

**Paper Reference(s)    1SC0/1BF**

**Pearson Edexcel Level 1/Level 2 GCSE (9–1)**

**Combined Science**

**Paper 1: Biology 1**

**Foundation Tier**

**Tuesday 14 May 2019 – Afternoon**

**Time: 1 hour 10 minutes plus your additional  
time allowance**

**INSTRUCTIONS TO CANDIDATES**

**Write your centre number, candidate number,  
surname, other names and your signature in  
the boxes below. Check that you have the  
correct question paper.**

<b>Centre No.</b>					
<b>Candidate No.</b>					
<b>Surname</b>					
<b>Other names</b>					
<b>Signature</b>					
<b>Paper Reference</b>	<b>1</b>	<b>S</b>	<b>C</b>	<b>0</b>	<b>/ 1 B F</b>



- **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.**
- **Calculators may be used.**
- **Any diagrams may NOT be accurately drawn, unless otherwise indicated.**
- **You must show all your working out with your answer clearly identified at the end of your solution.**

## **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.**

**(Instructions continue on next page)**

**(Turn over)**

- In questions marked with an **ASTERISK (\*)**, marks will be awarded for your ability to structure your answer logically showing how the points that you make are related or follow on from each other where appropriate.

### **ADVICE TO CANDIDATES**

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

**(Turn over)**

**Answer ALL questions. Write your answers in the spaces provided.**

**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 ☐.**

**(Questions begin on next page)**

**(Turn over)**

**1 (a) A student investigated mitosis in the root tip of a garlic plant.**

**(i) Explain why the student used the tip of the root. (2 marks)**

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**(Question continues on next page)**

**(Turn over)**

- (ii) The student squashed the root tip on a microscope slide to spread out the cells.

The slide was placed on the stage of a microscope.

Describe how to use the microscope to obtain a clear image of the cells. (2 marks)

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(Continue your answer on next page)

(Turn over)

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**(iii) The student could not see the chromosomes inside the cells.**

**State what can be added to the root tip squash to make the chromosomes visible. (1 mark)**

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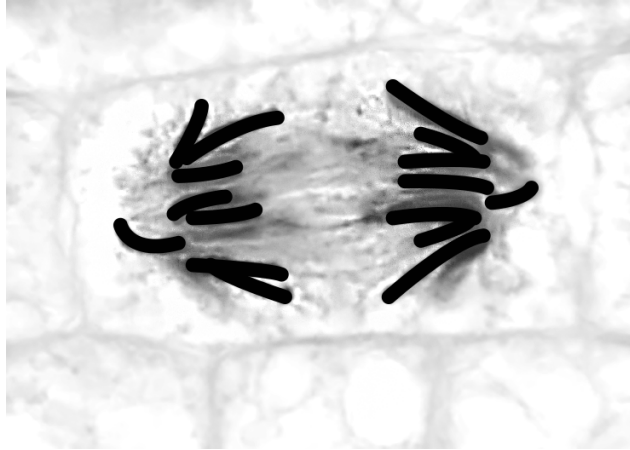
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**(Question continues on next page)**

**(Turn over)**

**(b) Figure 1 shows a root cell in a stage of mitosis.**



**Figure 1**

**(Question continues on next page)**

**(Turn over)**



**(i) Which stage of mitosis is shown in Figure 1? (1 mark)**

☐ **A    prophase**

☐ **B    metaphase**

☐ **C    anaphase**

☐ **D    telophase**

**(ii) Describe what is happening in Figure 1. (3 marks)**

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**(Continue your answer on next page)**

**(Turn over)**

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**(TOTAL FOR QUESTION 1 = 9 MARKS)**

**(Questions continue on next page)**

**(Turn over)**

**2 (a) Chlamydia is caused by a pathogen.**

**(i) Chlamydia is transmitted by  
(1 mark)**

- ☐ **A insect vectors**
- ☐ **B sneezing**
- ☐ **C sexual intercourse**
- ☐ **D contaminated food**

**(ii) The type of pathogen that causes  
chlamydia is a (1 mark)**

- ☐ **A bacterium**
- ☐ **B fungus**
- ☐ **C protist**
- ☐ **D virus**

**(Question continues on next page)**

**(Turn over)**

**(b) On page 13 Figure 2 shows the number of cases of chlamydia in the United Kingdom per 100 000 people between 1996 and 2013.**

