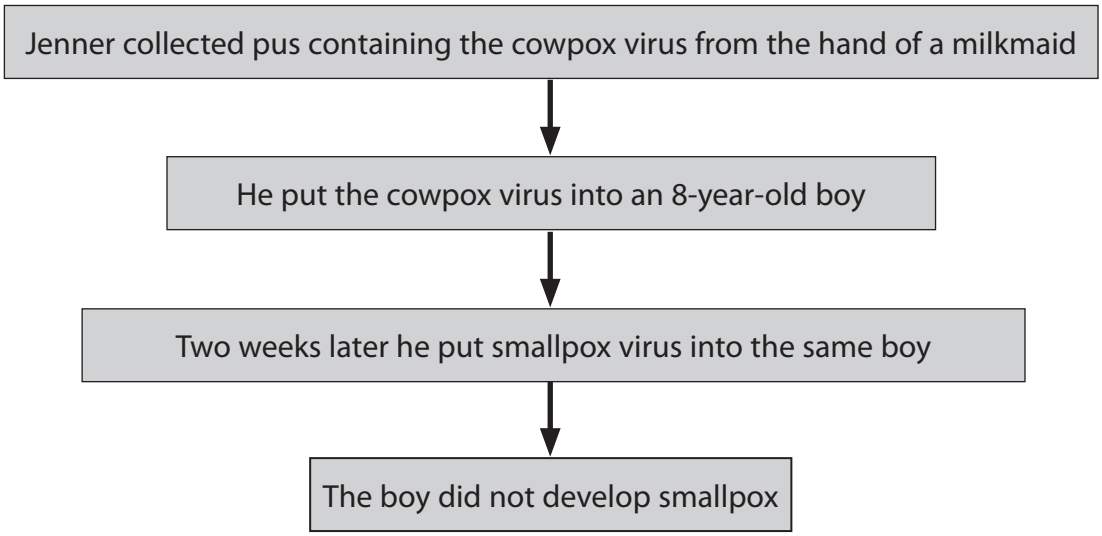
(1)

.....cm^3

(Total for Question 1 = 7 marks)

Viruses and bacteria

2 The flow diagram is about Edward Jenner's work on vaccines.



(a) Use words from the box to complete the sentences about vaccines.

(2)

antibodies	aseptic	hormones
immune	pathogens	

The cowpox virus from the milkmaid caused the boy to become

..... to smallpox.

His body produced ..... which stopped the smallpox

virus from causing an infection.

(b) This newspaper extract is from 2012.

> As a parent, you have to think about the advantages and risks when making the decision about whether your child should be immunised.

Suggest why a parent might decide **not** to have their child immunised.

(2)

.....

.....

