Please check the examination details below before entering your candidate information

Candidate surname	Other names

Centre Number | Candidate Number

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

Tuesday 16 May 2023

Morning (Time: 1 hour 10 minutes)

Paper reference **1SC0/1BF**

Combined Science
PAPER 1

Foundation Tier

You must have:
Ruler, calculator

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.*
- 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 7 2 5 5 4 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 (a) Figure 1 shows an animal cell.

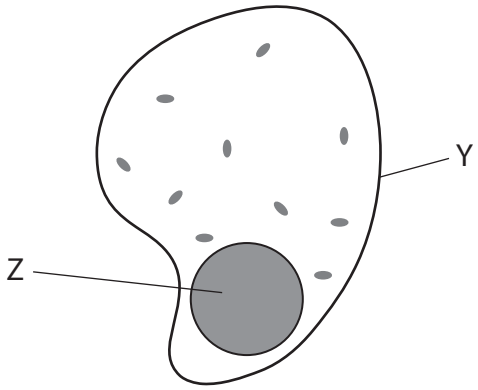


Figure 1

(i) Which part of the cell is labelled Y?

(1)

☒ **A** cell wall

☒ **B** cell membrane

☒ **C** nucleus

☒ **D** cytoplasm

(ii) Which structures are found in the part labelled Z?

(1)

☒ **A** chromosomes

☒ **B** mitochondria

☒ **C** ribosomes

☒ **D** vacuoles

(iii) Name the part of an animal cell where respiration occurs.

(1)

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(b) A microscope can be used to observe the structure of a cell.

Figure 2 shows a microscope.



© RouDhi/Shutterstock

Figure 2

(i) Give **one** advantage of using a microscope to look at cells.

(1)

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(ii) Draw **one** straight line from each part of the microscope to its function.

(2)

part of the microscope	**function**
eyepiece	to carry the microscope
stage	to make the cells look brighter
	to look through to see the cells
	to place a slide on
	to reflect light onto the cells

(c) Figure 3 shows some of the units used when cells and organelles are measured.

micrometre = 10^{-6} m	picometre = 10^{-12} m
nanometre = 10^{-9} m	millimetre = 10^{-3} m

Figure 3

Give the name of the smallest unit shown in Figure 3.

(1)

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(Total for Question 1 = 7 marks)

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2 (a) Figure 4 shows fossils in different layers of rock.

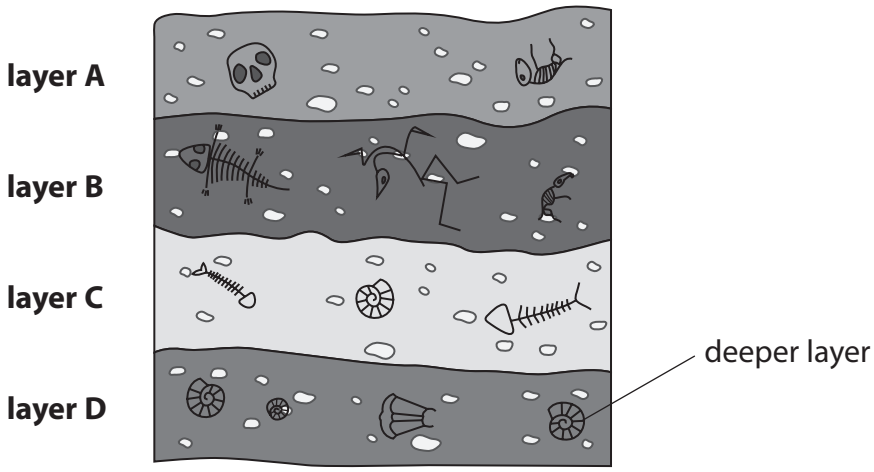


Figure 4

(i) Which layer of rock is likely to contain the most recent fossils?

(1)

