Please check the examination details below before entering your candidate information

Candidate surname	Other names

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

Centre Number | | | | | |

Candidate Number | | | | |

Tuesday 14 May 2019

Afternoon (Time: 1 hour 45 minutes) | Paper Reference **1BI0/1F**

Biology

Paper 1

Foundation Tier

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.*
- 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**.

Information

- The total mark for this paper is 100.
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*
- 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

- 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 ▶

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P 5 6 3 9 0 A 0 1 3 2

Pearson

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 ☒.

1 (a) Figure 1 shows a pea plant with flowers.

Figure 1

(i) Name the type of reproduction involving flowers.

(1)

.....

(ii) What is the advantage of reproduction involving flowers?

(1)

☒ **A** all the offspring are identical

☒ **B** there is variation in the offspring

☒ **C** there is no fertilisation

☒ **D** all the offspring grow faster

(b) The seeds produced by this pea plant can be round or wrinkled.

The allele for round seeds (R) is dominant to the allele for wrinkled seeds (r).

(i) A homozygous dominant round seeded plant was crossed with a homozygous recessive wrinkled seeded plant.

Complete the Punnett square to show the genotypes of the offspring.

(1)

	r	r
R		
R		

(ii) State the percentage of the offspring that will produce round seeds.

(1)

percentage = ... %

(iii) Which scientist discovered the basis of genetic inheritance by crossing pea plants?

(1)

☒ **A** Charles Darwin

☒ **B** Alfred Wallace

☒ **C** Louis Leakey

☒ **D** Gregor Mendel

(c) The blood group of a person is determined by their genotype.

Describe how a person inherits the blood group AB.

(2)

(Total for Question 1 = 7 marks)

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2 (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)

(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)

(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)

(b) Figure 2 shows a root cell in a stage of mitosis.

Figure 2

(i) Which stage of mitosis is shown in Figure 2?

(1)

- ☒ **A** prophase
- ☒ **B** metaphase
- ☒ **C** anaphase
- ☒ **D** telophase

(ii) Describe what is happening in Figure 2.

(3)

(Total for Question 2 = 9 marks)

3 (a) Chlamydia is caused by a pathogen.

(i) Chlamydia is transmitted by

(1)

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

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

(1)

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

(b) Figure 3 shows the number of cases of chlamydia in the United Kingdom per 100 000 people between 1996 and 2013.

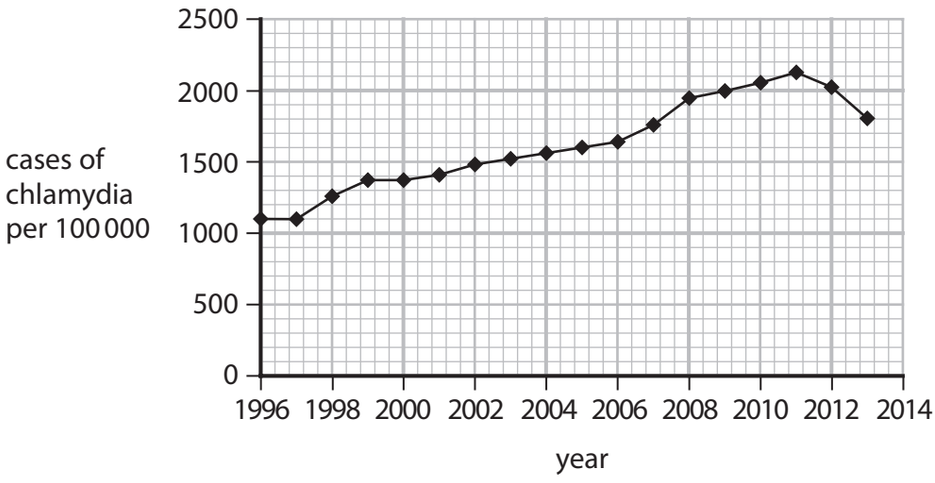

Figure 3

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

(2)

.....