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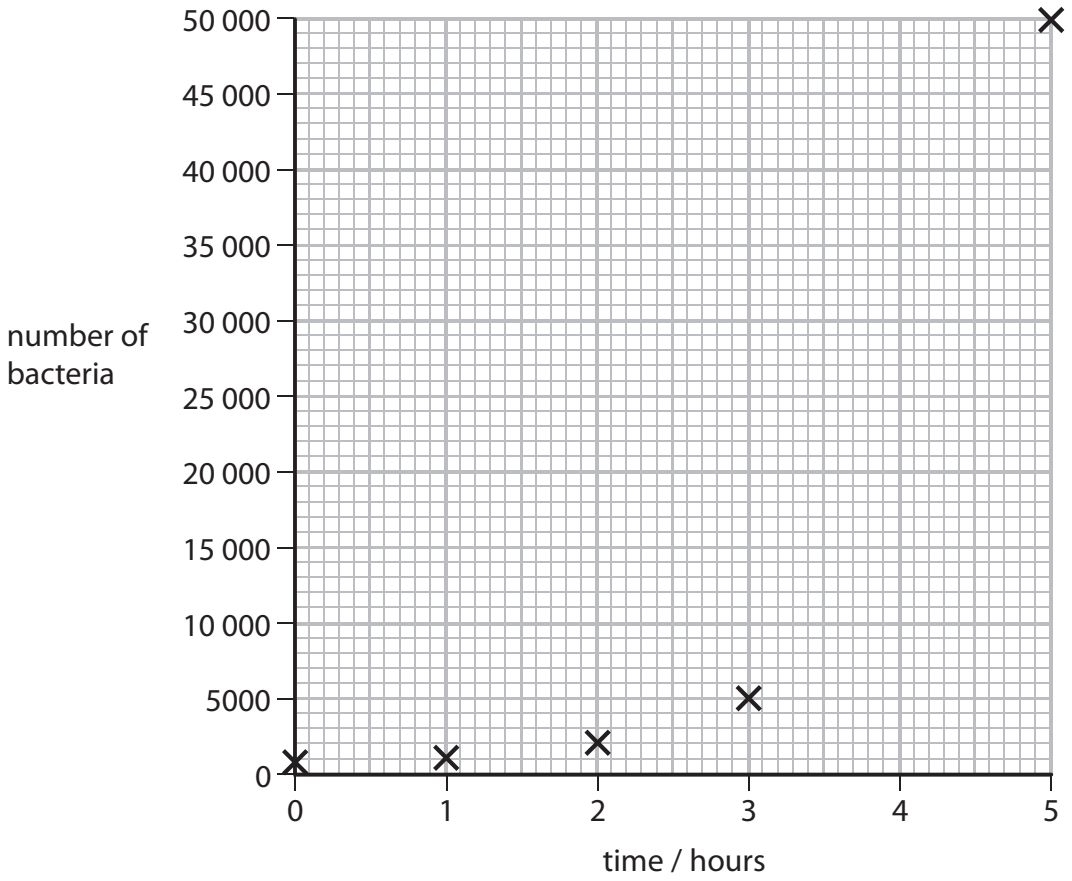
.....

(c) The graph shows the number of bacteria growing in a fermenter during a period of five hours.



(i) Draw the curve of best fit on the graph.

(1)

(ii) Use your curve of best fit to estimate the number of bacteria at four hours.

(1)

(iii) Describe the trend shown in the graph.

(1)

(d) Describe the optimum conditions for the rapid growth of bacteria.

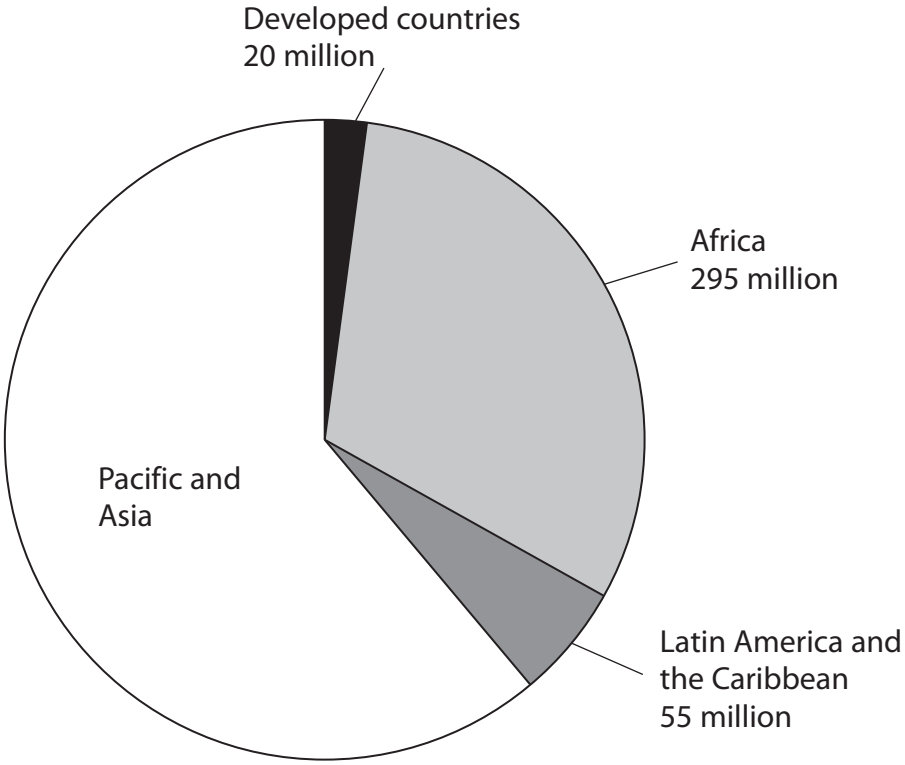
(2)

