Paper Reference(s) 5BI3F/01

Edexcel GCSE

Biology

Unit B3: Using Biology
Foundation Tier

Monday 20 May 2013 – Afternoon

Time: 1 hour plus your additional time allowance

INSTRUCTIONS TO CANDIDATES
Write your centre number, candidate number, surname, initials and your signature in the boxes below. Check that you have the correct question paper.

Centre No.							
Candidate No.							
Surname							
Initial(s)							
Signature							
Paper Reference	5	B	I	3	F	/	0	1

Q41934A

PEARSON

- **Use BLACK ink or ball-point pen.**
- **Answer ALL questions.**
- **Answer the questions in the spaces provided – there may be more space than you need.**

MATERIALS REQUIRED FOR EXAMINATION
Calculator, ruler

ITEMS INCLUDED WITH QUESTION PAPERS
Nil

INFORMATION FOR CANDIDATES
- **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 TO CANDIDATES
- **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.**

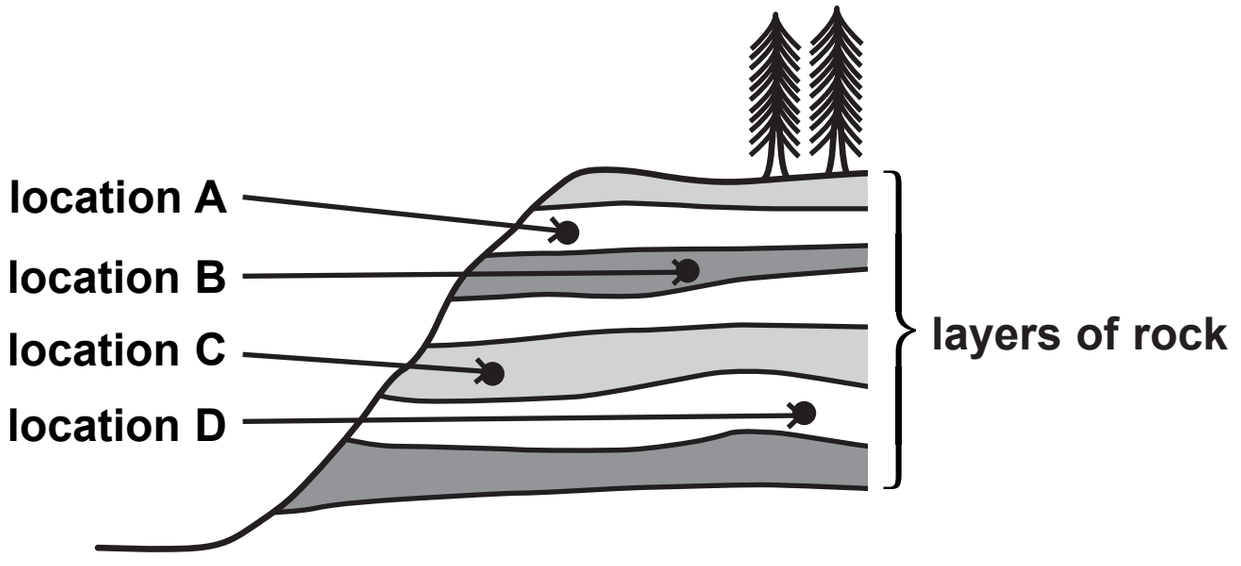
Answer ALL questions.

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.