.....

.....

.....

(ii) State the number of cases of chlamydia per 100 000 in 2013.

(1)

.....

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

Calculate the number of people with chlamydia in 2013.

(2)

.....

(Total for Question 3 = 7 marks)

4 (a) Figure 4 shows the structures in a leaf.

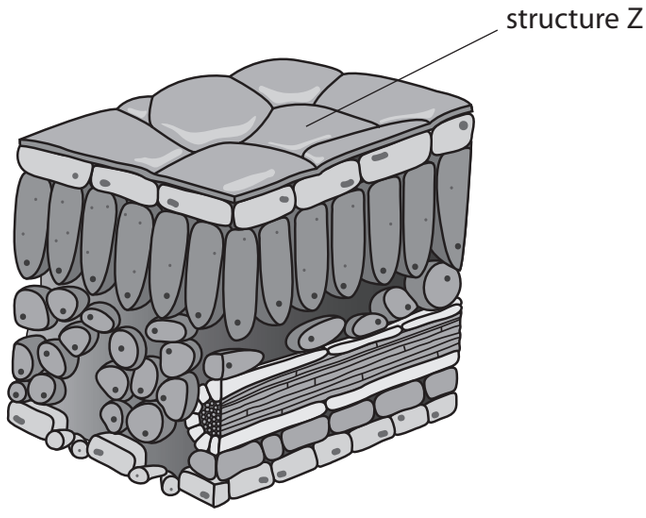

Figure 4

Explain how structure Z is involved in defence against pathogens.

(2)

(b) Chemicals can be extracted from plants.

Some of these chemicals can kill bacteria.

A scientist spread some bacteria on a nutrient agar plate as shown in Figure 5.

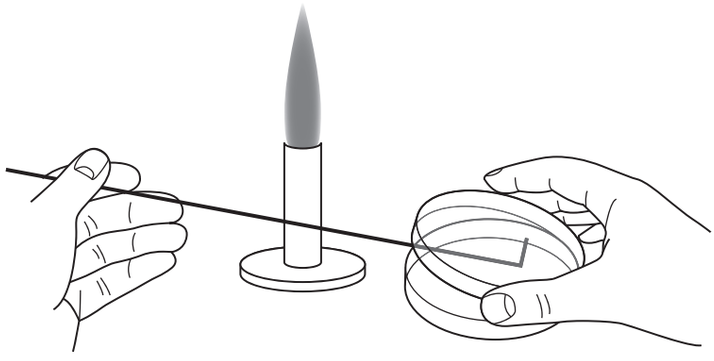

Figure 5

(i) What is being shown in Figure 5?

(1)

- ☒ **A** aseptic technique
- ☒ **B** cloning
- ☒ **C** genetic engineering
- ☒ **D** selective breeding

(ii) Explain why the scientist worked near to a Bunsen burner.

(2)

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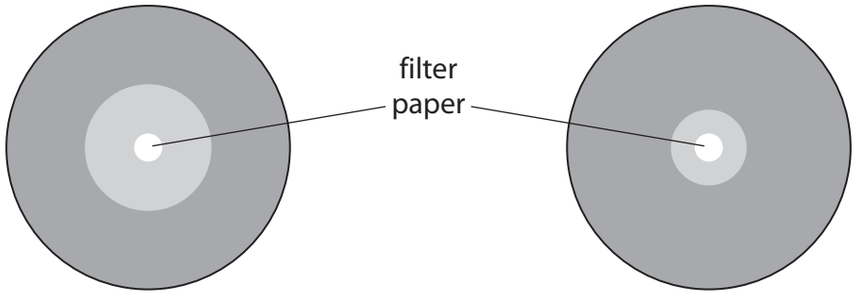
(c) A scientist spread bacteria onto the surface of two agar plates.

A filter paper disc was placed in the centre of each plate.

Each filter paper disc had been soaked in a different chemical extracted from plants.

