

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

Combined Science

Paper 1

Higher Tier

Total Marks

Tuesday 12 May 2020 – Afternoon

Time: 1 hour 10 minutes plus your additional time allowance

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

Surname					
Other names					
Centre Number					
Candidate Number					

YOU MUST HAVE

Calculator, ruler

YOU WILL BE GIVEN

Diagram Booklet

INSTRUCTIONS

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.

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) The human immunodeficiency virus (HIV) can cause AIDS.**

**Which type of cell is destroyed by the HIV virus?
(1 mark)**

- ☐ **A red blood cell**
- ☐ **B nerve cell**
- ☐ **C white blood cell**
- ☐ **D sperm cell**

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1 continued.

(b) Describe how the specific immune system defends the body against disease. (3 marks)

(continued on the next page)

1 continued.

(c) Look at Figure 1 for Question 1(c) in the Diagram Booklet.

**Figure 1 shows the number of people per million
OF THE POPULATION in five European countries
who were diagnosed with measles in one year.**

(continued on the next page)

1 continued.

- (i) The population of Belgium in that year was 11·18 million.**

Calculate the number of people in Belgium diagnosed with measles.

**Give your answer to three significant figures.
(3 marks)**

_____ people

(continued on the next page)

1 continued.

- (ii) Countries do not report the total number of people diagnosed with measles. Countries report the number of people diagnosed with measles per million of the population.**

Give ONE reason why this is better. (1 mark)

- (iii) Give ONE reason why the number of people per million diagnosed with measles is different in these countries. (1 mark)**

(TOTAL FOR QUESTION 1 = 9 MARKS)

Turn over

- 2 Look at Figure 2 for Question 2 in the Diagram Booklet.**

Figure 2 shows a banana plantation.

After the bananas have been harvested, the old plants are cut down.

The suckers then develop into mature plants producing the next crop of bananas.

The tip of each sucker contains a group of cells called a meristem.

- (a) (i) Describe the function of a meristem in the growth of a plant. (2 marks)**

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2 continued.

- (ii) A student took a sample of cells from a meristem to view under a light microscope.**

Describe how the student would prepare a microscope slide using these cells. (3 marks)

(continued on the next page)

2 continued.

(b) Look at Figure 3 for Question 2(b) in the Diagram Booklet.

Figure 3 is a drawing of a eukaryotic cell.

Structure Z is found in plant leaf cells.

(i) Name structure Z. (1 mark)

**(ii) Give ONE function of the mitochondrion.
(1 mark)**

(continued on the next page)

2 continued.

(iii) Describe how a prokaryotic cell is different from the cell in Figure 3. (2 marks)

(TOTAL FOR QUESTION 2 = 9 MARKS)

- 3 Look at Figure 4 for Question 3 in the Diagram Booklet.**

Figure 4 shows a great tit on a bird feeder.

Scientists have found that great tits living now have longer beaks than great tits living 50 years ago.

Genetic analysis shows changes in the sequence of the bird's DNA.

- (a) (i) Look at the diagram for Question 3(a)(i) in the Diagram Booklet.**

**Using the diagram, give the complementary strand sequence for this DNA template.
(1 mark)**

(continued on the next page)

3 continued.

(ii) Which statement correctly describes a DNA molecule? (1 mark)

- ☐ **A two strands joined together by strong bonds to form a double helix**
- ☐ **B two complementary bases twisted into a double helix by strong bonds**
- ☐ **C a double helix with strands joined by hydrogen bonds between bases**
- ☐ **D four complementary strands joined together with hydrogen bonds**

(iii) State the term used to describe a change in the sequence of DNA bases. (1 mark)

(continued on the next page)

3 continued.

- (b) Scientists think that great tits living now have longer beaks because of the increased use of bird feeders during the last 50 years.**

Explain how natural selection could have caused an increase in beak length because of the use of bird feeders. (4 marks)

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Turn over

3 continued.

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3 continued.

(c) Birds are classified in the domain Eukarya.

(i) Why are the cells from birds described as eukaryotic? (1 mark)

☐ **A they have membrane-bound organelles**

☐ **B they do not have nuclei**

☐ **C they have a rigid cell wall**

☐ **D they have a cell membrane**

(ii) Give ONE reason why the three domain classification system was proposed. (1 mark)

(TOTAL FOR QUESTION 3 = 9 MARKS)

Turn over

- 4 (a) Look at Figure 5 for Question 4(a) in the Diagram Booklet.