(Question continues on next page)

(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 mark)

☐ **A location A**

☐ **B location B**

☐ **C location C**

☐ **D location D**

(ii) **Suggest TWO possible ways in which stone tools were used. (2 marks)**

1 _____

_____

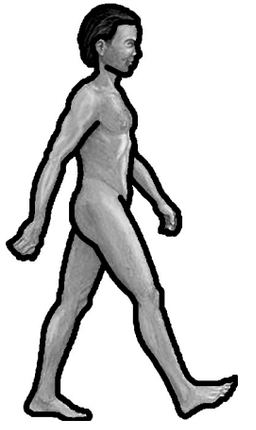
_____

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

(Question continues on next page)

(Turn over)

(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 mark)

☐ 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 marks)

(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 mark)

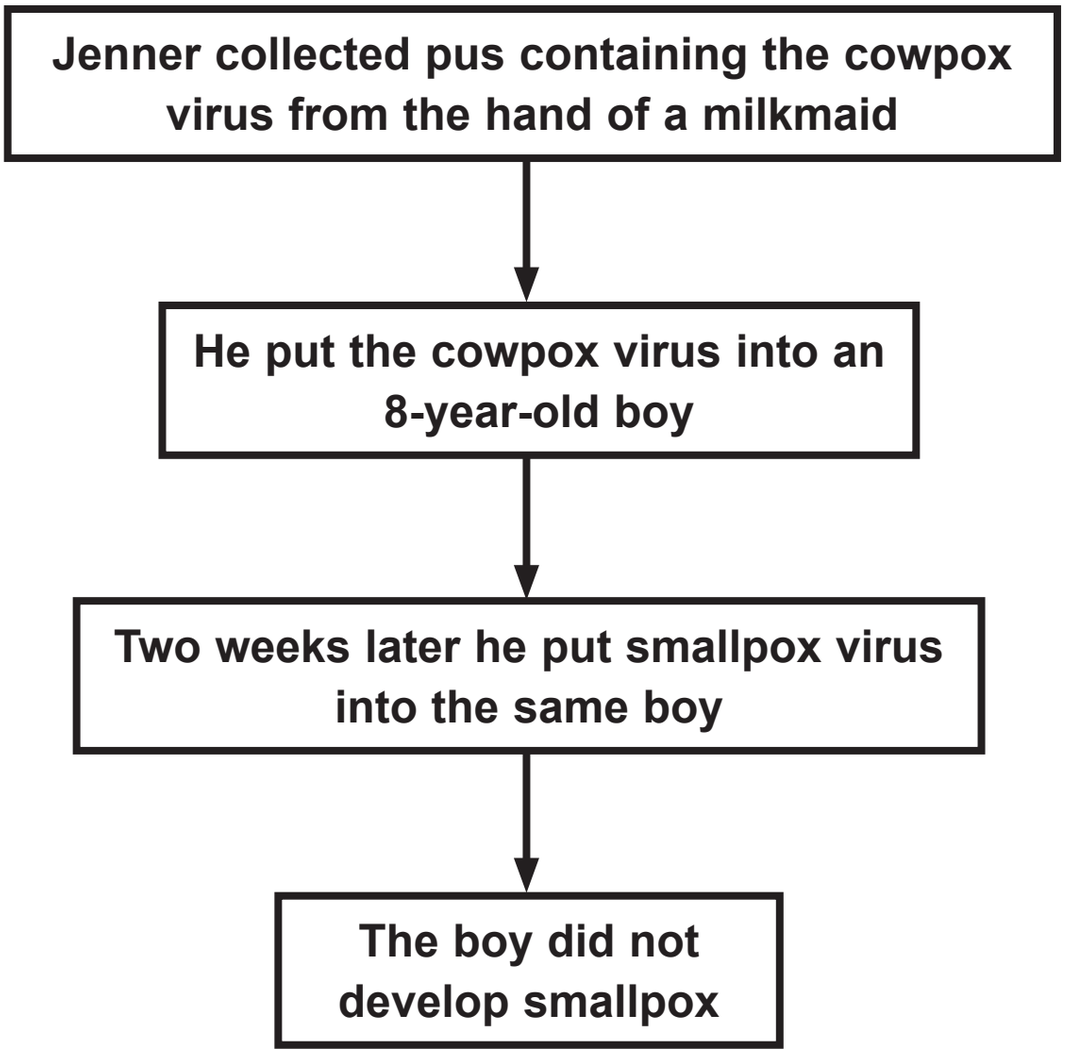
_____ cm^3

(TOTAL FOR QUESTION 1 = 7 MARKS)

(Questions continue on next page)

VIRUSES AND BACTERIA

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



(Question continues on next page)

(a) Use words from the box to complete the sentences about vaccines. (2 marks)

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.