**(Question continues on next page)**

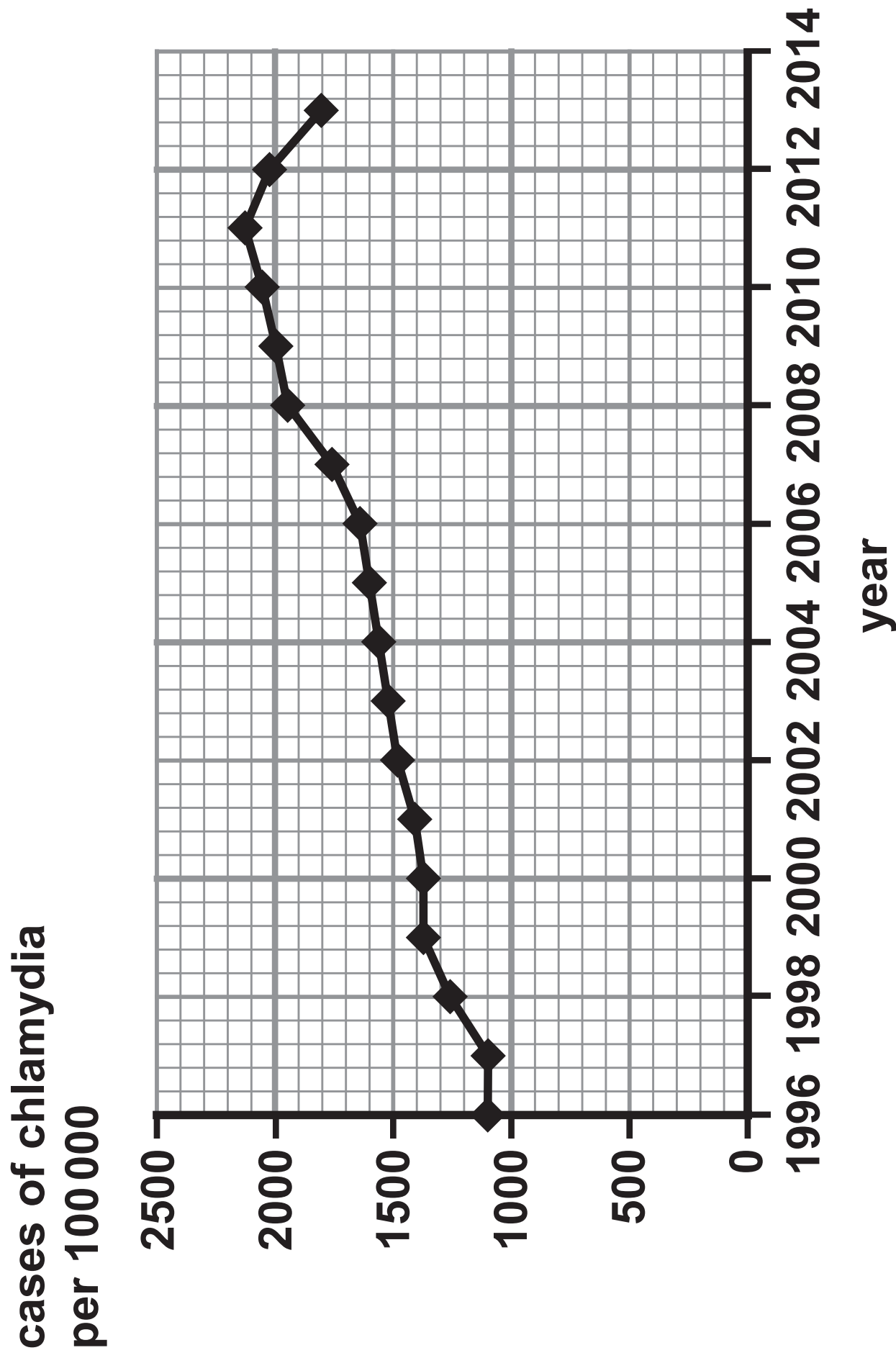


Figure 2

(Question continues on next page)

(Turn over)

- (i) Describe the trend in the number of cases of chlamydia between 1996 and 2013. (2 marks)**

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- (ii) State the number of cases of chlamydia per 100 000 in 2013. (1 mark)**

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**(Question continues on next page)**

**(Turn over)**

- (iii) The population of the United Kingdom in 2013 was 64 000 000.**

**Calculate the number of people with chlamydia in 2013. (2 marks)**

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**(TOTAL FOR QUESTION 2 = 7 MARKS)**

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**(Questions continue on next page)**

**(Turn over)**

3 (a) Figure 3 shows the activity of the enzymes pepsin and trypsin at different pH levels.