The results are shown in Figure 6.



chemical A	chemical B
radius of zone of inhibition = 12 mm	radius of zone of inhibition = 8 mm

Figure 6

(i) The area of a circle is calculated using πr^2.

Calculate the area of the zone of inhibition for chemical A.

Use $\pi = 3.14$

(2)

..... mm^2

(ii) The scientist concluded that chemical A was more effective than chemical B at killing bacteria.

Give **two** variables the scientist needed to control to make this conclusion valid.

(2)

1 .....

.....

2 .....

.....

(d) Some crop plants have been genetically engineered to produce toxic chemicals in their leaves.

Explain **one** advantage of producing these genetically modified crop plants.

(2)

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(Total for Question 4 =11 marks)

5 (a) Figure 7 shows the activity of the enzymes pepsin and trypsin at different pH levels.

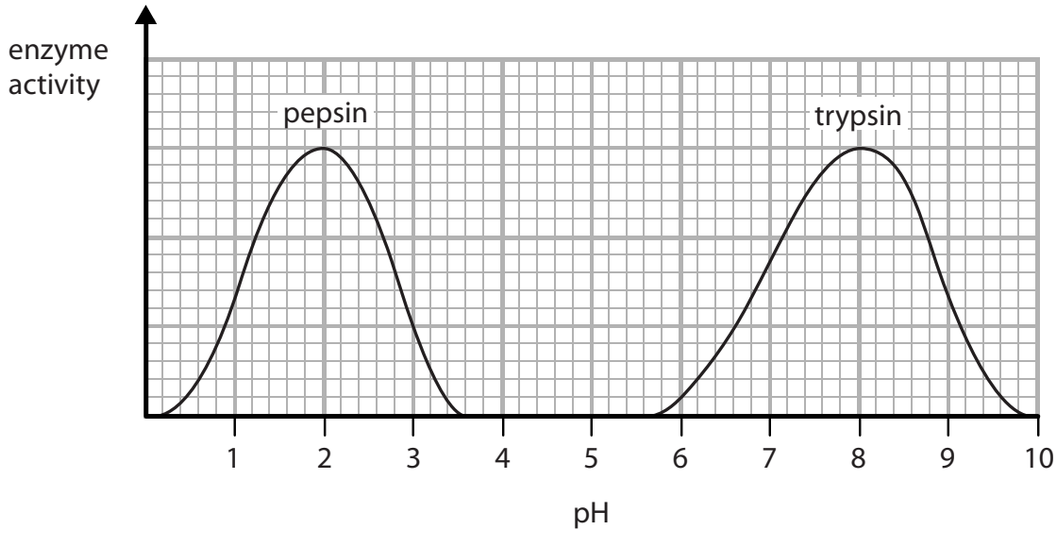

Figure 7

(i) Describe the trend in the graph for the enzyme **trypsin**.

Use data from the graph to support your answer.

(4)

(ii) State the optimum pH for the enzyme **pepsin**.

(1)

.....

(iii) Pepsin only works effectively in the stomach.

Describe the conditions in the stomach that allow pepsin to work effectively.

(2)

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(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)

☒ **A** specific

☒ **B** denatured

☒ **C** digested

☒ **D** dead

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

(1)

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(Total for Question 5 = 9 marks)

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

Figure 8 shows a human karyogram.

