Write your name here

Surname	Other names

Pearson Edexcel GCSE

Centre Number | | | | | |

Candidate Number | | | | |

Biology

Unit B3: Using Biology

Foundation Tier

Monday 16 June 2014 – 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 3 4 1 6 A 0 1 2 4

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 The photograph shows a robin.

Robins are songbirds.

Robins usually attract one mate for a breeding season.

(a) (i) In spring, male robins sing loudly to attract a female.

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

This type of behaviour is

(1)

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

(ii) Suggest a different way a robin can communicate.

(1)

.....

.....

(b) The survival rate for the offspring of many animals is very low.

A robin produced 12 offspring but only 5 survived their first year.

(i) Calculate the percentage survival rate for the offspring of this robin.

(2)

..... %

(ii) Suggest how robins care for their offspring.

(2)

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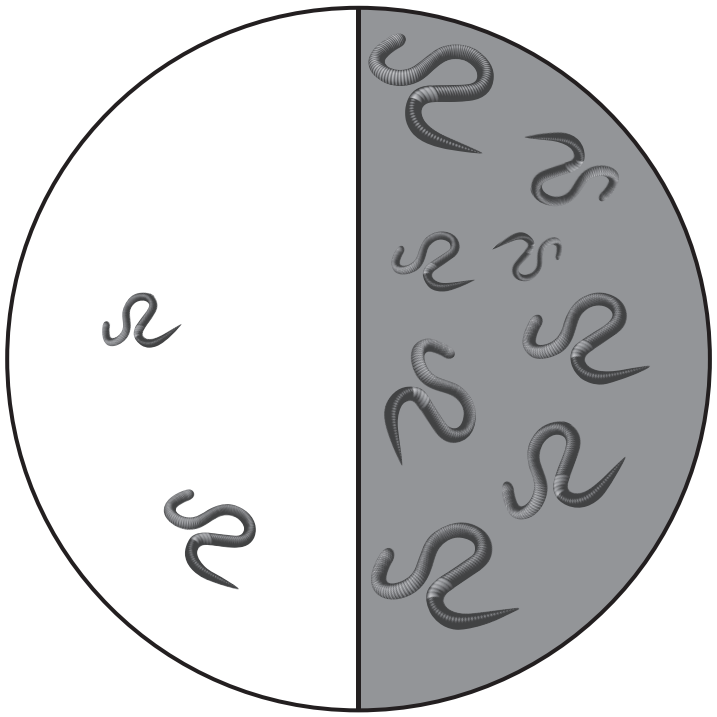
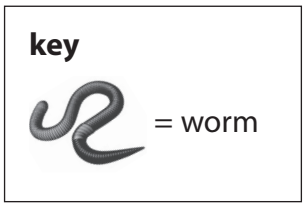
(c) Robins eat worms.

10 worms were placed in the centre of a choice chamber.

Half the chamber was in the light and half the chamber was in the dark.

The diagram shows the position of the worms after one hour.





Explain how this behaviour helps the worms to survive.

(2)

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(Total for Question 1 = 8 marks)

