

**Combined Science**

**Paper 1**

**Foundation Tier**

<b>Total Marks</b>
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**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.**

<b>Surname</b>					
<b>Other names</b>					
<b>Centre Number</b>					
<b>Candidate Number</b>					

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

**Figure 1 shows three cells.**

- (i) What is structure X? (1 mark)**

- ☐ **A cell membrane**
- ☐ **B cell wall**
- ☐ **C cytoplasm**
- ☐ **D nucleus**

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**1 continued.**

- (ii) The bacterial cell in Figure 1 has a flagellum.  
State the function of a flagellum. (1 mark)**

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- (iii) Give ONE other difference between the  
bacterial cell and the animal cell shown in  
Figure 1. (1 mark)**

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**1 continued.**

**(b) Substances move into and out of cells.**

**How does oxygen move into and out of cells?  
(1 mark)**

- ☐ **A transpiration**
- ☐ **B active transport**
- ☐ **C diffusion**
- ☐ **D osmosis**

**(c) A plant leaf cell is 0.04 mm long.**

**Calculate the length of the image after this cell has  
been magnified 500 times. (2 marks)**

**length of image = \_\_\_\_\_ mm**

**(TOTAL FOR QUESTION 1 = 6 MARKS)**

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**Turn over**

- 2 (a) Look at Figure 2 for Question 2(a) in the Diagram Booklet.

A student placed three different sized cubes of agar jelly into separate beakers containing the same concentration of hydrochloric acid.

The cubes contained a pink indicator.

This indicator becomes clear when in contact with an acid.

Figure 2 shows the results of the investigation after the cubes had been in the acid for 120 seconds.

- (i) The distance from the outside of cube B to the pink area was 3 mm.

Calculate the distance diffused by hydrochloric acid in ONE second. (2 marks)

\_\_\_\_\_ mm

**2 continued.**

**(ii) The student wanted to confirm their results.**

**Give ONE improvement the student should make to this investigation to confirm their results. (1 mark)**

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**2 continued.**

- (b) Devise a method, using cubes of agar jelly, to investigate how temperature affects the rate of diffusion. (3 marks)**

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**2 continued.**

**(c) Some substances move into and out of cells by active transport.**

**Which is the correct description of the movement of a substance by active transport? (1 mark)**

- ☐ **A against a concentration gradient using energy**
- ☐ **B down a concentration gradient using energy**
- ☐ **C against a concentration gradient without using energy**
- ☐ **D down a concentration gradient without using energy**

**(continued on the next page)**

**2 continued.**

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

**Some drugs used to treat cancer are taken into cells by active transport.**

**Figure 3 shows some causes of preventable cases of cancer in 2015.**

**(i) What is the percentage of preventable cases of cancer that are caused by tobacco?  
(1 mark)**

☐ **A 41%**

☐ **B 37%**

☐ **C 34%**

☐ **D 26%**

**(continued on the next page)**

**2 continued.**

- (ii) In 2015, data from Cancer Research UK suggested that 163 440 cases of cancer could have been prevented.**

**Calculate the number of preventable cases of cancer caused by alcohol.**

**Give your answer to the nearest whole number. (2 marks)**

**number of preventable cases of  
cancer caused by alcohol \_\_\_\_\_**

**(TOTAL FOR QUESTION 2 = 10 MARKS)**

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

**Farmers selectively breed chickens to produce larger chickens.**

**Figure 4 shows how the size of chickens has changed over time.**

- (i) Explain how farmers have used selective breeding to produce larger chickens.  
(3 marks)**

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**Turn over**

**3 continued.**

**(ii) Describe ONE benefit and ONE risk of selectively breeding chickens. (2 marks)**

**benefit** \_\_\_\_\_

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**risk** \_\_\_\_\_

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**Turn over**

**3 continued.**

**(b) The body cells of chickens have 78 chromosomes in their nuclei.**

**(i) State the number of chromosomes found in each sex cell of a chicken. (1 mark)**

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**(ii) Name the type of cell division which produces sex cells. (1 mark)**

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**3 continued.**

**(c) (i) What is the correct definition of a genome?  
(1 mark)**

- ☐ **A all the cells of an organism**
- ☐ **B all the enzymes of an organism**
- ☐ **C all the genetic material of an organism**
- ☐ **D all the cytoplasm of an organism**

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**3 continued.**

- (ii) A new project called the Earth BioGenome Project aims to discover the sequence of bases in the DNA for all plants and animals.**

**State TWO benefits of discovering the sequence of bases for all plants and animals.  
(2 marks)**

**1** \_\_\_\_\_

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**2** \_\_\_\_\_

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**(TOTAL FOR QUESTION 3 = 10 MARKS)**

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**Turn over**

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

**A student investigated the activity of a human enzyme at different temperatures.**

**The student measured the mass of product formed after 10 minutes at different temperatures.**

**Figure 5 shows the results of this investigation.**

- (i) Describe the trends shown in Figure 5.  
(2 marks)**

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**4 continued.**

**(ii) Explain the results obtained for temperatures from 40 °C to 60 °C. (2 marks)**

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**4 continued.**

**(b) Look at the diagram for Question 4(b)(i) in the Diagram Booklet.**

**Some enzymes are involved in the breakdown of food substances.**

**(i) Draw ONE straight line from each food group to the products of digestion for that food group. (2 marks)**

**(ii) Which enzyme breaks down fat? (1 mark)**

☐ **A    carbohydrase**

☐ **B    amylase**

☐ **C    protease**

☐ **D    lipase**

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**4 continued.**

**(c) Look at Figure 6 for Question 4(c) in the Diagram Booklet.**

**Figure 6 shows an enzyme and two substrates, P and Q.**

**Explain the reason why no product will be formed if the enzyme is mixed with substrate Q. (3 marks)**

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**(TOTAL FOR QUESTION 4 = 10 MARKS)**

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**5 (a) Measles is a communicable disease caused by a virus.**

**(i) What can a virus also be classified as?  
(1 mark)**

☐ **A a bacterium**

☐ **B a fungus**

☐ **C a pathogen**

☐ **D a protist**

**(ii) Give ONE reason why measles is described as a communicable disease. (1 mark)**

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**5 continued.**

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

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**5 continued.**

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

**Figure 7 shows the number of people per million  
OF THE POPULATION in five European countries  
who were diagnosed with measles in one year.**

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**5 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)**

**5 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)**

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

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**(TOTAL FOR QUESTION 5 = 11 MARKS)**

**Turn over**

- 6 Look at Figure 8 for Question 6 in the Diagram Booklet.**

**Figure 8 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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**6 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)**

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**6 continued.**

**(b) Look at Figure 9 for Question 6(b) in the Diagram Booklet.**

**Figure 9 is a drawing of a eukaryotic cell.**

**Structure Z is found in plant leaf cells.**

**(i) Name structure Z. (1 mark)**

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

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**6 continued.**

**\*(c) DNA is found in the nucleus of cells.**

**Describe the structure of DNA and how it can be extracted from plant cells. (6 marks)**

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**Turn over**



**6 continued.**

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**(TOTAL FOR QUESTION 6 = 13 MARKS)**

**TOTAL FOR PAPER = 60 MARKS**  
**END**