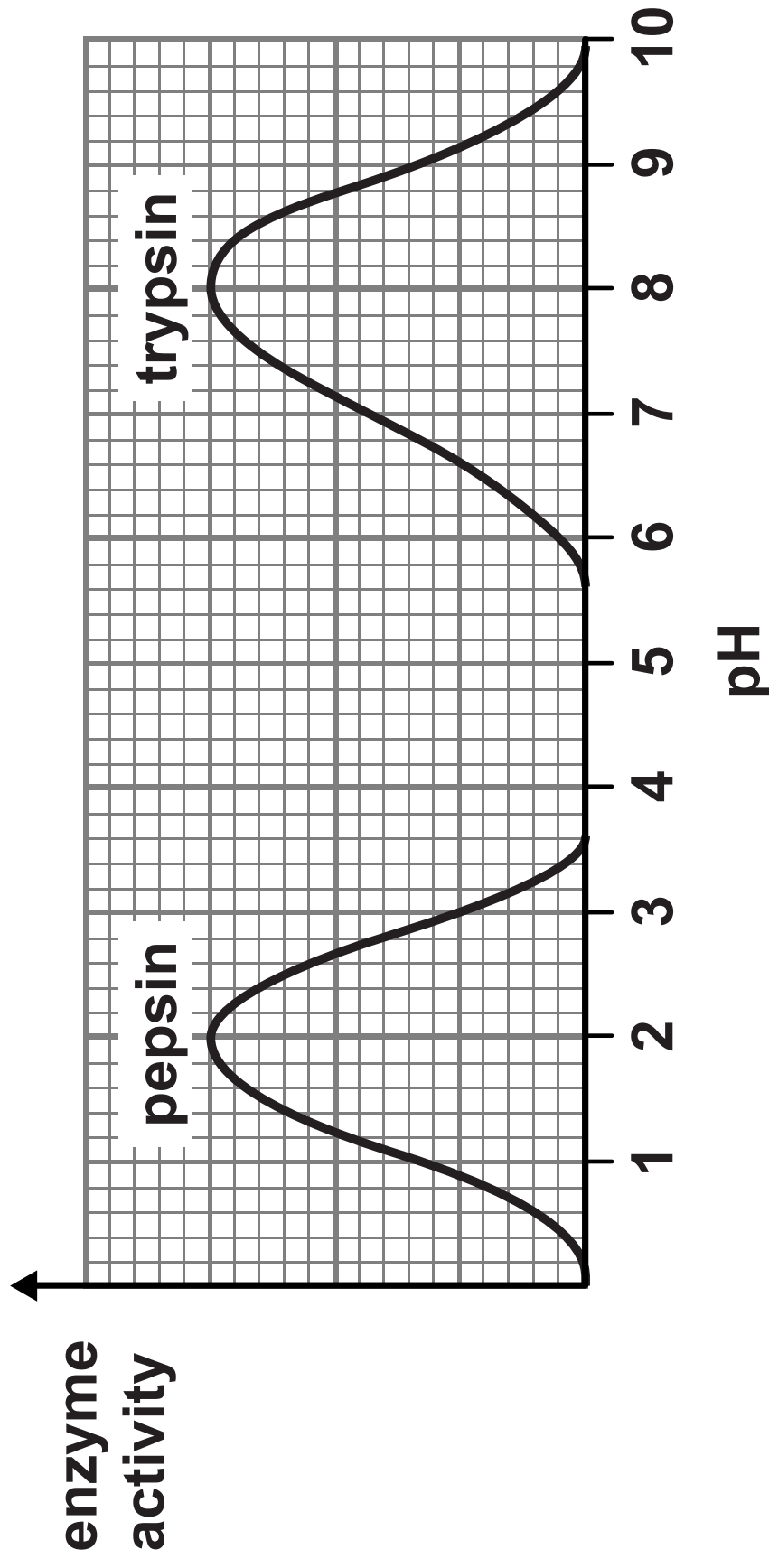


Figure 3

(Question continues on next page)

(Turn over)



- (i) Describe the trend in the graph for the enzyme TRYPSIN.