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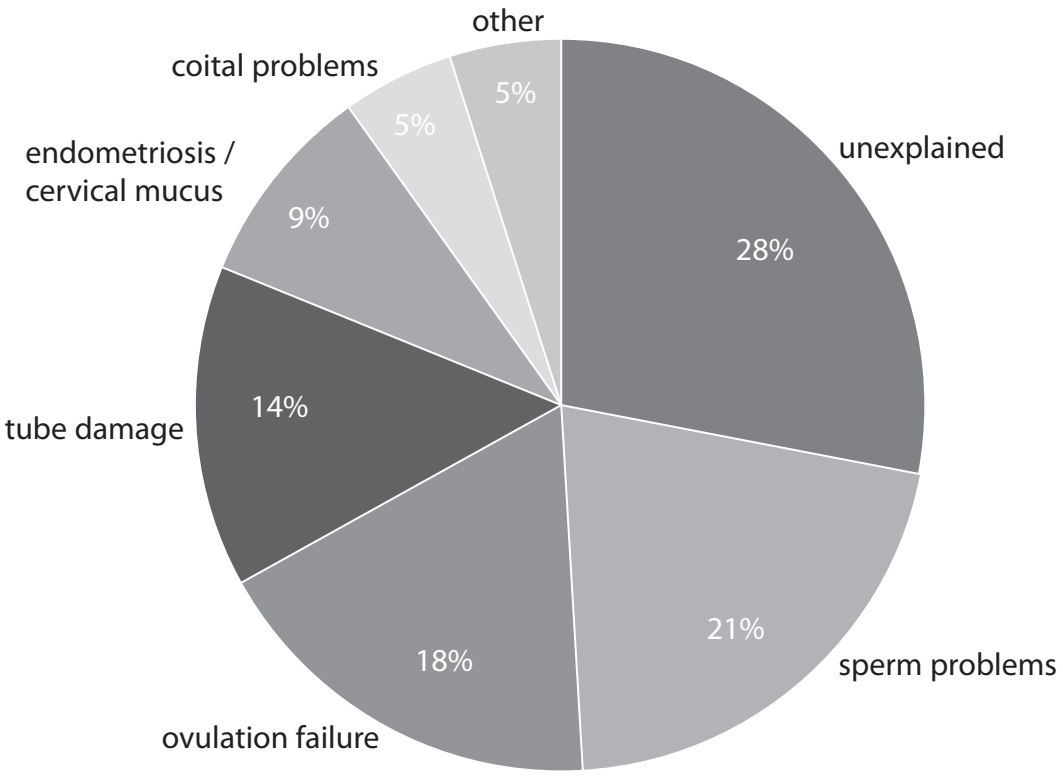
Question 2 is on the next page

Infertility

2 (a) The pie chart shows the common causes of infertility for the human population of the United Kingdom.



What is the main explained cause of infertility?

Place a cross (☒) in the box next to your answer.

(1)

- ☒ **A** coital problems
- ☒ **B** ovulation failure
- ☒ **C** sperm problems
- ☒ **D** tube damage

(b) State **two** treatments for infertility.

(2)

1 .....

.....

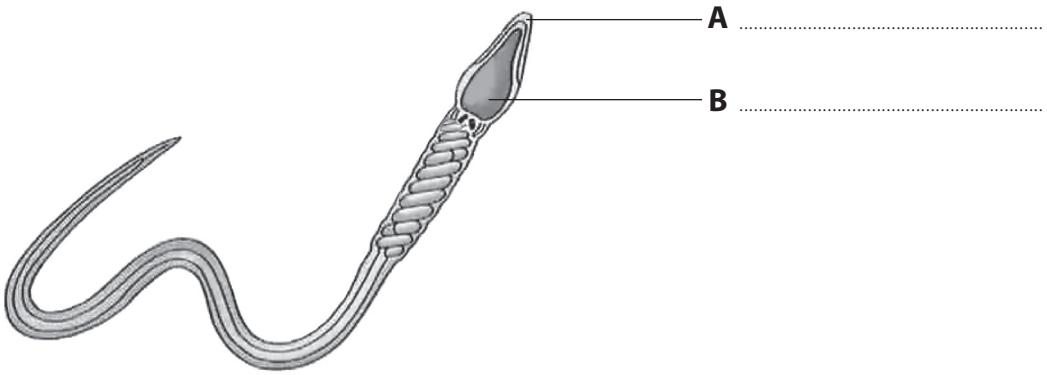
2 .....

.....

(c) Sometimes parts of the sperm do not function correctly.

(i) Name the parts labelled **A** and **B**.

(2)



(ii) Explain why mitochondria are important for the correct functioning of the sperm.