(Total for Question 2 = 9 marks)

Plant uses

3 (a) There are 950 million people living in the world who do not have enough food.

The pie chart shows the regions of the world where these people live.



(i) Calculate the number of people living in the Pacific and Asia region who do not have enough food.

(2)

.....million

(ii) Suggest why a country may not have enough food for its population.

(1)

.....

(b) The fungus *Beauveria bassiana* can be used to kill insects on crop plants.

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

The use of *Beauveria bassiana* is an example of a

(1)

☒ **A** type of crop rotation

☒ **B** genetic modification programme

☒ **C** pest management strategy

☒ **D** plant breeding programme

(ii) Explain **one** benefit to the farmer of using this fungus to kill insects on crop plants.

(2)

(c) (i) Plants can be used to make biofuels.

Explain why growing plants for biofuels can cause food shortages.

(2)

(ii) Explain **one** advantage of using plants to make biofuels.

(2)

(Total for Question 3 = 10 marks)

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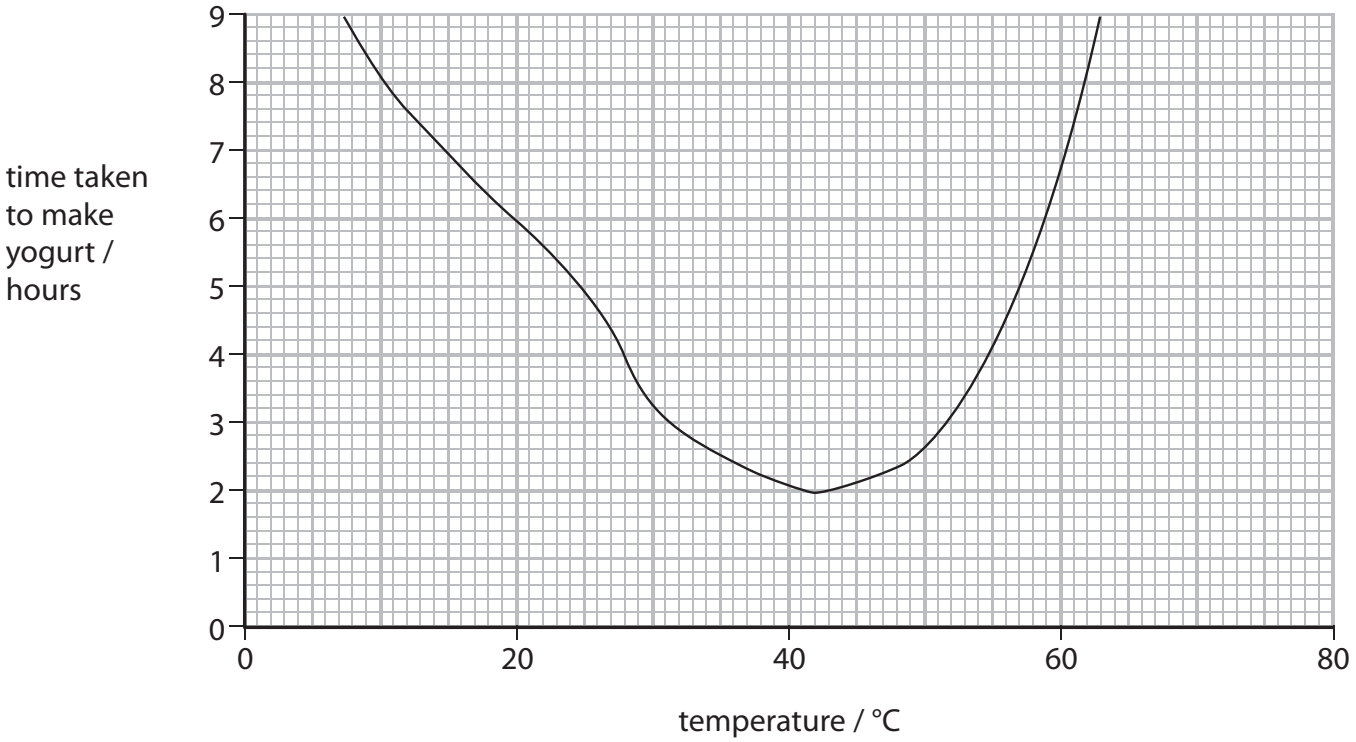
Question 4 is on the next page