Use data from the graph to support your answer. (4 marks)

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(Continue your answer on next page)

(Turn over)

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**(Question continues on next page)**

**(Turn over)**

**(ii) State the optimum pH for the enzyme PEPSIN. (1 mark)**

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**(iii) Pepsin only works effectively in the stomach.**

**Describe the conditions in the stomach that allow pepsin to work effectively. (2 marks)**

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**(Question continues on next page)**

**(Turn over)**

**(b) At high pH values the active site of the enzyme pepsin changes shape.**

**When the active site of the enzyme changes shape, the enzyme is  
(1 mark)**

- ☐ **A specific**
- ☐ **B denatured**
- ☐ **C digested**
- ☐ **D dead**

**(c) State what is produced when proteins are digested. (1 mark)**

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**(TOTAL FOR QUESTION 3 = 9 MARKS)**

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**(Questions continue on next page)**

**(Turn over)**

- 4 (a) A karyogram is a picture of the chromosomes found in the nucleus of a single cell.

Figure 4 shows a human karyogram.

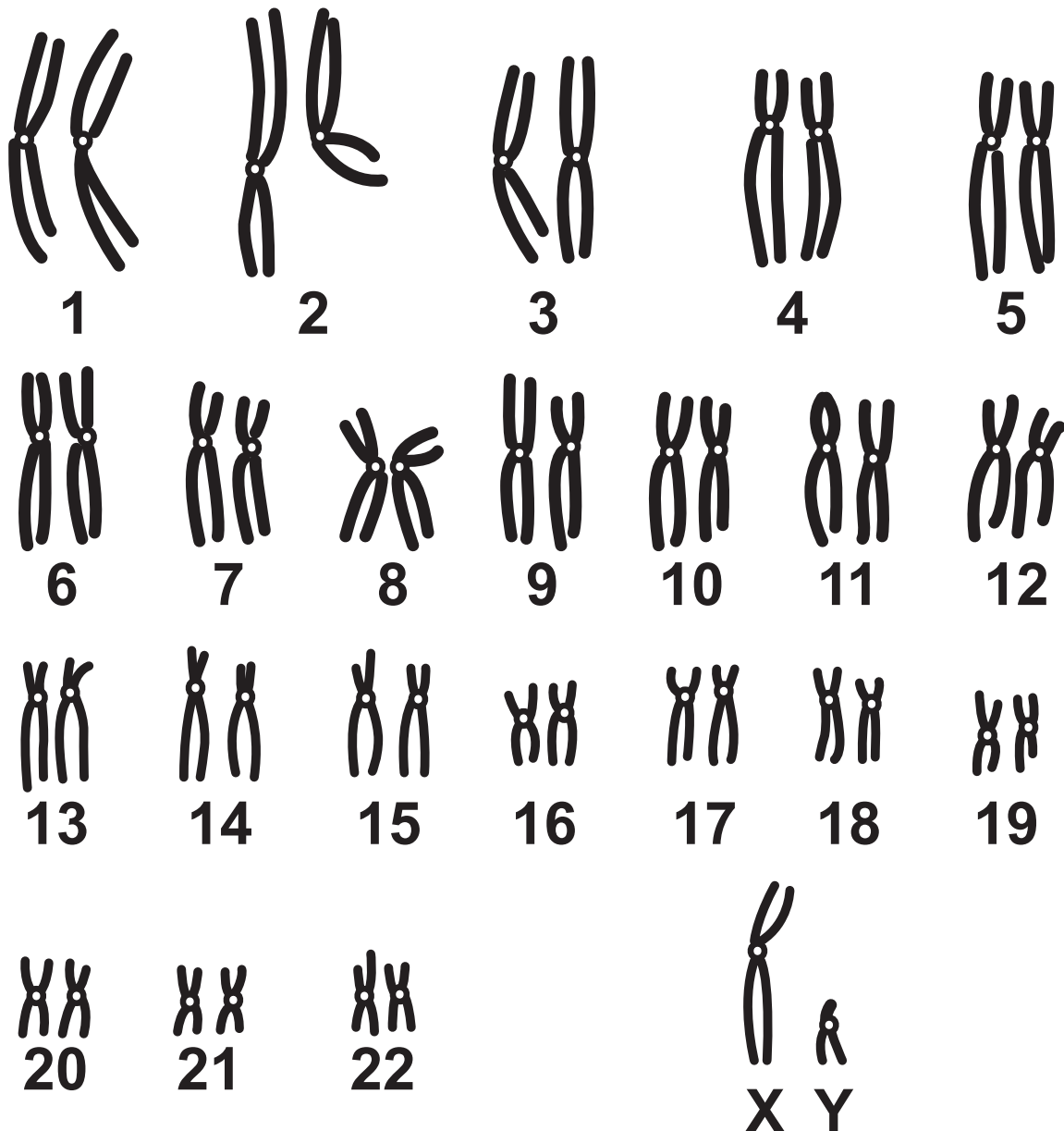


Figure 4

(Question continues on next page)

(Turn over)

- (i) State TWO reasons why this karyogram cannot be from a gamete (sex cell). (2 marks)

1 \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2 \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