(3)

(Total for Question 2 = 8 marks)

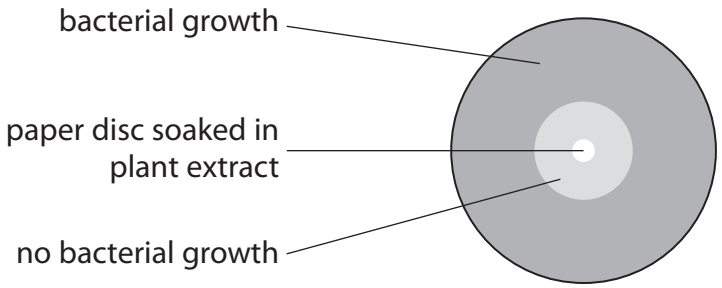
Natural antiseptics

3 Some plant extracts contain natural antiseptics.

A scientist spread bacteria on an agar plate.

She then soaked a paper disc in a plant extract and placed the disc on the agar plate.

The diagram shows how the agar plate looked after 24 hours.



(a) Suggest why there is no bacterial growth around the paper disc.

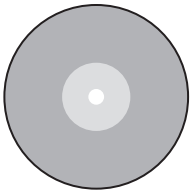
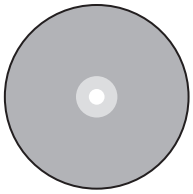
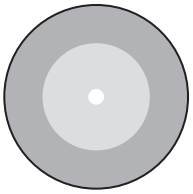
(1)

.....

.....

(b) The scientist then tested three more plant extracts **A**, **B** and **C**.

The table shows the results for the three different plant extracts.

plant extract	**A**	**B**	**C**
agar plate after 24 hours			
radius of circle with no bacterial growth / mm	25	15	50
total area with no bacterial growth / mm^2	1963	707	

The area of a circle can be calculated using the following formula

Area of a circle = πr^2

The value for π is 3.14

r = radius

(i) Calculate the area with no bacterial growth for plant extract **C**.

(2)

..... mm^2

(ii) Compare the antiseptic properties of plant extracts **A**, **B** and **C**.

(2)

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.....

.....

(c) Suggest why plants may produce natural antiseptics.

(2)

(d) Photoperiodicity is important in plants.

(i) State the stimulus that results in photoperiodicity in plants.

(1)

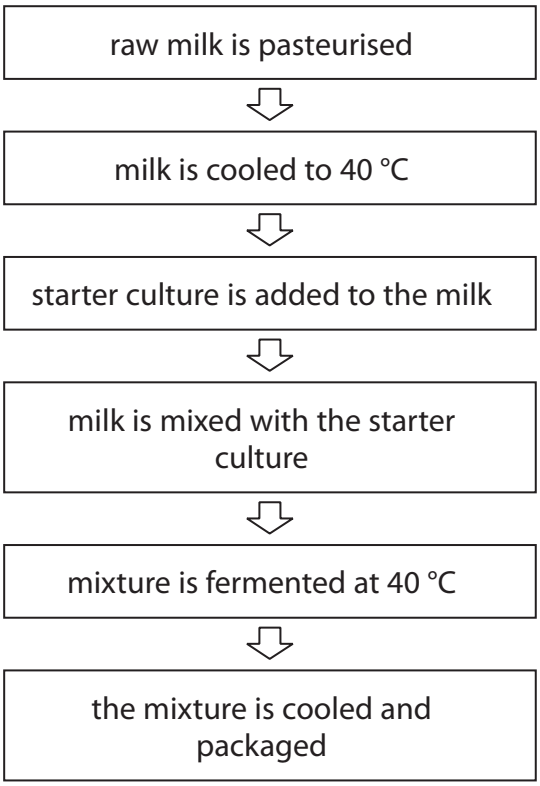
(ii) Explain why photoperiodicity is important in plants.

(2)

(Total for Question 3 = 10 marks)

Enzyme technology

4 The diagram shows one method of yogurt production.



(a) (i) Explain why the milk is kept at a temperature of 40 °C during fermentation.

(2)

(ii) Use words from the box to complete the following sentences about yogurt production.

(2)

lactose	boil	glucose
thicken	sucrose	liquify

The starter culture contains *Lactobacillus* bacteria which convert the

..... into lactic acid.

The lactic acid causes the milk to ..... and

produce yogurt.

(iii) Explain why the milk is pasteurised before the production of yogurt.

(2)

.....

.....

.....

.....