Biotechnology

4 (a) The graph shows the effect of temperature on the time taken to make yogurt.



(i) Use the graph to estimate the optimum temperature for yogurt production.

(1)

.....°C

(ii) Describe how microorganisms change milk into yogurt.

(3)

.....

.....

.....

.....

.....

.....

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

Yogurt can be produced in a fermenter.

Fermenters should be free from contamination by unwanted microorganisms.

Contamination can be prevented by

(1)

- ☒ **A** adding oxygen
- ☒ **B** agitation
- ☒ **C** controlling the temperature
- ☒ **D** using aseptic precautions

(c) Many other foods are made using microorganisms.

Describe the advantages of using microorganisms to produce food.

(2)

.....

.....

.....

.....

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

An enzyme produced by genetically modified yeast can be used in the production of cheese.

This enzyme is called

(1)

- ☒ **A** chymosin
- ☒ **B** invertase
- ☒ **C** lipase
- ☒ **D** protease

(ii) Describe the advantages of making cheese using the enzyme produced by genetically modified yeast.

(2)

.....

.....

.....

.....

(Total for Question 4 = 10 marks)

Egg cells

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

Sperm cells and egg cells contain sex chromosomes.

Egg cells contain

(1)

☒ **A** one X chromosome

☒ **B** one Y chromosome

☒ **C** two X chromosomes

☒ **D** two Y chromosomes

(b) (i) Complete the Punnett square to show how the sex of a child is inherited.

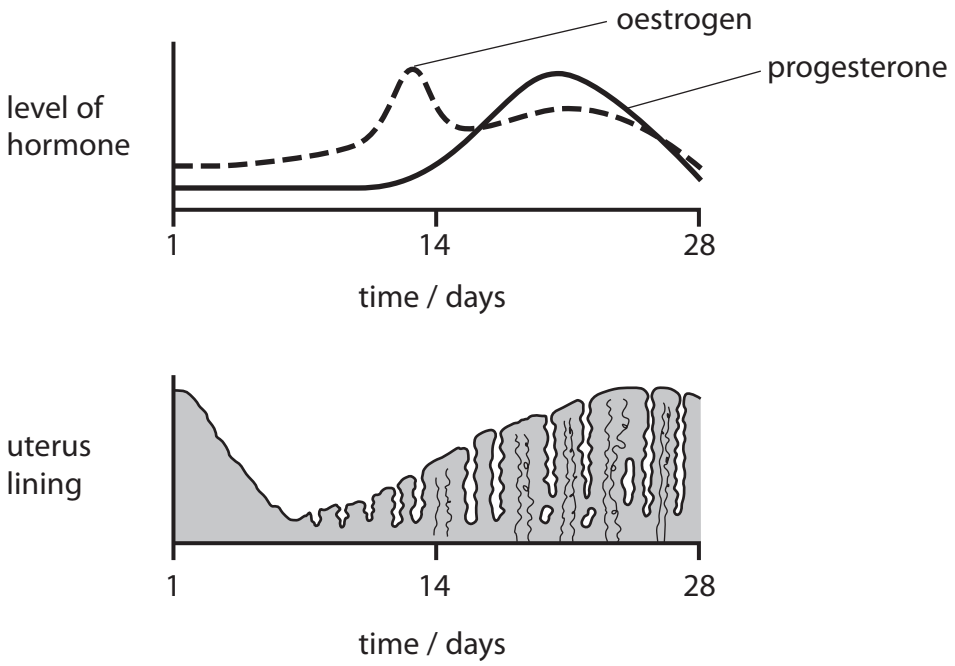
(2)