(Question continues on next page)

(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 marks)

_____

_____

_____

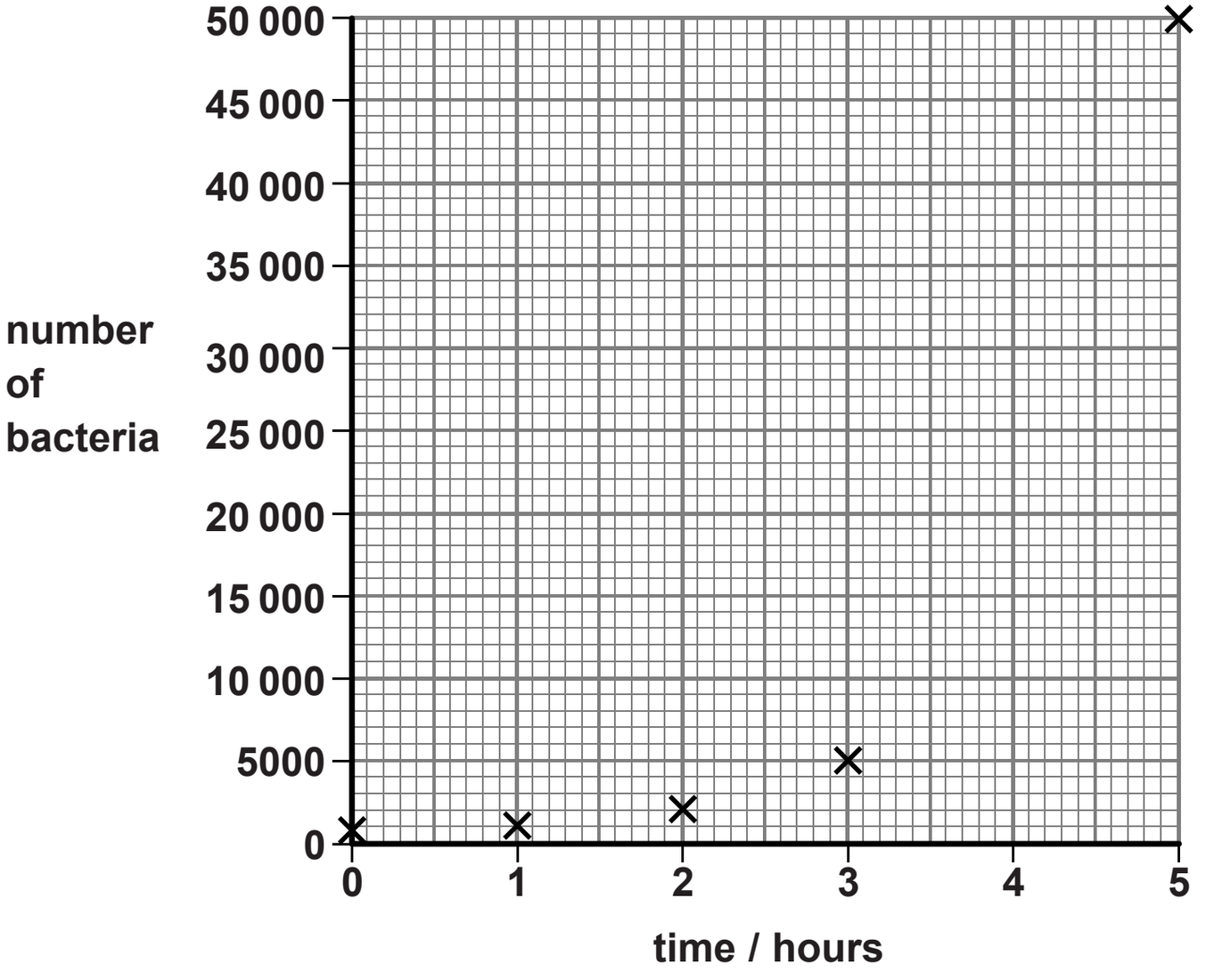
_____

_____

_____

(Question continues on next page)