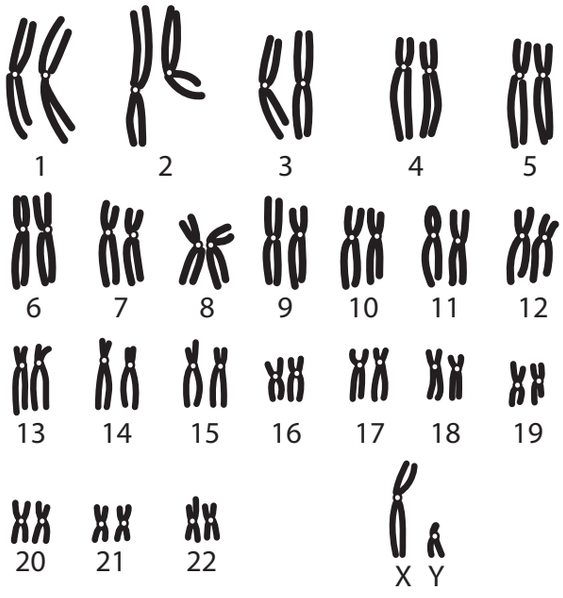

Figure 8

(i) State **two** reasons why this karyogram cannot be from a gamete (sex cell).

(2)

1 .....

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2 .....

.....

(ii) State the gender shown by this karyogram.

(1)

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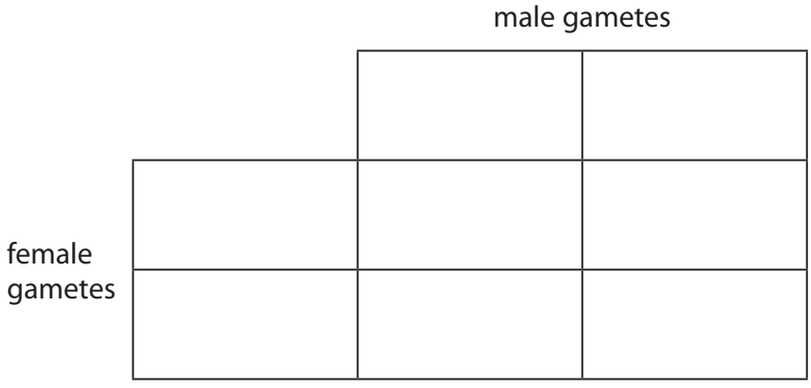
(iii) Complete the Punnett square to show how gender is inherited.

(2)



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

(1)

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(b) Figure 9 shows two sperm cells.

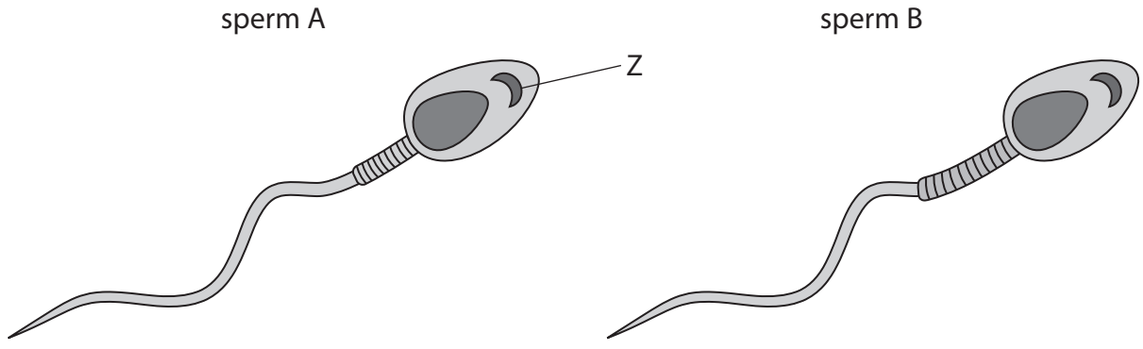

Figure 9

(i) Name structure Z.

(1)

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(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)

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(Total for Question 6 = 10 marks)

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7 Starch is a nutrient in food.

Starch is a source of energy.

(a) Name the enzyme that breaks down starch.

(1)

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(b) Enzymes from different parts of the digestive system were used to investigate the breakdown of starch.

Figure 10 shows the apparatus used in this investigation.

