Write your name here

Surname	Other names

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

Centre Number	Candidate Number

Combined Science

Paper 1: Biology 1

Foundation Tier

Sample Assessment Materials for first teaching September 2016	Paper Reference
Time: 1 hour 10 minutes	**1SC0/1BF**

You must have:	Total Marks
Calculator, ruler	

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 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.*
- 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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S 5 0 0 5 3 A 0 1 2 0

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 Eye colour is controlled by genes.

The allele for brown eyes, B, is dominant to the allele for blue eyes, b.

(a) A female with blue eyes and a male with brown eyes are about to have a child.

Complete the Punnett square to determine the phenotype of the child.

(2)

		man	
		B	B
woman	b		
	b		

Phenotype of child .....

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(b) A scientist recorded the eye colour of 30 people.

The results are shown in Figure 1.

blue	green	blue	brown	brown	brown	hazel	blue	
brown	hazel	blue	blue	hazel	green	brown	brown	
blue	green	brown	brown	blue	hazel	blue	brown	brown
brown	blue	brown	brown	brown				

Figure 1

(i) Complete the tally chart, in Figure 2, for this data.

(2)

eye colour			
blue	brown	green	hazel
total.....	total.....	total.....	total.....

Figure 2

(ii) Give another appropriate method of displaying this information.

(1)

.....

.....

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A section of one allele for eye colour has the following DNA sequence:

ATGGCTAAGTA

(c) (i) Which sequence is the complementary DNA strand?

(1)

- ☒ **A** ATGGCTAAGTA
- ☒ **B** CGTTAGCCTGC
- ☒ **C** TACCGATTCAT
- ☒ **D** GCAATGGACG

(ii) Give **one** way in which a second allele for eye colour might be different.

(1)

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Figure 3 outlines a method that can be used to extract DNA from fruit.

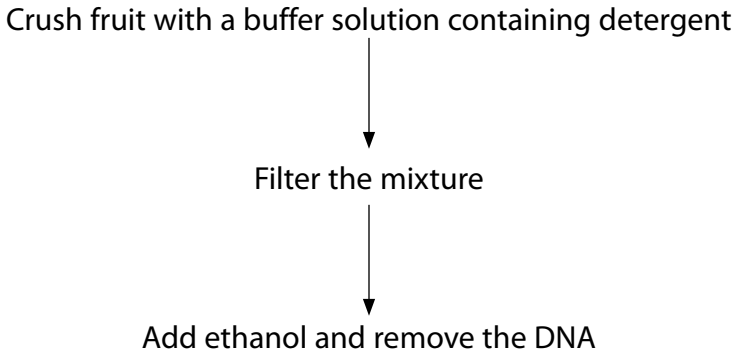

Figure 3

(d) (i) Give a reason for filtering the mixture.

(1)

.....

.....

(ii) What is the role of the ethanol?

(1)

- ☒ **A** denature the enzymes
- ☒ **B** disrupt cell membranes
- ☒ **C** supercoil the DNA
- ☒ **D** to precipitate the DNA

(Total for Question 1 = 9 marks)

2 Antibiotics can be used to treat Chlamydia, which is a sexually transmitted infection.

(a) What type of pathogen causes Chlamydia?

(1)

☒ **A** bacteria

☒ **B** fungus

☒ **C** protist

☒ **D** virus

Figure 4 shows the number of new cases of Chlamydia diagnosed each year, in a region of the UK, between 2000 and 2008.

