Paper Reference(s) 1SC0/1BF
Pearson Edexcel Level 1/Level 2 GCSE (9–1)

Total Marks

Combined Science
PAPER 1
Foundation Tier

Tuesday 16 May 2023 – Morning

Time: 1 hour 10 minutes

In the boxes below, write your name, centre number and candidate number.

Surname						
Other names						
Centre Number						
Candidate Number						

V72554A

Pearson

YOU MUST HAVE

Calculator, ruler

YOU WILL BE GIVEN

Diagram Booklet

INSTRUCTIONS

Answer ALL questions.

Answer the questions in the spaces provided in this Question Paper or in the separate Diagram Booklet – 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.

(continued on the next page)

INFORMATION continued.

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.

There may be spare copies of some diagrams.

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.

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) Look at FIGURE 1 for Question 1(a) in the Diagram Booklet. It shows an animal cell.

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

☐ **A cell wall**

☐ **B cell membrane**

☐ **C nucleus**

☐ **D cytoplasm**

1(a) continued.

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

☐ A chromosomes

☐ B mitochondria

☐ C ribosomes

☐ D vacuoles

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

(continued on the next page)

1 continued.

(b) Look at FIGURE 2 for Question 1(b)(i) in the Diagram Booklet. A microscope can be used to observe the structure of a cell.

Figure 2 shows a microscope.

(i) Give ONE advantage of using a microscope to look at cells.
(1 mark)

(ii) Look at the diagram for Question 1(b)(ii) in the Diagram Booklet. Draw ONE straight line from each part of the microscope to its function.
(2 marks)

(continued on the next page)

1 continued.

(c) The list below 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

Give the name of the smallest unit shown in the list above.
(1 mark)

(Total for Question 1 = 7 marks)

2 (a) Look at FIGURE 4 for Question 2(a) (i) in the Diagram Booklet. It shows fossils in different layers of rock.

(i) Which layer of rock is likely to contain the most recent fossils? (1 mark)

☐ A layer A

☐ B layer B

☐ C layer C

☐ D layer D

(continued on the next page)

2(a) continued.

Look at FIGURE 5 for Question 2(a) (ii) in the Diagram Booklet. It shows some stone tools from two different periods of time.

(ii) Explain ONE difference between tool A and tools B, C and D. (2 marks)

(continued on the next page)

2 continued.

(b) Our human ancestors domesticated animals.

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

(continued on the next page)

2(b) continued.

(i) Use words from the list to complete the sentences on the next page.
(2 marks)

asexual

characteristics

evidence

ideas

inherited

selective

Animals with the most desirable _____ were bred together.

This is called _____ breeding.

2(b) continued.

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

Which is the definition of a genome?
(1 mark)

☐ 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

(continued on the next page)

2(b) continued.

(iii) Give ONE advantage of domesticating animals.
(1 mark)

(Total for Question 2 = 7 marks)

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

☐ 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

(continued on the next page)

3 continued.

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

Look at FIGURE 6 for Question 3(b) in the Diagram Booklet. It shows different BMI ranges and their weight descriptions.

(i) A person has a BMI of 39·0

Explain the risk of this person developing cardiovascular disease.
(2 marks)

Answer space continues on the next page.

3(b)(i) continued.

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

State TWO other treatments for cardiovascular disease.
(2 marks)

1

2

3 continued.

(c) Look at FIGURE 7 for Question 3(c) in the Diagram Booklet. It shows the percentage of people who smoked cigarettes in England from 2011 to 2019.

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

(continued on the next page)

3(c) continued.

(ii) Give TWO reasons for this change in the number of people smoking cigarettes.
(2 marks)

1 _____

2 _____

(continued on the next page)

3(c) continued.

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

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

Which is the description of cancer?
(1 mark)

☐ A uncontrolled organ division

☐ B uncontrolled cell division

☐ C controlled cell division

☐ D controlled organ division

(Total for Question 3 = 10 marks)

4 Figure 8 shows some characteristics of pea plants.

FIGURE 8

flower colour	seed shape
purple	round
white	wrinkled

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

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

☐ A heterozygous

☐ B homozygous

☐ C gamete

☐ D recessive

(continued on the next page)

4 continued.

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

(i) Look at the Punnett square for Question 4(b) in the Diagram Booklet. Complete the Punnett square.
(2 marks)

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

percentage = _____ %

4 continued.

(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 marks)

ratio _____ : 1

(continued on the next page)

4(c) continued.

(ii) Explain why it was possible for this cross to produce some offspring with white flowers. (2 marks)

(continued on the next page)

4 continued.

(d) The cells in pea plants are diploid.

These cells have 14 chromosomes.

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

(2 marks)

(continued on the next page)

4(d) continued.

(ii) Describe what happens at fertilisation.
(2 marks)

(Total for Question 4 = 12 marks)

5 (a) Apple trees show genetic variation.

(i) State ONE possible cause of genetic variation in apple trees.
(1 mark)

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

Which is the term for an observable characteristic?
(1 mark)

☐ A gene

☐ B genotype

☐ C heterozygous

☐ D phenotype

5 continued.

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

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

Look at FIGURE 9 for Question 5(c) in the Diagram Booklet. It shows apple tree shoots grafted on to a rootstock.

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

(continued on the next page)

5(c) continued.

Give ONE advantage and ONE disadvantage of growing genetically identical apple trees.
(2 marks)

Answer space continues on the next page.

advantage

disadvantage

5(c) continued.

(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 given in the list below.
(4 marks)

starch solution

enzyme solution

iodine solution

a range of pH solutions

Answer space continues on the next 2 pages.

5(d) continued.

Turn over

5(d) continued.

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

Explain why this enzyme would not work at pH 10.
(2 marks)

(Total for Question 5 = 11 marks)

6 Look at FIGURE 10 for Question 6(a) in the Diagram Booklet. It shows colonies of bacteria growing on an agar plate.

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 marks)

_____

bacteria

(continued on the next page)

6 continued.

(b) Some bacteria are pathogens.

(i) State the meaning of the term pathogen.
(1 mark)

(continued on the next page)

6(b) continued.

(ii) Explain why antibiotics can be used to treat bacterial infections. (2 marks)

(continued on the next page)

6(b) continued.

(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.
(2 marks)

magnification =

(continued on the next page)

6 continued.

*(c) Look at FIGURE 11 for Question 6(c) in the Diagram Booklet. It shows a bacterial cell and a plant cell.

Describe the similarities and differences of a bacterial cell and a plant cell.
(6 marks)

Answer space continues on the next page.

6(c) continued.

(Total for Question 6 = 13 marks)

TOTAL FOR PAPER = 60 MARKS

END OF PAPER