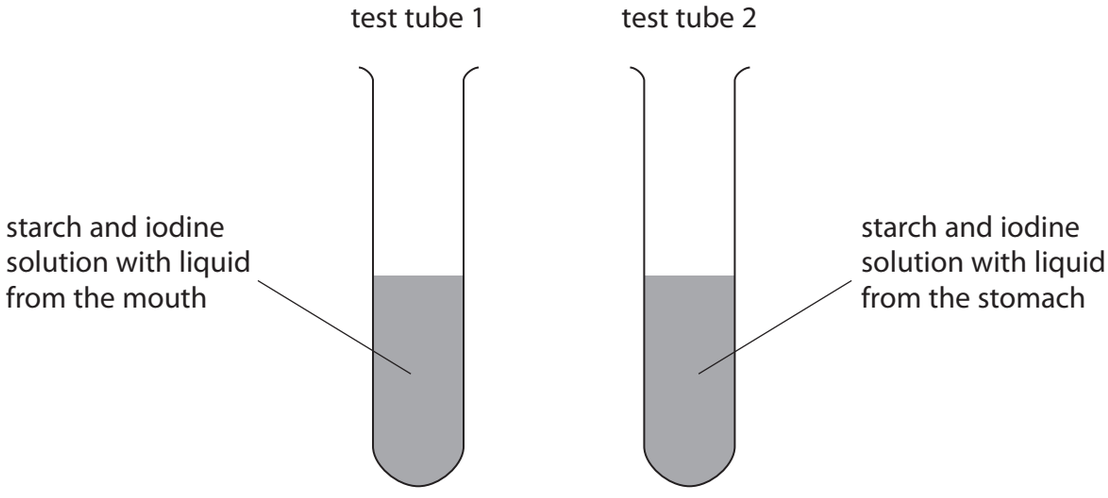

Figure 10

The colour of the contents of each test tube was recorded every two minutes for a total of ten minutes.

The results are shown in Figure 11.

	colour of the contents of each test tube	
time in minutes	**test tube 1** starch and iodine solution with liquid from the mouth	**test tube 2** starch and iodine solution with liquid from the stomach
0	blue-black	blue-black
2	blue-black	blue-black
4	brown	blue-black
6	orange	blue-black
8	orange	blue-black
10	orange	blue-black

Figure 11

(i) Give **one** reason why the contents of both test tubes were blue-black at the beginning of the investigation.

(1)

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(ii) Explain the results of this investigation after ten minutes.

(3)

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*(c) The diagram shows equipment that can be used to measure the energy content of different foods.

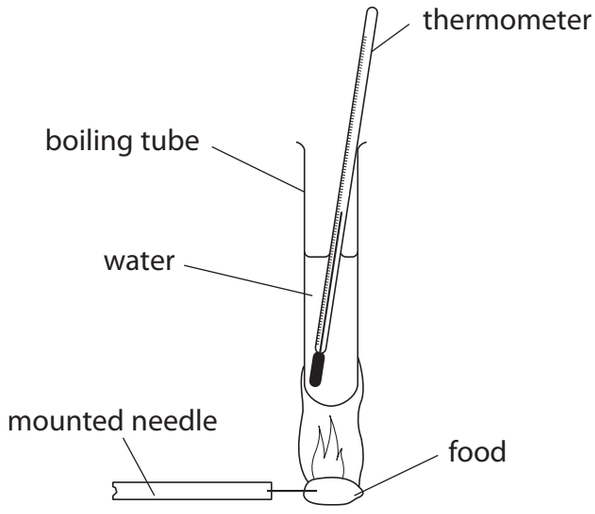

Figure 12

Devise a method to compare the energy content of two foods using this equipment.

Include details of how to control the variables.

(6)

(Total for Question 7 = 11 marks)

8 (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)

- ☒ **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

(ii) Figure 13 shows the percentage of each base in human DNA.