- (ii) State the gender shown by this karyogram. (1 mark)

\_\_\_\_\_

(Question continues on next page)

(Turn over)

- (iii) Complete the Punnett square to show how gender is inherited. (2 marks)

		male gametes	
female gametes			

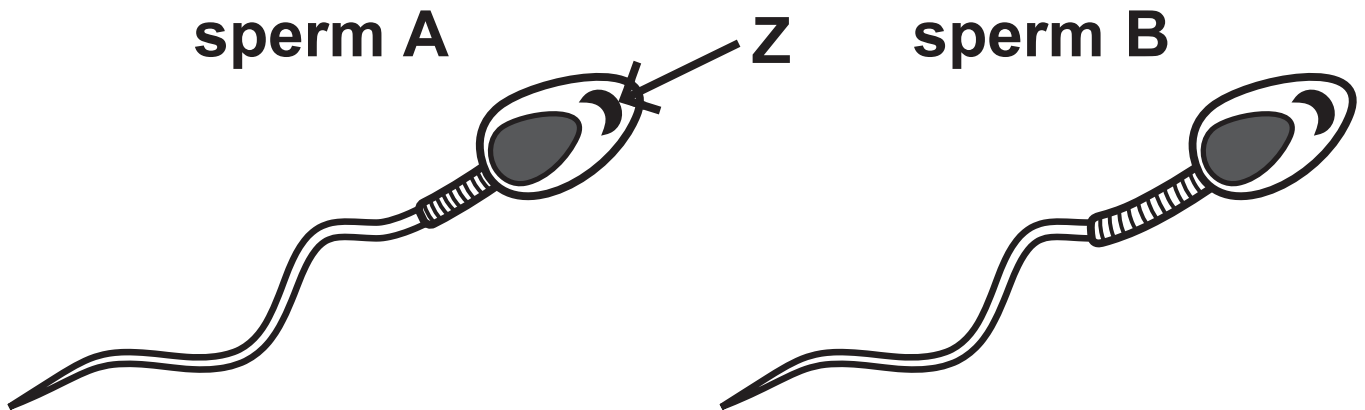
- (iv) State the probability that a child will be male. (1 mark)

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(Question continues on next page)

(Turn over)

**(b) Figure 5 shows two sperm cells.**



**Figure 5**

**(i) Name structure Z. (1 mark)**

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**(Question continues on next page)**

**(Turn over)**



- (ii) Sperm B has a larger middle section than sperm A.

Explain why sperm B will be more likely to fertilise an egg than sperm A if they were both released at the same time. (3 marks)

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**(TOTAL FOR QUESTION 4 = 10 MARKS)**

**(Questions continue on next page)**

**(Turn over)**

**5 (a) James Watson and Francis Crick built a model that showed that DNA has a double helix structure.**

**(i) Which statement about DNA is correct? (1 mark)**

- ☐ **A each pair of bases is joined by hydrogen bonds**
- ☐ **B phosphate groups are joined by hydrogen bonds**
- ☐ **C nucleotides consist of a sugar and a phosphate group only**
- ☐ **D bases are joined to phosphate molecules**

**(Question continues on next page)**

**(Turn over)**

(ii) Figure 6 shows the percentage of each base in human DNA.

percentage in  
human DNA (%)