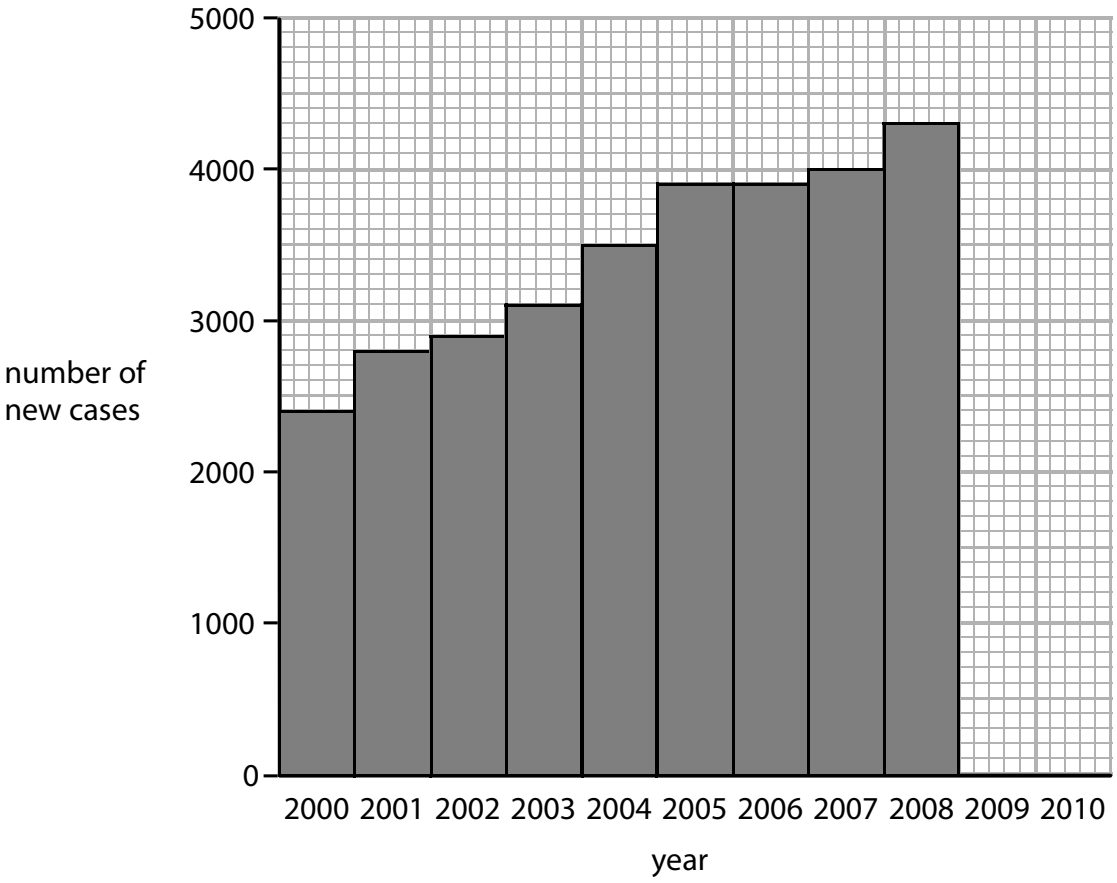

Figure 4

(b) (i) In 2009 there were 4800 new cases diagnosed.

In 2010 there were 4100 new cases diagnosed.

Plot this data on the graph in Figure 4.

(1)

(ii) Describe the trend in cases between 2000 and 2010.

(2)

People infected with Chlamydia are more likely to be infected with the STI Gonorrhoea.

(iii) Explain how people become infected with both Chlamydia and Gonorrhoea.

(2)

HIV is a sexually transmitted infection.

(c) Explain how infection with HIV can lead to AIDS.

(2)

(Total for Question 2 = 8 marks)

3 Figure 6 shows a diagram of a cell.

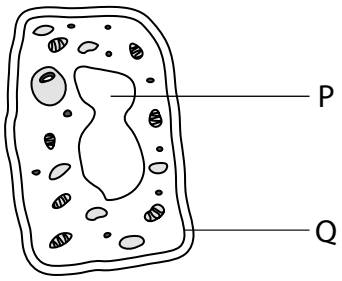

Figure 5

(a) (i) Which row of the table identifies both structure P and structure Q?

(1)

		structure P	structure Q
☒	**A**	nucleus	cell membrane
☒	**B**	nucleus	cell wall
☒	**C**	vacuole	cell membrane
☒	**D**	vacuole	cell wall

(ii) Plant cells have a cell wall and a large vacuole.

Draw one straight line from each structure to its function.