☒ **A** layer A

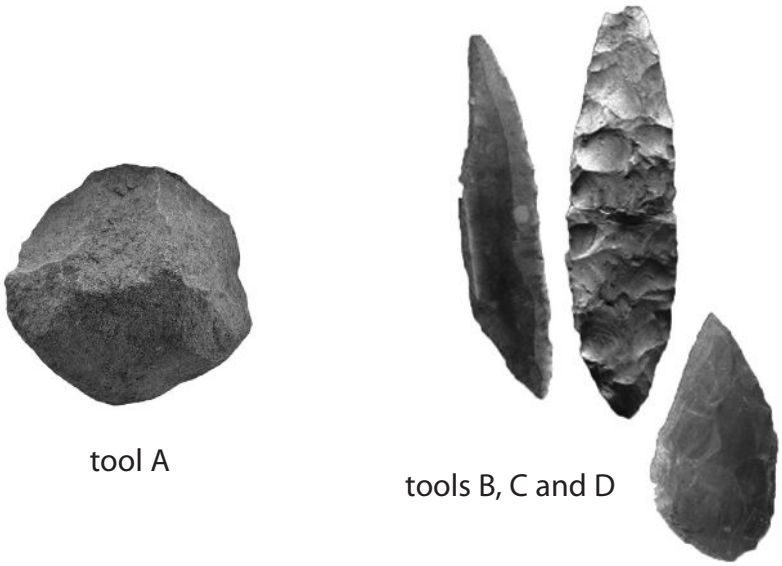
☒ **B** layer B

☒ **C** layer C

☒ **D** layer D

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Figure 5 shows some stone tools from two different periods of time.



tool A

tools B, C and D

© Yes058 Montree Nanta/Shutterstock

Figure 5

(ii) Explain **one** difference between tool A and tools B, C and D.

(2)

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(b) Our human ancestors domesticated animals.

Animals were domesticated to use as working animals and to keep as pets.

(i) Use words from the box to complete the sentences.

(2)

asexual	characteristics	evidence
ideas	inherited	selective

Animals with the most desirable ..... were bred together.

This is called ..... breeding.

(ii) Scientists have analysed the genomes of domestic animals.

Which is the definition of a genome?

(1)

☒ **A** all the cells of an organism

☒ **B** all the enzymes of an organism

☒ **C** all the DNA of an organism

☒ **D** all the structures of an organism

(iii) Give **one** advantage of domesticating animals.

(1)

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(Total for Question 2 = 7 marks)

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3 (a) Which is the reason why obesity is a non-communicable disease?

(1)

- ☒ **A** it is spread from person to person
- ☒ **B** it is caused by a virus
- ☒ **C** it is not spread from person to person
- ☒ **D** it lasts for a short time

(b) Several factors affect the risk of developing cardiovascular disease.

Figure 6 shows different BMI ranges and their weight descriptions.

BMI range	weight description
18.5 to 24.9	healthy weight
25.0 to 29.9	overweight
30.0 to 39.9	obese
40 or more	severely obese

Figure 6

(i) A person has a BMI of 39.0

Explain the risk of this person developing cardiovascular disease.

(2)

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(ii) Changes in lifestyle can reduce the risk of cardiovascular disease.

State **two** other treatments for cardiovascular disease.

(2)

1 .....

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2 .....

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(c) Figure 7 shows the percentage of people who smoked cigarettes in England from 2011 to 2019.

