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

Combined Science

PAPER 1

Higher Tier

Total Marks

Friday 10 May 2024 – 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						

Q75511A

Pearson

YOU MUST HAVE

Ruler, calculator

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.

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) Pepsin and trypsin are enzymes that break down proteins.

Look at Figure 1 for Question 1(a) in the Diagram Booklet. It shows the results of an investigation into the activity of pepsin and trypsin at different pH levels.

(i) Which molecules are produced when a protein is broken down?
(1 mark)

- ☐ **A sugars**
- ☐ **B amino acids**
- ☐ **C fatty acids**
- ☐ **D starches**

(continued on the next page)

1(a) continued.

(ii) Describe the trend in the graph for the enzyme pepsin.

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

(continued on the next page)

1(a) continued.

(iii) State the optimum pH for the enzyme trypsin.
(1 mark)

(iv) Explain why there is no trypsin activity at pH 5.
(3 marks)

(continued on the next page)

1(a) continued.

(v) Temperature is a variable that should be controlled in this investigation.

Give ONE way the temperature could be controlled.
(1 mark)

(Total for Question 1 = 9 marks)

2 (a) Malaria is a disease that causes damage to the blood and liver.

(i) Which type of pathogen causes malaria?
(1 mark)

☐ A a bacterium

☐ B a fungus

☐ C a protist

☐ D a virus

(ii) State how the pathogen that causes malaria is spread.
(1 mark)

(continued on the next page)

2 continued.

(b) Measles is a disease caused by a virus.

Look at Figure 2 for Question 2(b) in the Diagram Booklet. It shows the number of measles cases reported in England and Wales from 1985 to 2015.

Explain ONE conclusion that can be made about the change in the number of measles cases reported from 1985 to 2015.
(2 marks)

(continued on the next page)

2 continued.

(c) Describe TWO ways the immune system will respond to an infection by a pathogen.
(2 marks)

1 _____

_____

2 _____

_____

_____

(continued on the next page)

2 continued.

(d) Beriberi is a disease caused by a lack of vitamin B1 in the diet.

Give ONE reason why beriberi is classed as a non-communicable disease.
(1 mark)

(Total for Question 2 = 7 marks)

3 (a) A student made a microscope slide of cells taken from the inside of their mouth.

(i) The student wore gloves while using a swab to collect cells from their mouth.

Give ONE other safety precaution the student should take.
(1 mark)

(continued on the next page)

3(a) continued.

(ii) Look at Figure 3 for Question 3(a)(ii) in the Diagram Booklet. A light microscope was used to obtain an image similar to the one shown in Figure 3.

Describe how the student used the light microscope to view these cells at a magnification of ×400
(3 marks)

Answer space continues on the next page.

3(a)(ii) continued.

(continued on the next page)

3 continued.

(b) The cytoplasm of a cell contains a nucleus.

Explain the role of ONE other structure in the cytoplasm of a human cell.
(2 marks)

(continued on the next page)

3 continued.

(c) DNA can be extracted from human cells in a similar way to the method used to extract DNA from fruits.

Describe the stages of the method used to extract DNA from cells.
(3 marks)

(continued on the next page)

3 continued.

(d) The Human Genome Project sequenced the order of the bases in the human genome.

Give TWO other outcomes from the Human Genome Project.
(2 marks)

1 _____

_____

_____

2 _____

_____

_____

(Total for Question 3 = 11 marks)

4 (a) Look at Figure 4 for Question 4(a) in the Diagram Booklet. It shows images of two stone tools.

Scientists think that tool **A** was probably used by **Homo erectus** around 1·6 million years ago.

Tool **B** was probably used by **Homo habilis** around 2 million years ago.

(i) Give ONE reason, using Figure 4, why scientists think that tool **A** was used by a more recent human ancestor.
(1 mark)

(continued on the next page)

4(a) continued.

(ii) Describe how scientists can date stone tools using information from where the tools were discovered.
(2 marks)

(continued on the next page)

4 continued.

(b) Differences in fossilised bones indicate structural changes that have occurred during the evolution of humans.

Describe TWO structural changes that have occurred during human evolution.
(2 marks)

1 _____

_____

_____

2 _____

_____

_____

(continued on the next page)

4 continued.

(c) The migration patterns of humans can be tracked by analysing DNA in mitochondria.

Look at Figure 5 for Question 4(c) in the Diagram Booklet. It shows a mitochondrion viewed using an electron microscope.

(i) At a magnification of ×62 000 this mitochondrion has a length of **434 mm**

Calculate the actual length of this mitochondrion.

Give your answer in micrometres (µm)
(3 marks)

_____ µm

(continued on the next page)

4(c) continued.

(ii) Explain why an electron microscope is used to see mitochondria clearly.
(2 marks)

(Total for Question 4 = 10 marks)

5 Statins are a type of medicine used to treat cardiovascular disease.

Some people taking statins have reported muscle pain as a side effect.

Scientists analysed data from double-blind trials to determine if there was a correlation between statin use and muscle pain.

In these double-blind trials, neither doctors nor patients knew whether the patient had been given statins or not.

(a) (i) Describe the benefits of using double-blind trials.
(2 marks)

(continued on the next page)

5(a) continued.

(ii) Which stage of the process for testing new medicines could involve a double-blind trial? (1 mark)

☐ A discovery

☐ B development

☐ C preclinical

☐ D clinical

(continued on the next page)

5 continued.

(b) In a study, people were given statins or a placebo.

The percentage of people who reported muscle pain was recorded.

Look at Figure 6 for Question 5(b) in the Diagram Booklet. It shows the results of this study.

(i) In year one, 9199 people taking statins reported muscle pain.

Calculate the total number of people taking statins in this study.

Give your answer to 4 significant figures.
(3 marks)

_____ people

(continued on the next page)

5(b) continued.

(ii) The scientists concluded that most of the muscle pain reported was not due to the use of statins.

Explain, using information from the table in Figure 6, why the scientists made this conclusion.

(3 marks)

Answer space continues on the next page.

5(b)(ii) continued.

(continued on the next page)

5(b) continued.

(iii) The results of the study are reliable because the data was obtained from a large sample of people.

Describe TWO factors that should have been considered when selecting people for the study. (2 marks)

1 _____

_____

_____

2 _____

_____

_____

(Total for Question 5 = 11 marks)

6 (a) When one cell goes through the stages of the cell cycle, two cells are produced.

Look at Figure 7 for Question 6(a) in the Diagram Booklet. It shows the three stages of the cell cycle.

*(i) Describe the three stages of the cell cycle shown in Figure 7.
(6 marks)

Answer space continues on the next 2 pages.

6(a)(i) continued.

6(a)(i) continued.

(continued on the next page)

6(a) continued.

(ii) State what happens to the cell cycle in cancerous cells.
(1 mark)

(continued on the next page)

6 continued.

(b) The production of more cells contributes to the growth of an animal.

(i) Which other process is needed for the growth of an animal?
(1 mark)

☐ A cell elongation

☐ B differentiation

☐ C cell wall synthesis

☐ D transpiration

(continued on the next page)

6(b) continued.

(ii) A parent is concerned that their child is not growing as much as other children.

Describe how a doctor might determine if the child is growing as expected.
(4 marks)

Answer space continues on the next page.

6(b)(ii) continued.

(Total for Question 6 = 12 marks)

TOTAL FOR PAPER = 60 MARKS

END OF PAPER