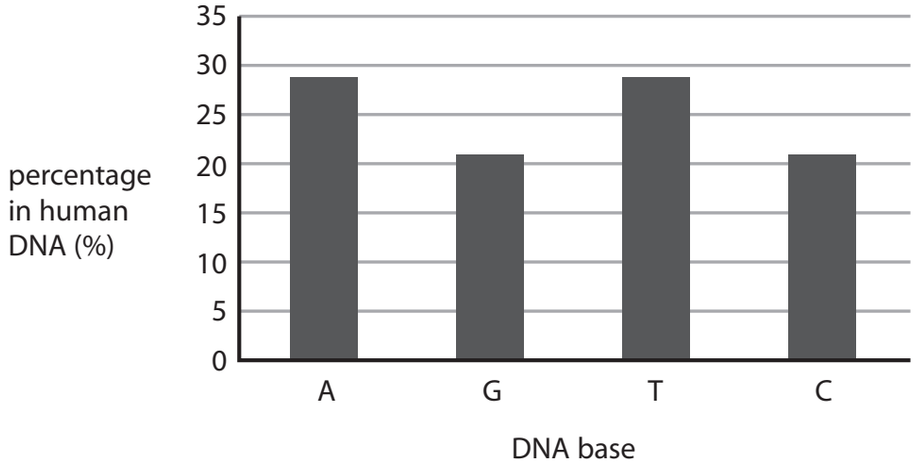

Figure 13

Describe how this data provides evidence for base pairing in DNA.

(2)

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(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.

(1 nanogram = 1000 picograms)

(2)

..... picograms

(c) A student used the method shown in Figure 14 to compare the mass of DNA extracted from strawberry fruit cells and from kiwi fruit cells.

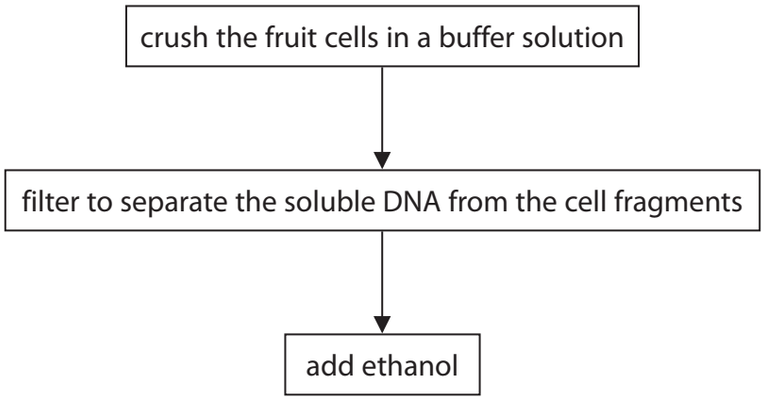

Figure 14

(i) State why ethanol is used.

(1)

.....

.....

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

(2)

1 .....

.....

2 .....

.....

(iii) The student repeated the experiment.

Give **one** reason why.

(1)

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.....

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

Compare the outcomes of mitosis and meiosis.

(3)

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(Total for Question 8 = 12 marks)

9 (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)

(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)

*(c) Figure 15 shows three stone tools found in different layers of rock.