(2)

structure	**function**
	where respiration occurs
cell wall	contains cellulose to provide support
	where photosynthesis occurs
large vacuole	controls the cell
	stores cell sap

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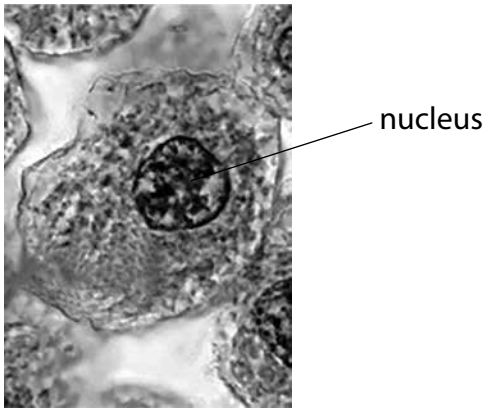
Figure 6 shows an image of an animal cell taken using a microscope with a 10× eyepiece lens and a 40× objective lens.



(Source: © Ed Reschke/Getty Images)

Figure 6

(b) (i) The total magnification of the animal cell is

(1)

- ☒ **A** ×50
- ☒ **B** ×140
- ☒ **C** ×400
- ☒ **D** ×4000

(ii) The diameter of the cell is 15 μm.

Use Figure 7 to estimate the diameter of the cell nucleus.

(1)

diameter of nucleus = ... μm

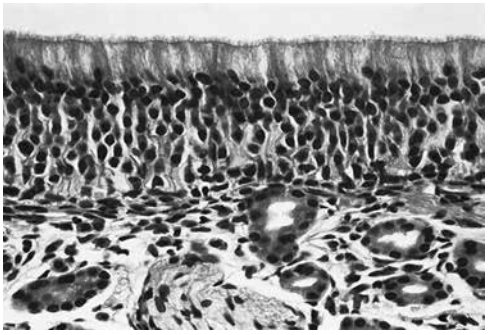
(iii) Give the measurement of 15 μm in mm.

(1)

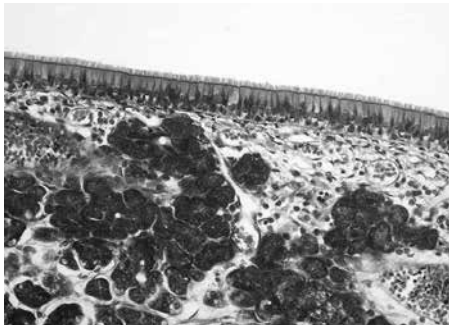
..... mm

The development of electron microscopes has increased our understanding of cells and their features.

Figure 7 shows two images of ciliated epithelium, one taken using a light microscope and one using an electron microscope.



Light microscope



Electron microscope

(Science photolibrary Epithelium C022/2228 C023/4048)

Figure 7

(c) Explain how the electron microscope image helps us to understand more about ciliated epithelium.

(3)

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(Total for Question 3 = 9 marks)

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4 Cell division processes are used to produce body cells and gametes.

The nucleus of a daffodil cell has 46 chromosomes.

(a) (i) State the number of chromosomes in each pollen grain from this daffodil.

(1)

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.....

(ii) Humans share 35% of their DNA with a daffodil.

The human genome contains 6600 million bases.

Calculate the number of bases that are the same as a daffodil.

(2)

number of bases = ... million

Figure 8 shows the development of a human embryo from a fertilised egg.

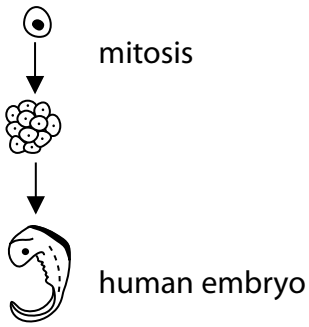

Figure 8

(b) (i) Explain how many cells are produced from one fertilised egg, after two cell divisions by mitosis.

(2)

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(ii) Which process occurs causing the divided cells to become specialised?

(1)

- ☒ **A** meiosis
- ☒ **B** cloning
- ☒ **C** differentiation
- ☒ **D** cytokinesis

A student wanted to observe dividing cells under a microscope.

The student squashed the root tip of an onion plant on a microscope slide.

(c) (i) Describe how the student should use a light microscope to view the squashed root tip.

(3)

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(ii) Even though the slide was at the correct magnification, the student could not see the chromosomes in the dividing cells.