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

The scientist whose research contributed to the process of pasteurisation is

(1)

☒ **A** Diane Fossey

☒ **B** Edward Jenner

☒ **C** Jane Goodall

☒ **D** Louis Pasteur

(b) *Saccharomyces cerevisiae* is a microorganism used in the manufacture of sweets.

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

Saccharomyces cerevisiae is used in the manufacture of sweets because it produces the enzyme

(1)

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

(c) Enzymes can also be used in washing powders.

Explain why enzymes are used in washing powders.

(3)

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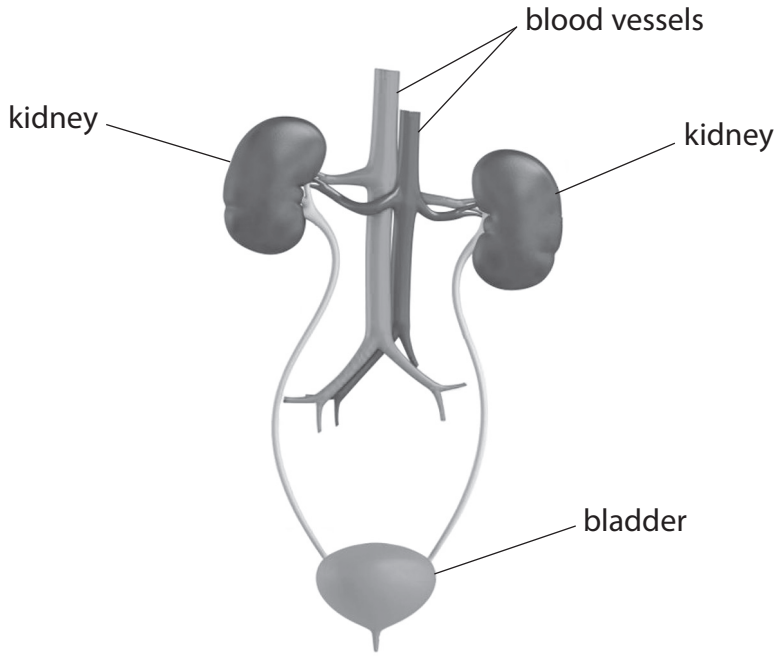
(Total for Question 4 = 11 marks)

Kidneys and disease

5 Kidney disease can be treated by kidney dialysis or kidney donation.

The diagram shows the human urinary system.



(a) Draw **one** straight line from each part of the urinary system to its function.

(2)

part of urinary system	function
renal artery	transports urine to the bladder
	transports blood into the kidneys
ureter	transports urine from the bladder
	transports blood away from the kidneys

(b) Kidney dialysis removes harmful chemicals from a patient's blood.

Urea is one chemical that is removed from a patient's blood.

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

Urea is produced in the

(1)

- ☒ **A** bladder
- ☒ **B** gall bladder
- ☒ **C** liver
- ☒ **D** pancreas

(c) In one year a total of 3600 kidney donations took place.

A third of kidney donations are from donors who are still living.

(i) Calculate the number of kidneys donated by donors who are still living.

(2)

.....

(ii) Suggest why kidney donations from people who are still living are more common than other organ donations.

(1)

.....

.....

*(d) Haemophilia is a sex-linked genetic disorder of the blood.

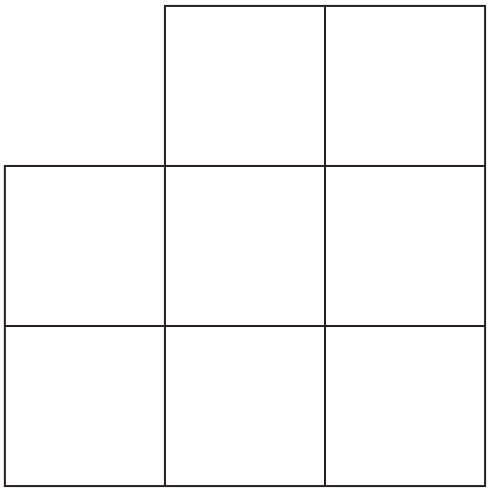
The allele for haemophilia is recessive and is located on the **X** chromosome.