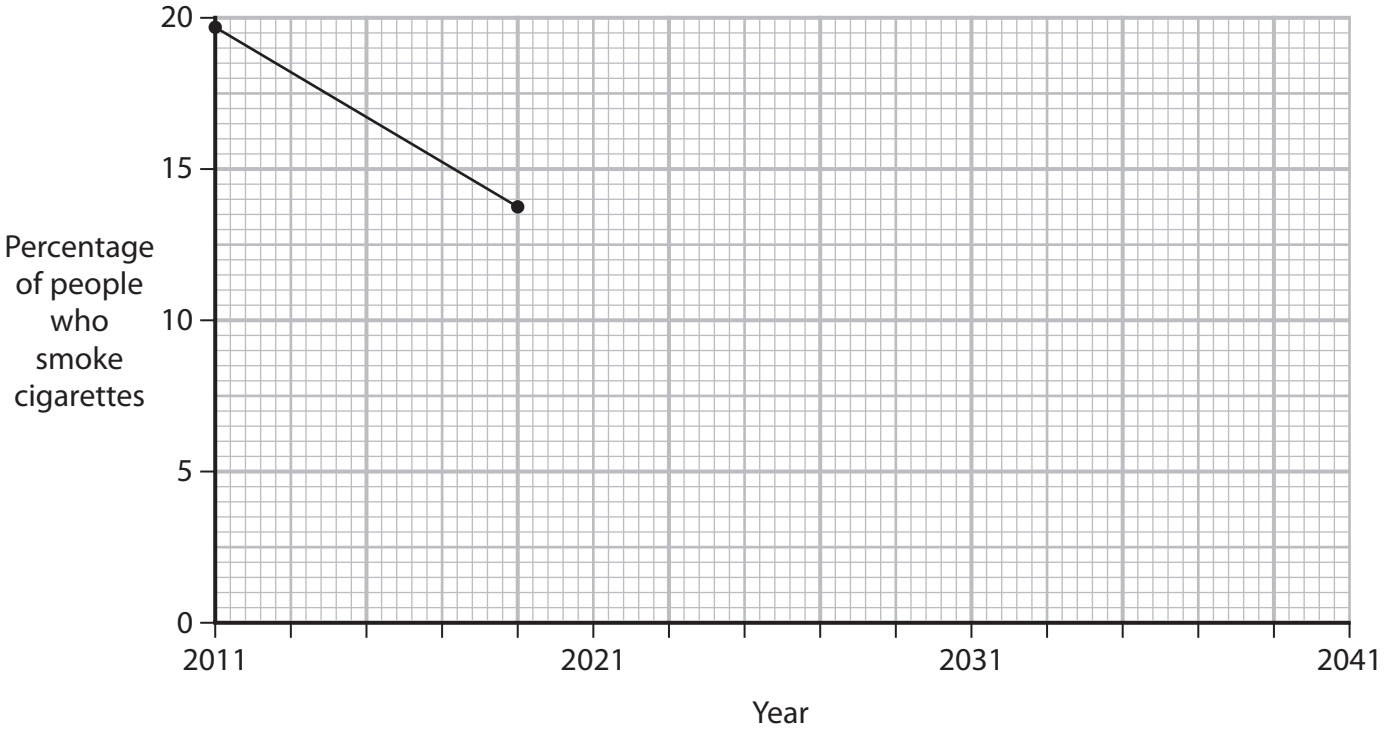


Figure 7

(i) State the trend shown in the graph from 2011 to 2019.

(1)

.....

.....

(ii) Give **two** reasons for this change in the number of people smoking cigarettes.

(2)

1 .....

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2 .....

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(iii) Draw a line on Figure 7 to show the likely trend in the percentage of people smoking cigarettes from 2019 to 2041.

(1)

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(iv) Smoking cigarettes can increase the risk of people developing cancer.

Which is the description of cancer?

(1)

☒ **A** uncontrolled organ division

☒ **B** uncontrolled cell division

☒ **C** controlled cell division

☒ **D** controlled organ division

(Total for Question 3 = 10 marks)

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4 Figure 8 shows some characteristics of pea plants.

flower colour	seed shape
purple	round
white	wrinkled

Figure 8

The allele for purple flowers is dominant to the allele for white flowers.

(a) Which term describes the allele for white flowers?

(1)

- ☒ **A** heterozygous
- ☒ **B** homozygous
- ☒ **C** gamete
- ☒ **D** recessive

(b) A scientist crossed a pea plant that produced round seeds (Rr) with a pea plant that produced wrinkled seeds (rr).

(i) Complete the Punnett square.

(2)

		wrinkled seeds	
round seeds	R		
	r		

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

(1)

percentage = ... %

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(c) The scientist crossed **two** purple flowering pea plants.

The offspring were:

- 133 plants with purple flowers
- 46 plants with white flowers

(i) Calculate the ratio of offspring with purple flowers to offspring with white flowers.

Give your answer to the nearest whole number.

(2)

ratio ..... : 1

(ii) Explain why it was possible for this cross to produce some offspring with white flowers.

(2)

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(d) The cells in pea plants are diploid.

These cells have 14 chromosomes.

(i) Explain why pea plant gametes have only seven chromosomes.

(2)

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(ii) Describe what happens at fertilisation.

(2)

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(Total for Question 4 = 12 marks)

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5 (a) Apple trees show genetic variation.

(i) State **one** possible cause of genetic variation in apple trees.

(1)

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.....

(ii) The colour of an apple is an observable characteristic.

Which is the term for an observable characteristic?

(1)

☒ **A** gene

☒ **B** genotype

☒ **C** heterozygous

☒ **D** phenotype

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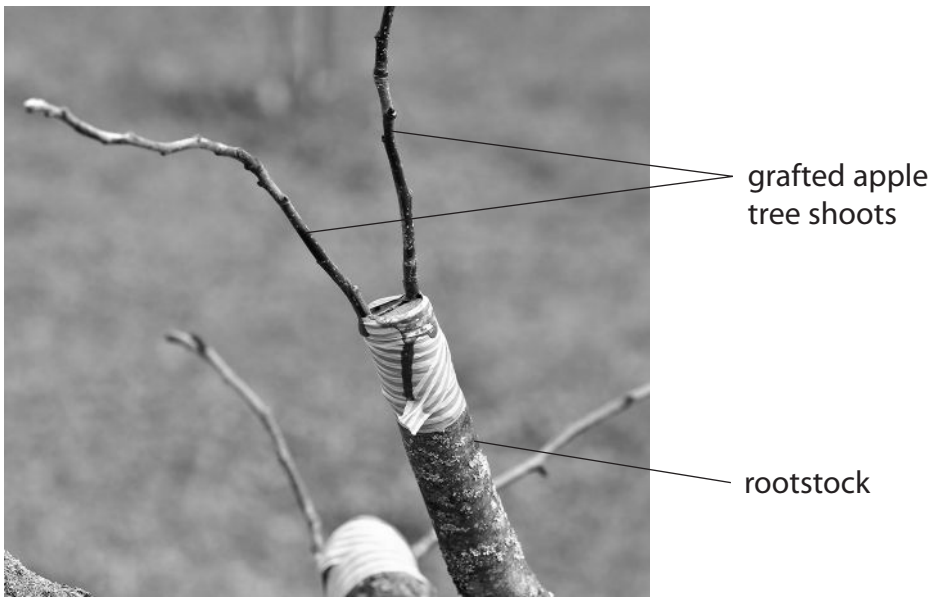
(b) Name the type of reproduction that produces genetically identical organisms.