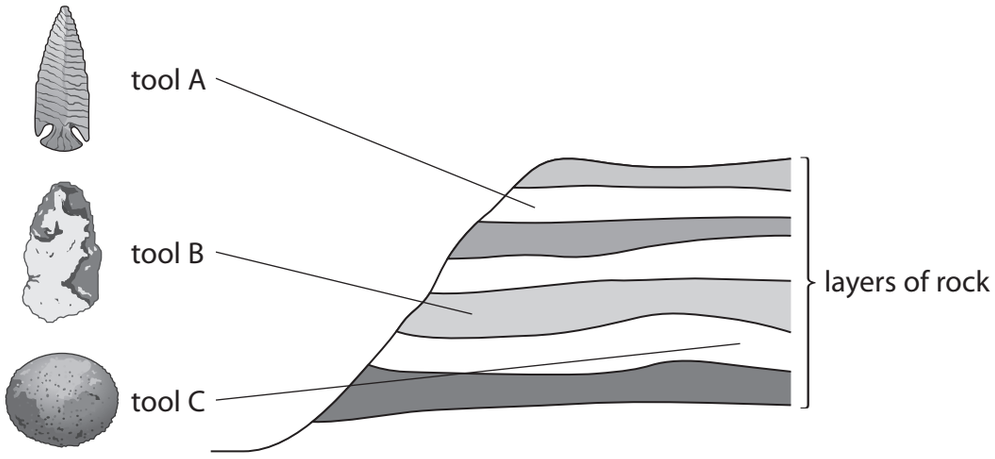

Figure 15

Explain how information from Figure 15 provides evidence for human evolution.

(6)

(Total for Question 9 = 13 marks)

10 (a) The effect of age on focusing distance was investigated.

Volunteers of different ages had their eyes tested.

Each volunteer was asked to read words from a book. The book was moved closer to their eyes.

When the words became out of focus, the distance was recorded.

Figure 16 shows the results.

age of volunteers	distance (mm)			mean distance (mm)
	person 1	person 2	person 3	
40	256	261	257	258
45	282	275	280	279
50	292	301	297	?
55	311	309	307	309

Figure 16

(i) Calculate the mean distance for the volunteers aged 50.

Give your answer to three significant figures.

(3)

..... mm

(ii) Give **one** conclusion that can be made from the data in Figure 16.

(1)

.....

.....

(iii) Give **two** improvements that are needed in this investigation before a valid conclusion can be made.

(2)

1 .....

.....

2 .....

.....

(b) Which part of the eye detects coloured light?

(1)

☒ **A** iris

☒ **B** lens

☒ **C** cones

☒ **D** cornea

(c) Figure 17 shows light rays entering the eye of a person with normal vision.

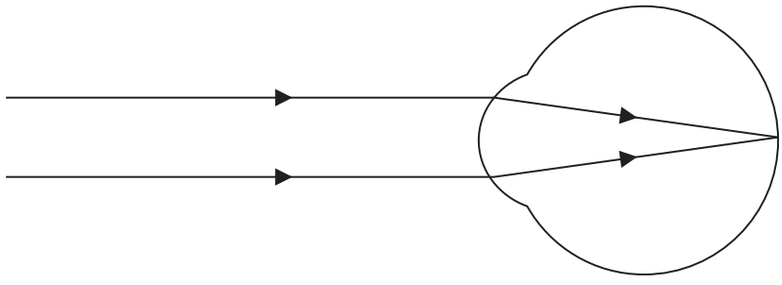

Figure 17

(i) Describe how light rays are focused to give normal vision.

(2)

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(ii) Figure 18 shows light rays entering the eye of a person with an eye defect and two lenses that can be used to correct eye defects.

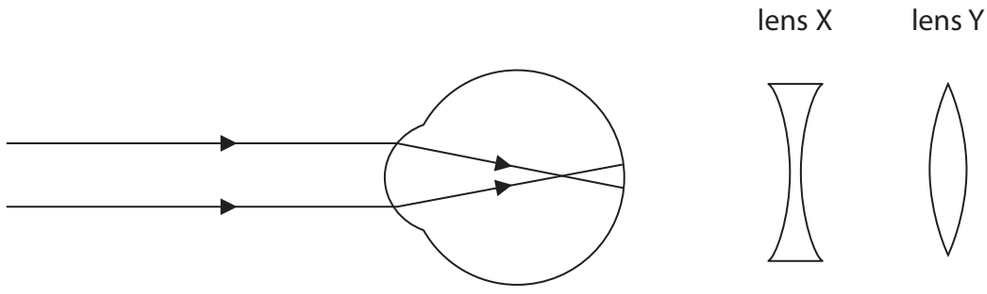

Figure 18

Explain which lens would correct the eye defect shown in Figure 18.

(2)

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(Total for Question 10 = 11 marks)

TOTAL FOR PAPER = 100 MARKS

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