A female heterozygous for haemophilia and an unaffected male have children.

Use a genetic diagram to help explain what the genotypes and phenotypes of their children could be.

Use the letter **h** for the haemophilia allele.

(6)



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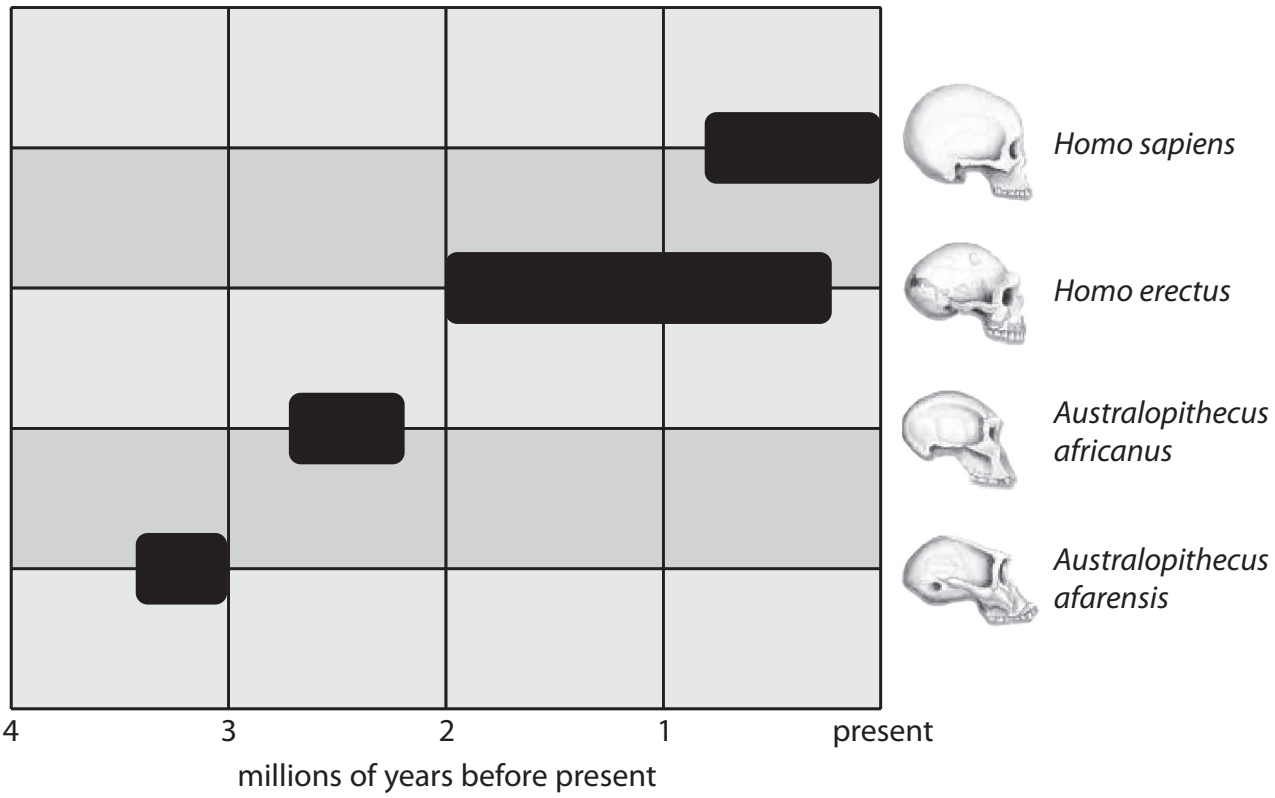
(Total for Question 5 = 12 marks)

Human evolution

6 (a) The diagram shows the estimated time when early humans and their ancestors existed.



(i) In which time period did *Australopithecus afarensis* exist?

Place a cross (☒) in the box next to your answer.