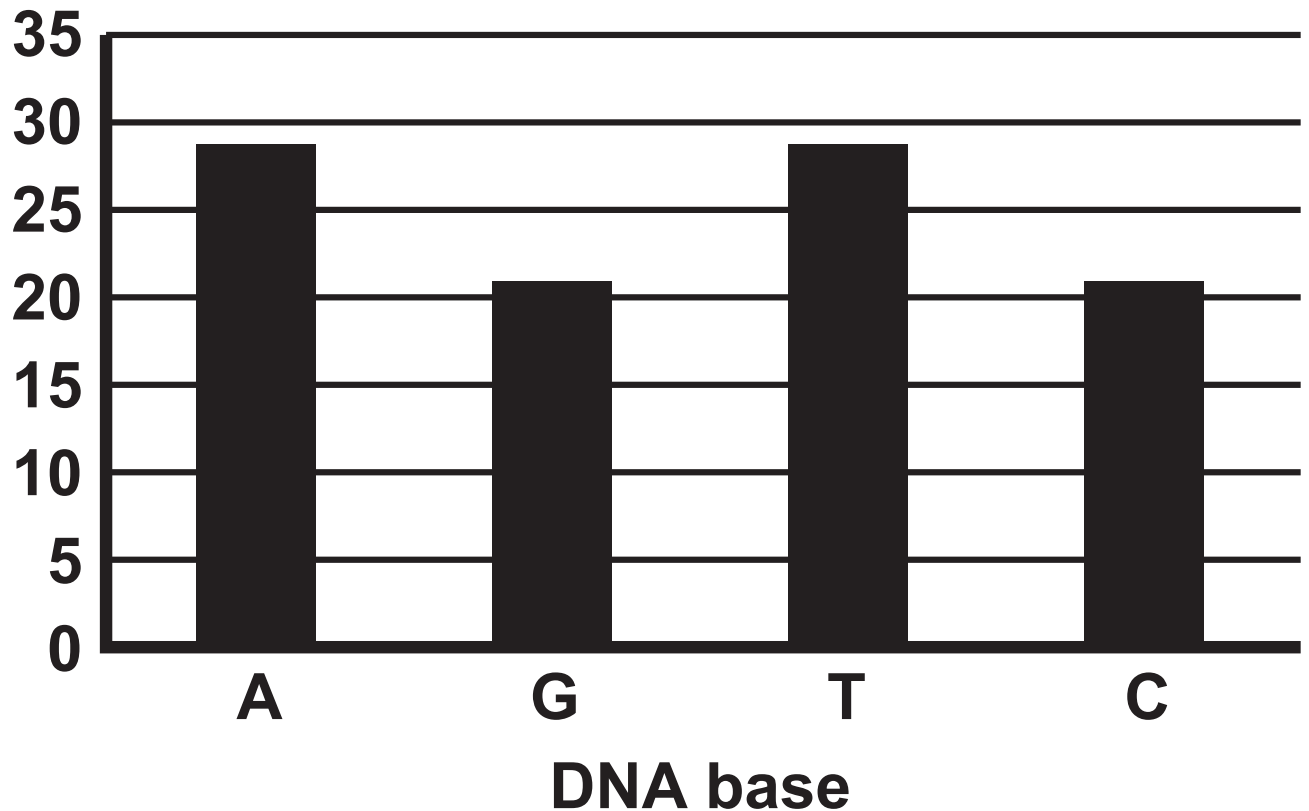


Figure 6

(Question continues on next page)

(Turn over)

**Describe how this data provides evidence for base pairing in DNA.  
(2 marks)**

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**(Question continues on next page)**