(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 mark)

(ii) Use your curve of best fit to estimate the number of bacteria at four hours. (1 mark)

(Question continues on next page) (Turn over)

(iii) Describe the trend shown in the graph.
(1 mark)

(d) Describe the optimum conditions for the rapid growth of bacteria. (2 marks)

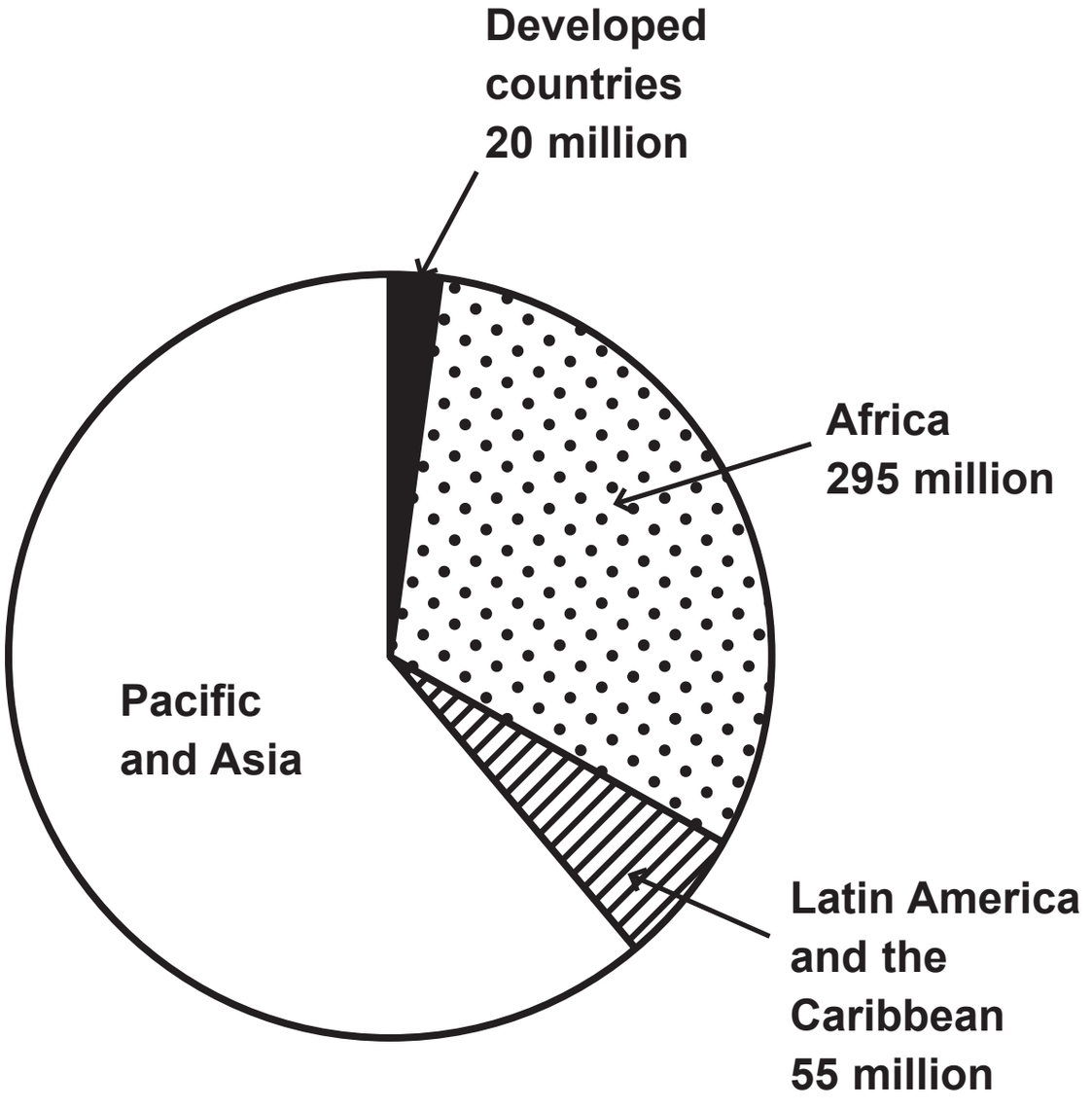
(TOTAL FOR QUESTION 2 = 9 MARKS)