(1)

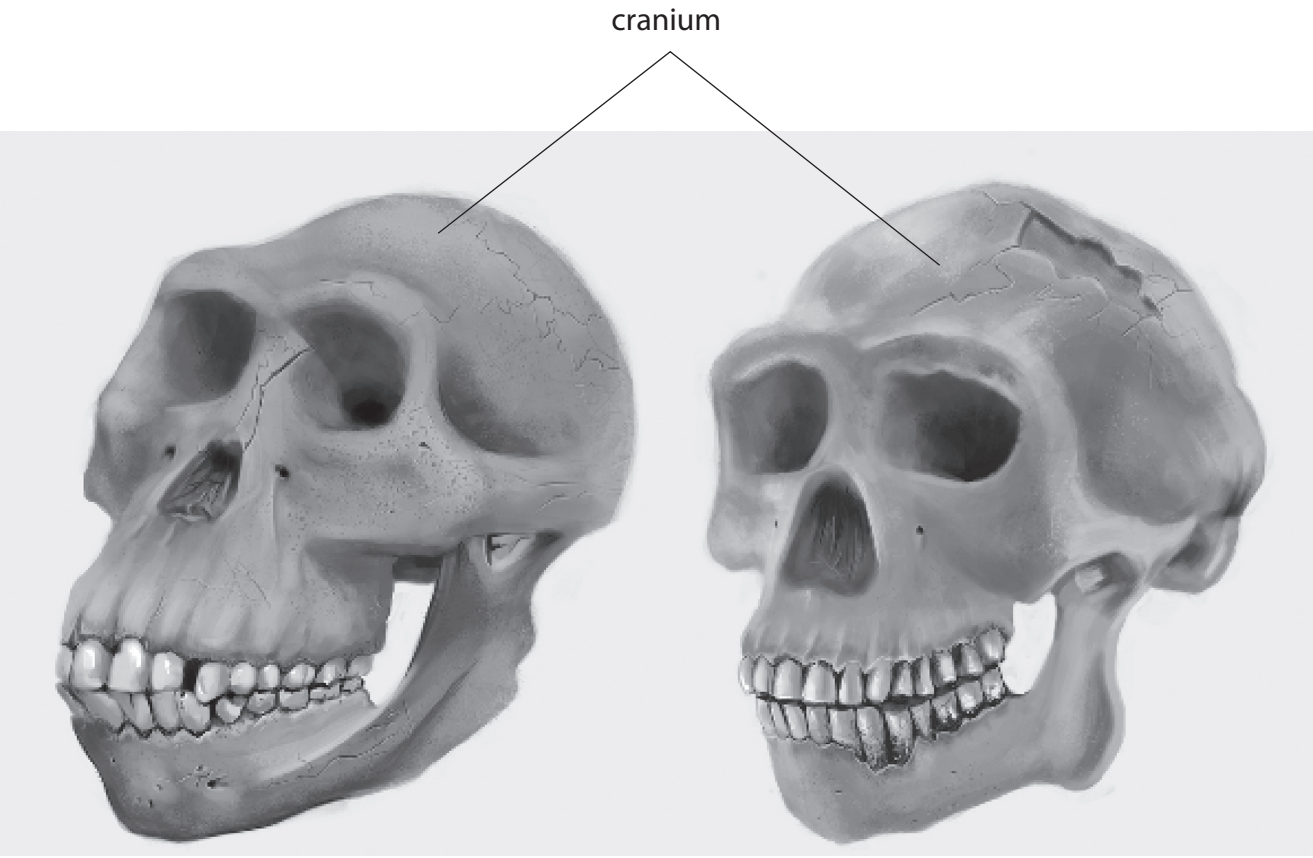
☒ **A** present day to 1 million years before present

☒ **B** 1 to 2 million years before present

☒ **C** 2 to 3 million years before present

☒ **D** 3 to 4 million years before present

The photograph shows the skulls of two different early humans.



Australopithecus afarensis *Homo erectus*

(ii) Suggest why the cranium of *Australopithecus afarensis* is smaller than the cranium of *Homo erectus.*

(1)

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(iii) Describe **one** structural difference in another part of these skulls.