A student mixed 10 cm^3 of starch solution with 5 cm^3 of amylase solution and kept the tube in a water bath at 25°C .

The student tested the solution for starch and for glucose every 30 seconds.

Figure 5 shows the results.

- (i) Give ONE reason for the result at 150 seconds. (1 mark)

(continued on the next page)

4 continued.

- (ii) Another student repeated the investigation with the same volumes of solutions and at the same temperature of 25°C.**

Give TWO other variables that would need to be controlled in the investigation. (2 marks)

1 _____

2 _____

(continued on the next page)

4 continued.

- (iii) Both students also included a tube containing 10 cm³ of starch solution with 5 cm³ of distilled water instead of 5 cm³ of amylase solution.**

They tested the solution for starch and for glucose every 30 seconds.

Give ONE reason why this tube was included in their investigations. (1 mark)

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4 continued.

(b) Amylase has an optimum pH of 6-8.

Devise a method the students could use to confirm the optimum pH for amylase. (3 marks)

[illegible]

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Turn over

4 continued.

(c) Amylase is produced by salivary glands and the pancreas.

Explain why amylase is not produced in the stomach. (3 marks)

(TOTAL FOR QUESTION 4 = 10 MARKS)

- 5 (a) Look at Figure 6 for Question 5(a) in the Diagram Booklet.

The reaction time of five people was tested using a computer.

These people were then given 100 cm^3 of a liquid to drink.

Their reaction times were recorded 10 minutes after drinking the liquid.

Figure 6 shows the results.

- (i) Calculate the mean difference in reaction time.

Give your answer in milliseconds. (2 marks)

_____ ms

(continued on the next page)

5 continued.

- (ii) The drinks manufacturer wants to advertise the effect of the drink on reaction time.**

The manufacture needs to confirm the effect on reaction time by improving the investigation.

**Give TWO improvements the manufacturer would need to make to this investigation.
(2 marks)**

1 _____

2 _____

(continued on the next page)

5 continued.

(b) Look at Figure 7 for Question 5(b) in the Diagram Booklet.

Figure 7 shows a neurone.

**(i) Name the type of neurone shown in Figure 7.
(1 mark)**

(ii) Which row identifies structure P and structure Q? (1 mark)

	STRUCTURE P	STRUCTURE Q
<input type="checkbox"/> A	myelin sheath	axon
<input type="checkbox"/> B	cell body	dendron
<input type="checkbox"/> C	myelin sheath	dendron
<input type="checkbox"/> D	cell body	axon

(continued on the next page)

5 continued.

- *(c) Some painkillers prevent neurotransmitters binding to receptors in a synapse.**

Explain how a signal is transmitted at a synapse and how the painkillers reduce the pain felt by the person. (6 marks)

(continued on the next page)

Turn over

5 continued.

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Turn over

5 continued.

(TOTAL FOR QUESTION 5 = 12 MARKS)

- 6 Cancer Research UK found that many people do not realise that obesity is linked to an increased risk of developing cancer.**

In the body, fat tissue sends signals that cause other cells to divide.

- (a) (i) Describe how this could cause cancer to develop. (3 marks)**

(continued on the next page)

Turn over

6 continued.

(ii) Cell division occurs during the cell cycle.

During which stage of the cell cycle is DNA replicated? (1 mark)

☐ **A anaphase**

☐ **B prophase**

☐ **C interphase**

☐ **D telophase**

(continued on the next page)

6 continued.

(iii) Obesity is linked to 1 in 20 cases of ALL types of cancer.

Approximately 13% of cases of bowel cancer are caused by obesity.

Determine how the impact of obesity on bowel cancer compares to the impact of obesity on all types of cancer. (2 marks)

(continued on the next page)

6 continued.

(b) Two men have the same mass of 80 kg.

**One man's BMI is categorised as normal weight,
the other man's BMI is categorised as obese.**

**Explain why the men have different BMI values.
(2 marks)**

(continued on the next page)

6 continued.

(c) Obesity can also cause cardiovascular disease to develop.

Describe the different treatments available for cardiovascular disease. (3 marks)

[illegible]

(TOTAL FOR QUESTION 6 = 11 MARKS)

TOTAL FOR PAPER = 60 MARKS
END