(Questions continue on next page)

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.



(Question continues on next page)

(i) Calculate the number of people living in the Pacific and Asia region who do not have enough food. (2 marks)

_____ million

(ii) Suggest why a country may not have enough food for its population. (1 mark)

_____

_____

(Question continues on next page)

(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 mark)

- ☐ **A type of crop rotation**
- ☐ **B genetic modification programme**
- ☐ **C pest management strategy**
- ☐ **D plant breeding programme**

(Question continues on next page)

(ii) Explain ONE benefit to the farmer of using this fungus to kill insects on crop plants. (2 marks)

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

Explain why growing plants for biofuels can cause food shortages. (2 marks)

(Question continues on next page)

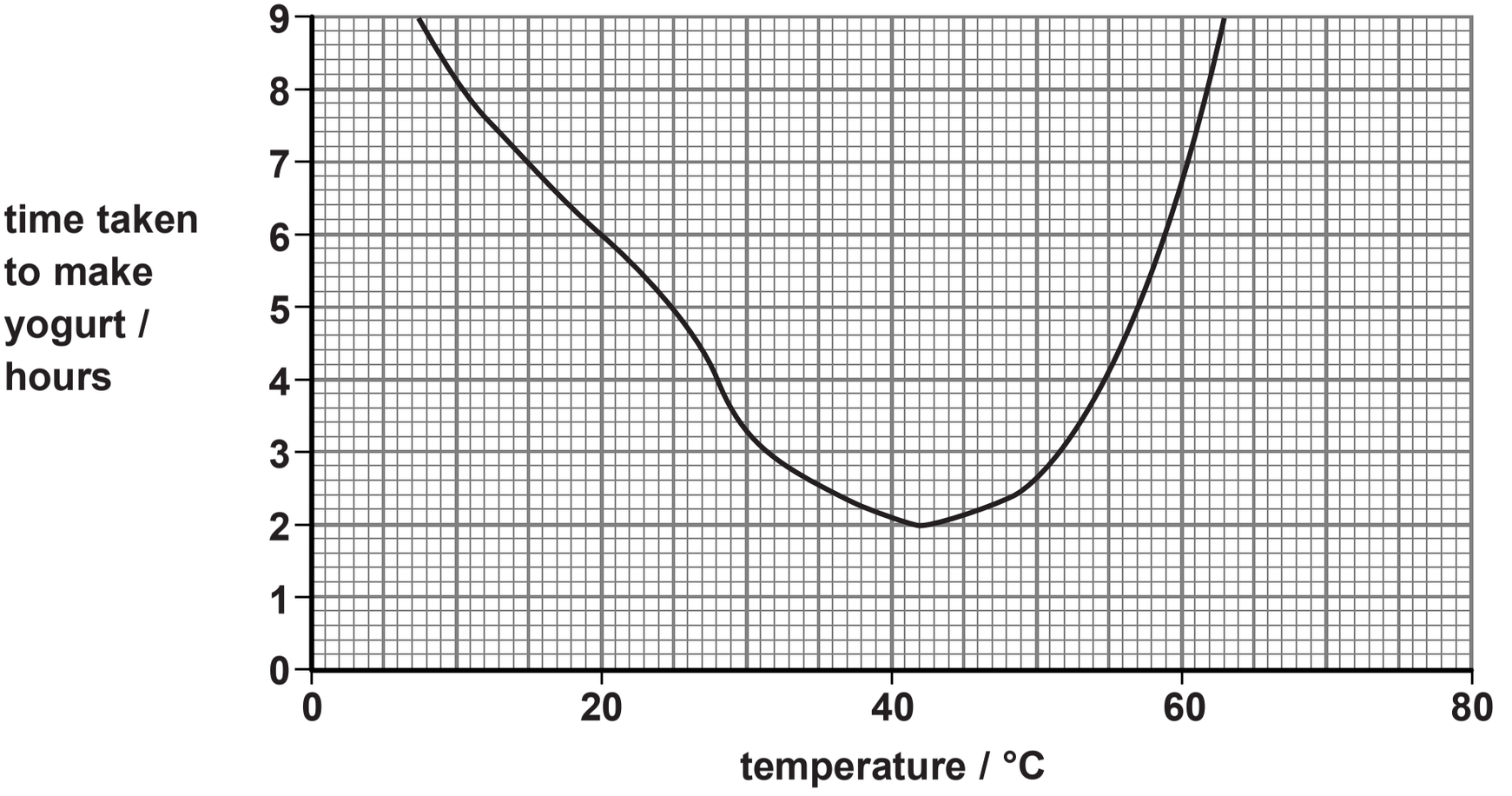
(ii) Explain ONE advantage of using plants to make biofuels. (2 marks)