State what could be done to the slide to make the chromosomes more visible.

(1)

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(Total for Question 4 = 10 marks)

5 Figure 9 shows the times when *Homo sapiens* and some of their ancestral species are thought to have lived.

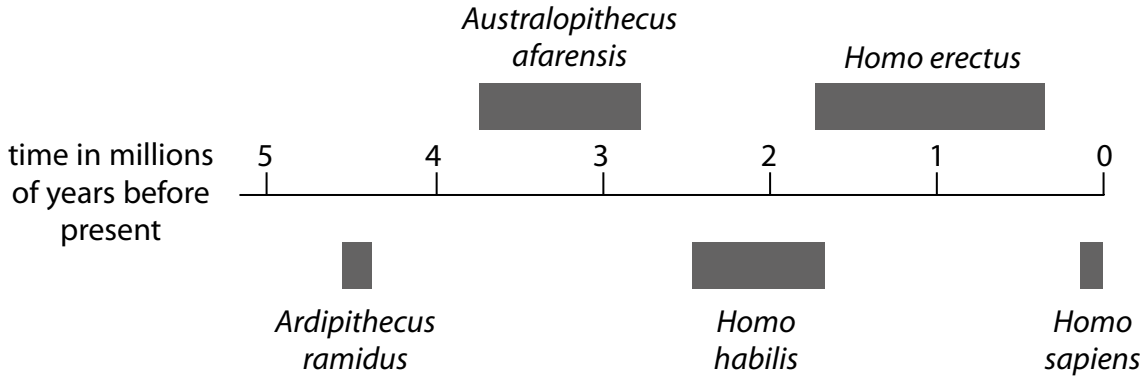

Figure 9

(a) Fossil remains of *Ardipithecus ramidus* were discovered in Ethiopia.

(i) Calculate the number of years *Ardipithecus ramidus* is thought to have inhabited the Earth.

(2)

Answer .....

(ii) Describe the evidence that scientists might have used to show that *Ardipithecus ramidus* inhabited the Earth earlier than *Homo habilis.*

(2)

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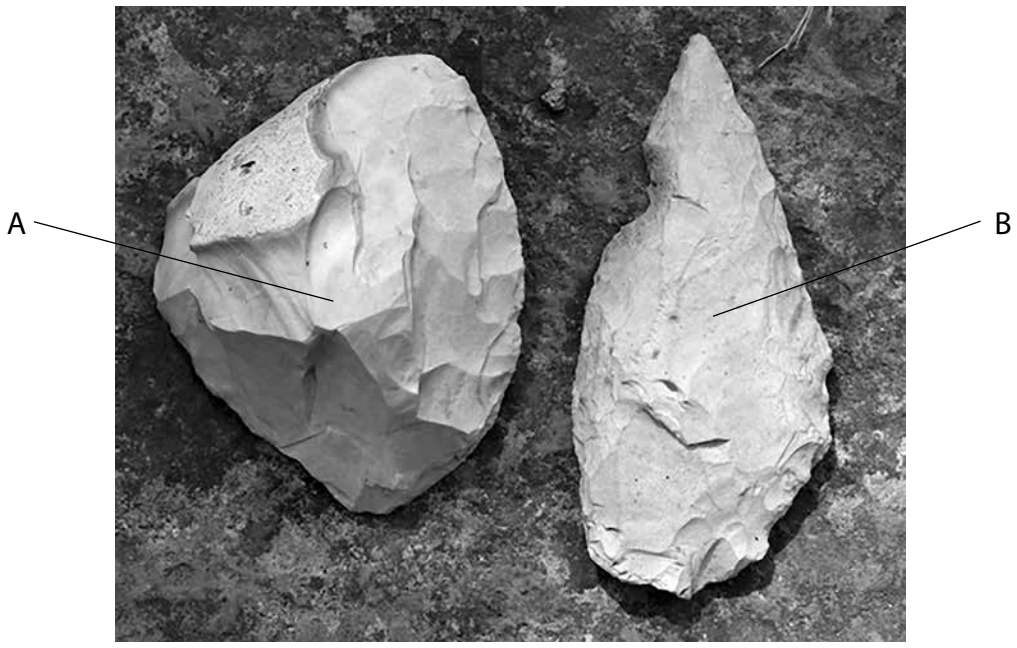
(iii) Suggest an explanation for the extinction of *Homo habilis*.