**(Turn over)**

**(b) A scientist obtained a mass of 0.0062 nanograms of DNA from a diploid human cell.**

**Calculate the mass of DNA the scientist should obtain from a haploid human cell.**

**Give your answer in picograms.  
(2 marks)**

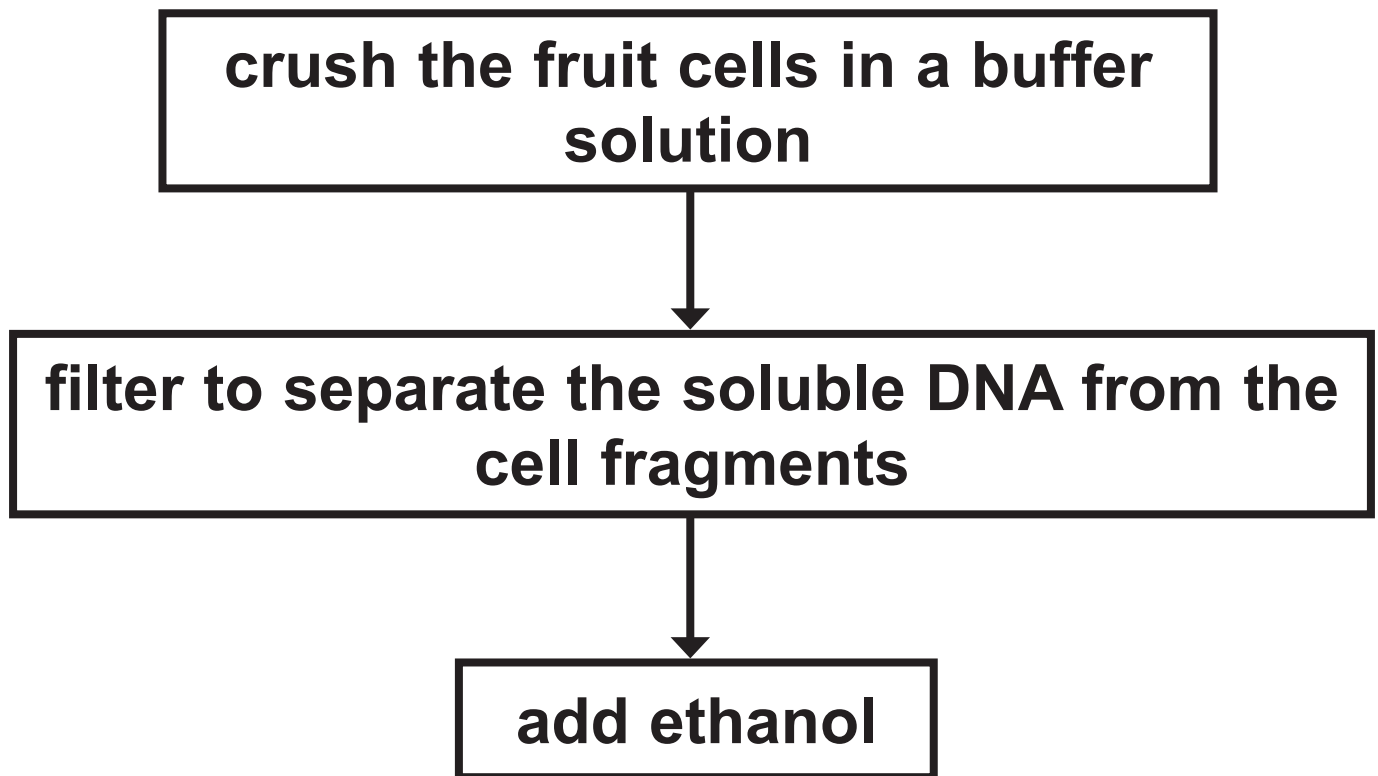
**(1 nanogram = 1000 picograms)**

\_\_\_\_\_ picograms

**(Question continues on next page)**

**(Turn over)**

- (c) A student used the method shown in Figure 7 to compare the mass of DNA extracted from strawberry fruit cells and from kiwi fruit cells.



**Figure 7**

**(Question continues on next page)**

**(Turn over)**

- (i) **State why ethanol is used.**  
**(1 mark)**

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**(Question continues on next page)**

- (ii) State TWO variables the student needs to control when using this method to compare the mass of DNA from these two fruits.  
(2 marks)

1 \_\_\_\_\_

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\_\_\_\_\_

2 \_\_\_\_\_

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(Question continues on next page)

(Turn over)



**(iii) The student repeated the experiment.**

**Give ONE reason why. (1 mark)**

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**(d) Mitosis and meiosis are processes that produce new cells.**

**Compare the outcomes of mitosis and meiosis. (3 marks)**

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**(Continue your answer on next page)**  
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**(TOTAL FOR QUESTION 5 = 12 MARKS)**

**(Questions continue on next page)**

**(Turn over)**

- 6 (a) *Clostridium tetani* is a bacterium that can be found in soil.

It causes the infection tetanus.

Children are vaccinated against tetanus.