(TOTAL FOR QUESTION 3 = 10 MARKS)

(Questions continue on next page)

BIOTECHNOLOGY

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



(Question continues on next page)

(Turn over)

(i) Use the graph to estimate the optimum temperature for yogurt production. (1 mark)

_____ °C

(ii) Describe how microorganisms change milk into yogurt. (3 marks)

_____

_____

_____

_____

_____

_____

_____

_____

_____

(Question continues on next page)

(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 mark)

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

(Question continues on next page)

(c) Many other foods are made using microorganisms.

Describe the advantages of using microorganisms to produce food. (2 marks)

(Question continues on next page)

(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 mark)

☐ **A** chymosin

☐ **B** invertase

☐ **C** lipase

☐ **D** protease

(Question continues on next page)

(ii) Describe the advantages of making cheese using the enzyme produced by genetically modified yeast. (2 marks)

(TOTAL FOR QUESTION 4 = 10 MARKS)

(Questions continue on next page)

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.

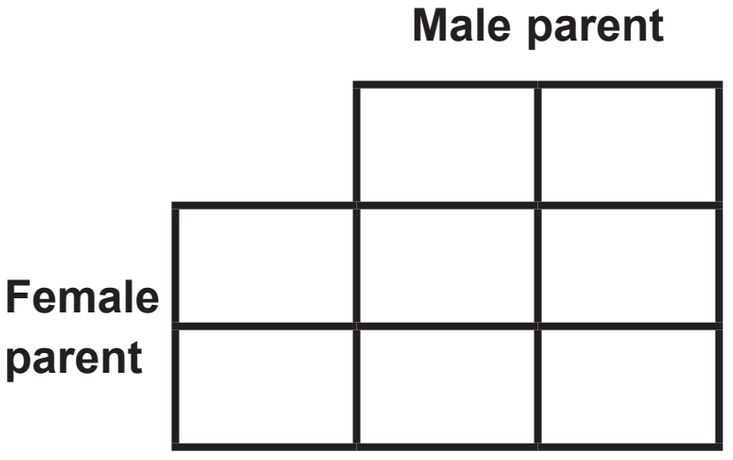
Egg cells contain

(1 mark)

- ☐ **A one X chromosome**
- ☐ **B one Y chromosome**
- ☐ **C two X chromosomes**
- ☐ **D two Y chromosomes**

(Question continues on next page)

(b) (i) Complete the Punnett square to show how the sex of a child is inherited. (2 marks)