(1)

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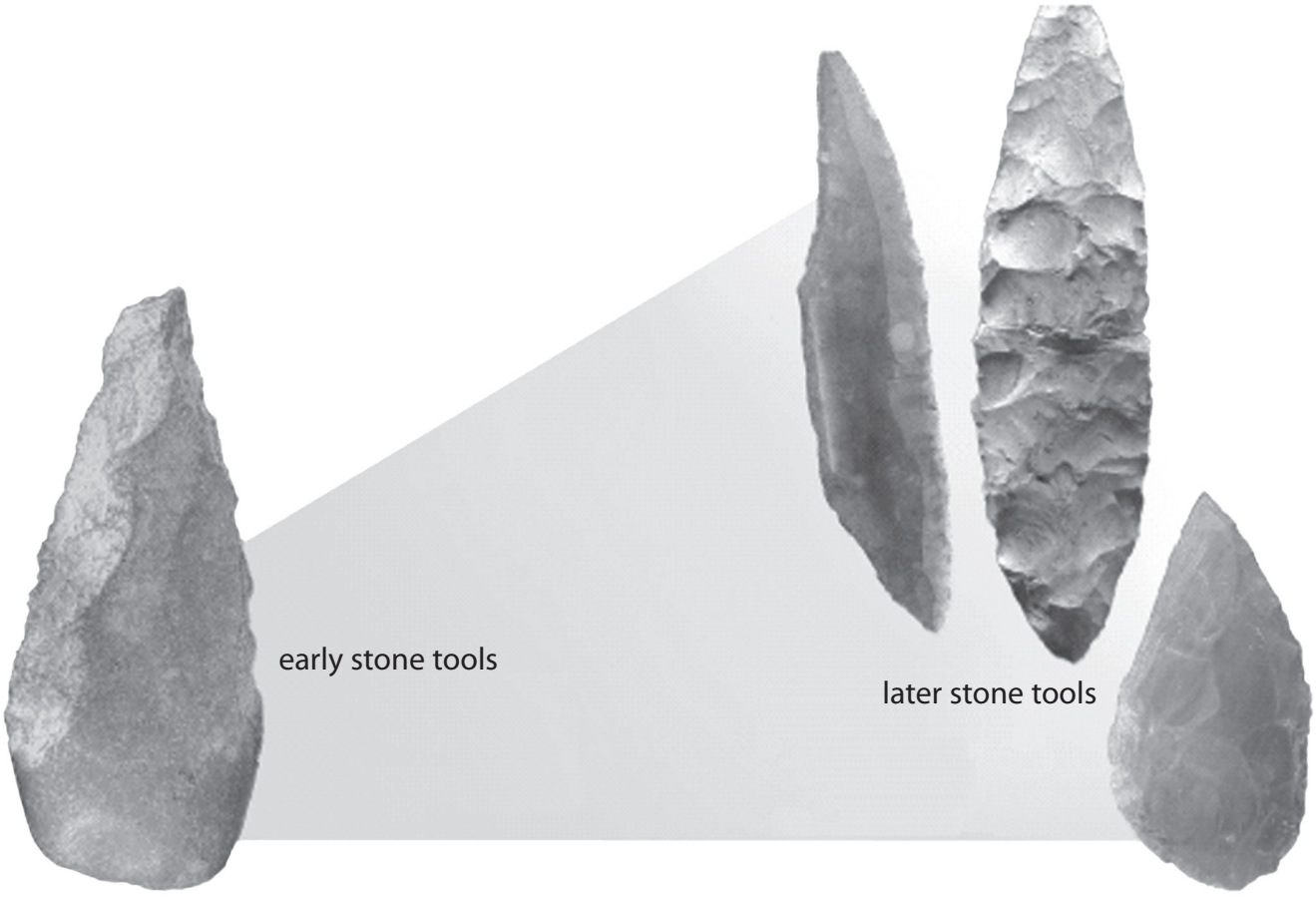
(b) The photograph shows some stone tools from different times in the Earth's history.



Suggest why there are differences in these stone tools.

(2)

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*(c) Describe the evidence for human evolution, based on fossils.

Include reference to specific early human fossils in your answer.

(6)

(Total for Question 6 = 11 marks)

TOTAL FOR PAPER = 60 MARKS

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