(ii) Calculate the percentage chance that a child will be female.

(1)

percentage chance .....

*(c) The diagram shows the level of two hormones involved in the menstrual cycle and the thickness of the uterus lining.



Using the information in the diagram and your own knowledge, describe the stages of the menstrual cycle.

(6)

(d) Explain what happens to the uterus lining if a woman becomes pregnant.

(2)

.....

.....

.....

.....

(Total for Question 5 = 12 marks)

Behaviour

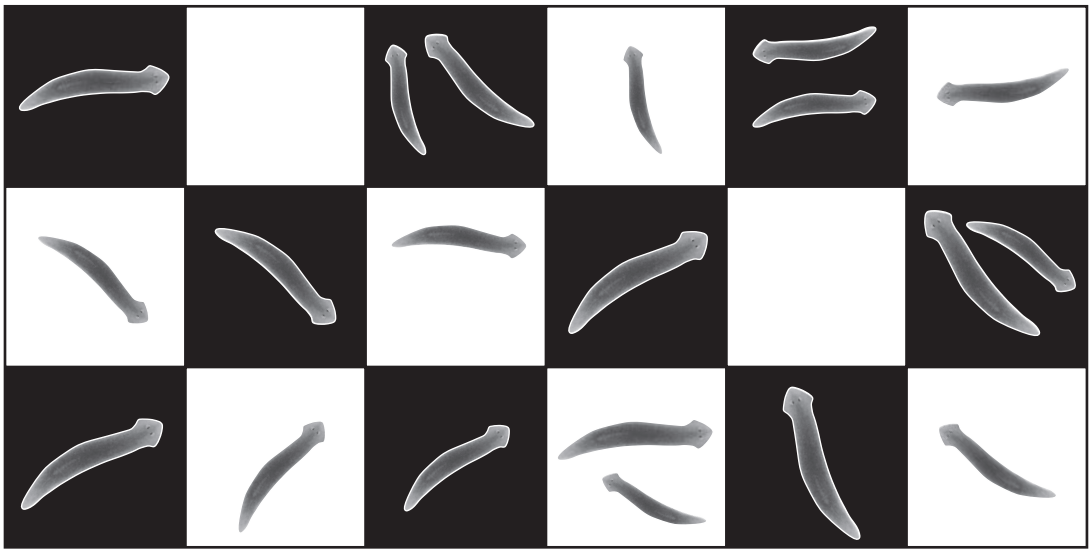
6 Flatworms are animals that live in freshwater streams.

20 flatworms were placed in the centre of a tray containing water.

The tray had black and white squares painted on the bottom.

The diagram shows the position of the flatworms one hour later.

Key  = flatworm



(a) (i) Calculate the percentage of flatworms found on the black squares.

(3)

.....%

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

The type of behaviour shown by the flatworms is

(1)

☒ **A** conditioning

☒ **B** habituation

☒ **C** imprinting

☒ **D** innate

(iii) Suggest why this behaviour may help flatworms survive in the streams where they live.

(2)

*(b) Animals communicate in order to survive and during courtship.

Explain why animals use a variety of signals to communicate.

Use examples to support your answer.

(6)

(Total for Question 6 = 12 marks)

TOTAL FOR PAPER = 60 MARKS

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