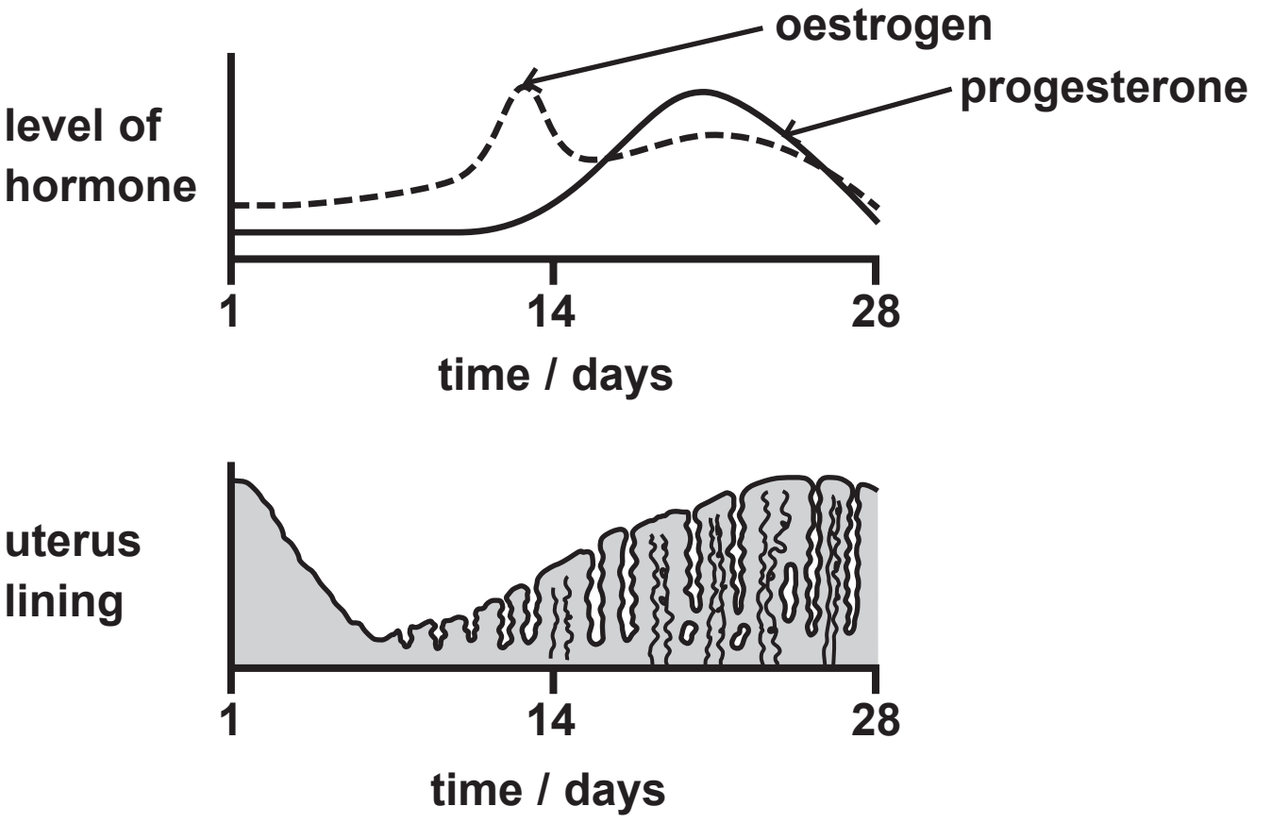


(ii) Calculate the percentage chance that a child will be female. (1 mark)

percentage chance _____

(Question continues on next page)

*(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 marks)

(Question continues on next page)

(d) Explain what happens to the uterus lining if a woman becomes pregnant. (2 marks)

(TOTAL FOR QUESTION 5 = 12 MARKS)

(Questions continue on next page)