Explain why these children do not get tetanus if the bacteria enter their body through a cut in the skin.  
(3 marks)

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**(Question continues on next page)**

**(Turn over)**

**(b) Colistin is an antibiotic used to treat infections in the bloodstream.**

**Some bacteria are resistant to Colistin.**

**Explain how these bacteria have become resistant to Colistin.  
(4 marks)**

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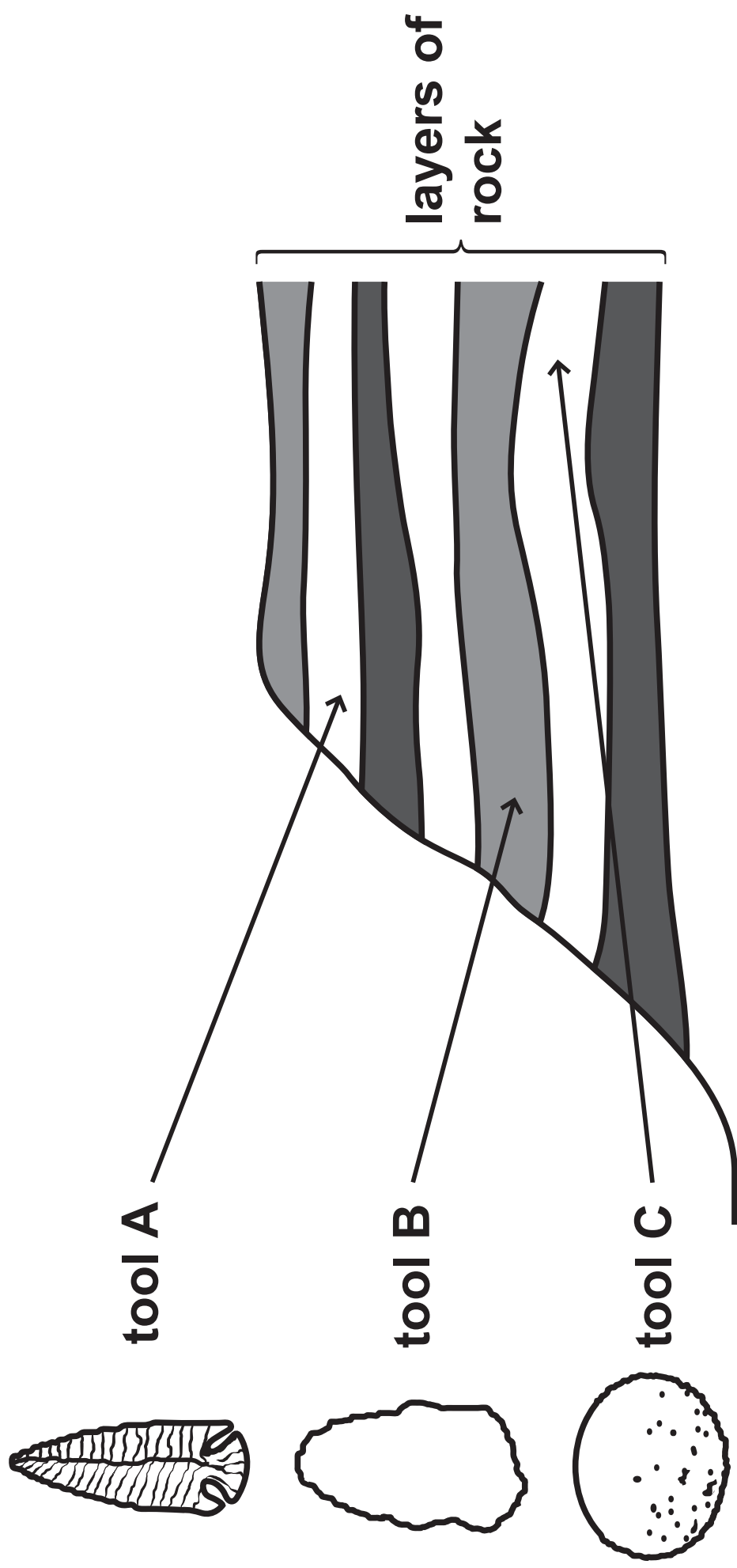
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**(Question continues on next page)**

**(Turn over)**

**\*(c) Figure 8 shows three stone tools found in different layers of rock.**



**Figure 8**

**(Question continues on next page)**

**(Turn over)**

**Explain how information from Figure 8 provides evidence for human evolution. (6 marks)**

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**(Continue your answer on next page)**

**(Turn over)**



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**TOTAL FOR PAPER = 60 MARKS**  
**END**