Use information from Figure 9.

(2)

Figure 10 shows two stone tools, one used by *Homo habilis* and one used by *Homo erectus*.



(Source: Frederic Surmely/look at sciences/Science Photo Library)

Figure 10

(iv) Explain which stone tool was most likely to be used by *Homo erectus*.

Use information from Figure 9 and Figure 10.

(2)

(b) The population of humans on Earth has increased significantly, leading to food shortages.

The growth of drought-resistant crop plants could lead to an increase in food supply.

Describe how drought-resistant crop plants can be produced.

(3)

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(Total for Question 5 = 11 marks)

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6 The ratio of waist-to-hip measurements can be used to determine the risk of a person developing cardiovascular disease.

(a) Calculate the waist-to-hip ratio for a person with a waist measurement of 830 mm and a hip measurement of 0.99 m.

Give your answer to two decimal places.

(2)

Answer = ...

Dieting can reduce the effects of cardiovascular disease.

A scientist is planning to test a new diet for weight loss.

She selects 40 obese people to take part in the test.

All the obese people are between 20 and 30 years of age.

(b) (i) State **two** other factors the scientist should control when selecting the people.

(2)

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(ii) Devise a plan the scientist could use to test the effectiveness of the new diet using the 40 obese people.

(3)

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Smoking is a lifestyle factor that can cause many diseases.

Figure 11 shows the trends in smoking between 1960 and 2010 for men and women.

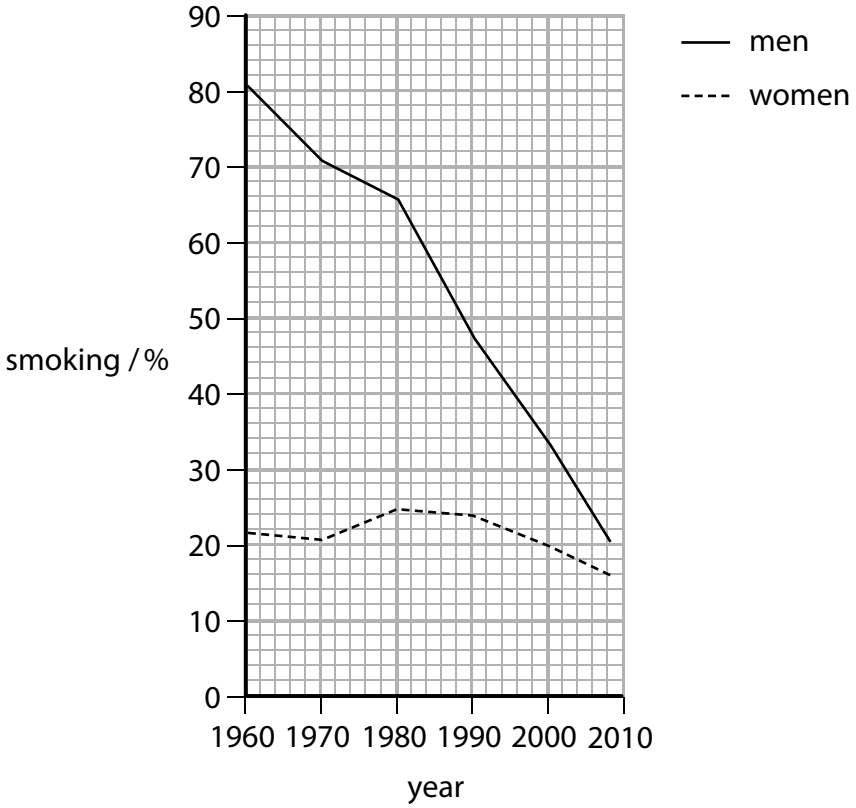

Figure 11

*(c) Explain how the changes in the trends for smoking may affect the occurrence of cardiovascular disease.

(6)

(Total for Question 6 = 13 marks)

TOTAL FOR PAPER = 60 MARKS