(1)

.....

(c) Grafting is a technique used to grow some varieties of apple tree.

Figure 9 shows apple tree shoots grafted on to a rootstock.



(Source: © ATTILA Barsan/Shutterstock)

Figure 9

Grafting can be used to produce apple trees that are genetically identical.

Give **one** advantage and **one** disadvantage of growing genetically identical apple trees.

(2)

advantage

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disadvantage

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(d) As apples ripen, enzymes convert starch into sugars.

Devise a method to find the optimum pH of an enzyme that breaks down starch.

You may use standard laboratory equipment and the solutions listed in the box.

starch solution	enzyme solution	iodine solution
a range of pH solutions		

(4)

(e) The optimum pH of an enzyme is pH 6.

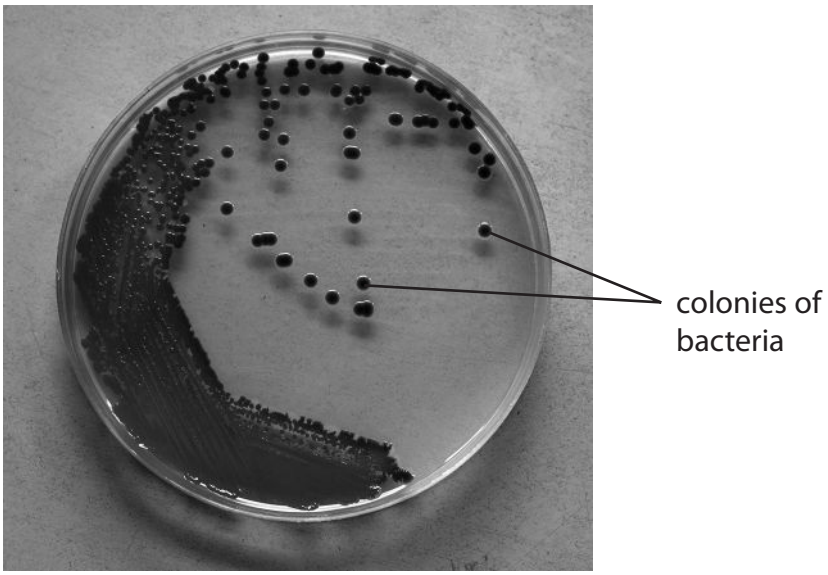
Explain why this enzyme would not work at pH 10.

(2)

(Total for Question 5 = 11 marks)

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6 Figure 10 shows colonies of bacteria growing on an agar plate.



(Source: © Chatchouliya/Shutterstock)

Figure 10

Each colony starts as one bacterium.

Every time bacteria reproduce, the number of bacteria in each colony doubles.

(a) Calculate the number of bacteria in a colony after five hours, if each bacterium reproduces every 30 minutes.

(2)

..... bacteria

(b) Some bacteria are pathogens.

(i) State the meaning of the term pathogen.

(1)

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(ii) Explain why antibiotics can be used to treat bacterial infections.

(2)

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(iii) A rod-shaped bacterium is 0.005 mm long.

A student draws the rod-shaped bacterium.

The bacterium in the drawing is 80 mm long.

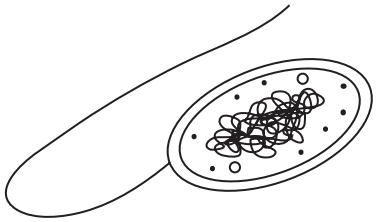
Calculate the magnification of this drawing.

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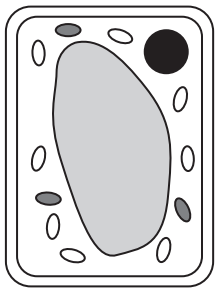
magnification = ...

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*(c) Figure 11 shows a bacterial cell and a plant cell.



bacterial cell



plant cell

Figure 11

Describe the similarities and differences of a bacterial cell and a plant cell.

(6)

(Total for Question 6 = 13 marks)

TOTAL FOR PAPER = 60 MARKS

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