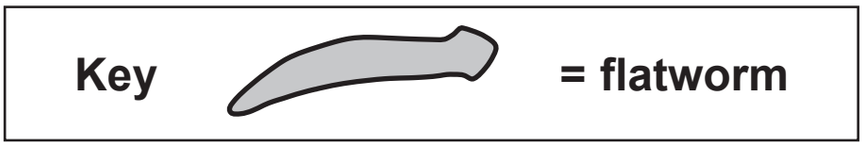
BEHAVIOUR

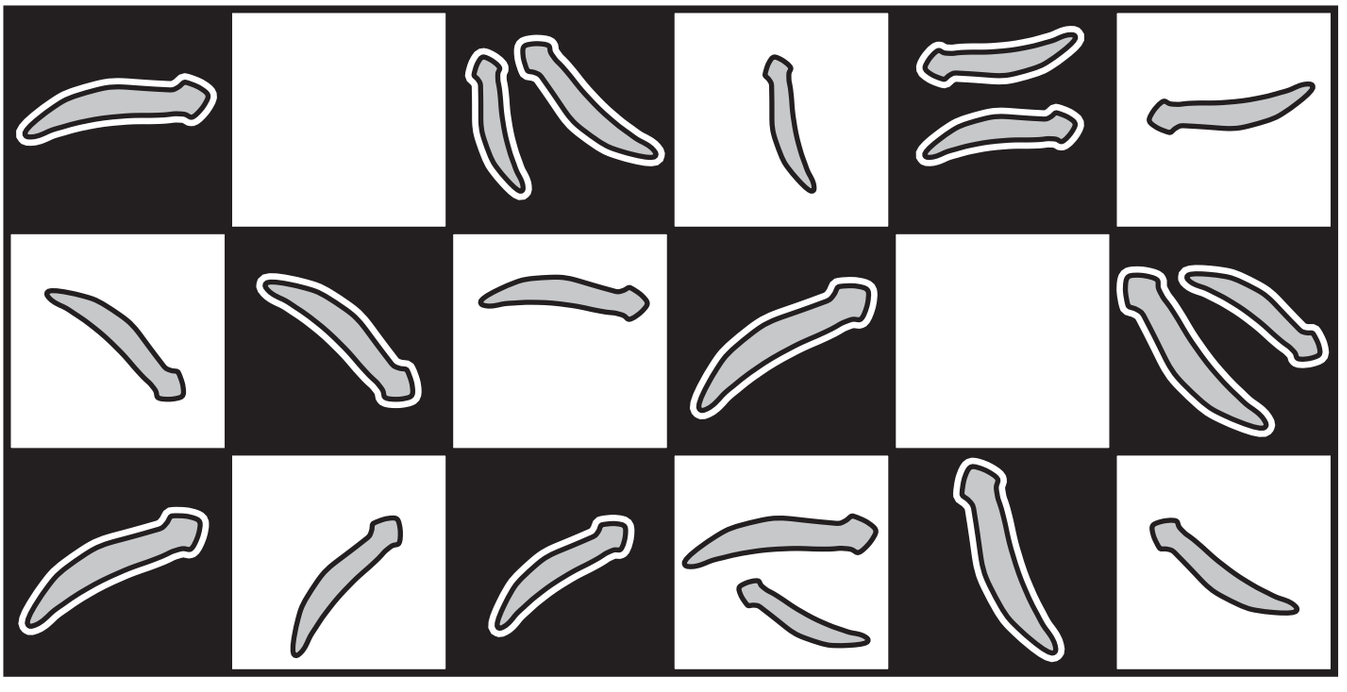
6 Flatworms are animals that live in freshwater streams.

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.





(Question continues on next page)

(a) (i) Calculate the percentage of flatworms found on the black squares. (3 marks)

_____ %

(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 mark)

☐ A conditioning

☐ B habituation

☐ C imprinting

☐ D innate

(Question continues on next page)

(iii) Suggest why this behaviour may help flatworms survive in the streams where they live. (2 marks)

*(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 marks)

(Continue your answer on next page)

(TOTAL FOR QUESTION 6 = 12 MARKS)

TOTAL FOR PAPER = 60 MARKS

END