

Combined Science  
Paper 1  
Foundation tier

Total Marks
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Time: 1 hour 10 minutes

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

Surname					
Other names					
Centre Number					
Candidate Number					

**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.**

**(continued on the next page)**

**Turn over**

**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.**

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**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 Some bacteria cause disease.**

**(a) Which word describes an organism that causes disease?  
(1 mark)**

☐ **A pathogen**

☐ **B culture**

☐ **C antibiotic**

☐ **D platelet**

**(b) Look at the diagram for Question 1(b) in the Diagram Booklet. Draw ONE straight line from each disease to the main way that the disease is spread.  
(2 marks)**

**(continued on the next page)**

**1 continued.**

**(c) A scientist investigated the effect of temperature on the growth of bacteria.**

**The bacteria were grown at 10 °C and 20 °C.**

**The number of bacteria grown at each temperature were counted every two hours.**

**Look at FIGURE 1 for Question 1(c) in the Diagram Booklet. It shows the result.**

**Look at FIGURE 2 for Question 1(c) in the Diagram Booklet. It shows a graph of the results at 20 °C.**

**(continued on the next page)**

**1 continued.**

- (i) Plot the points on the graph for the number of bacteria at 10 °C.**

**The first two points have been plotted for you.  
(1 mark)**

- (ii) Draw a line of best fit on the graph for 10 °C.  
(1 mark)**

**(continued on the next page)**

**1 continued.**

**(iii) Describe how the growth of bacteria at 10 °C was different from the growth of bacteria at 20 °C.  
(2 marks)**

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**(Total for Question 1 = 7 marks)**

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**Turn over**



**2 Stone tools can be found at sites used by our human ancestors.**

**(a) Look at FIGURE 3 and FIGURE 4 for Question 2(a) in the Diagram Booklet. They show two tools found at the same site: tool P and tool Q.**

**(i) Describe how tool P was made.  
(2 marks)**

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**(continued on the next page)**

**2 continued.**

- (ii) A scientist stated that tool Q was made by a more evolved human ancestor than tool P.**

**Which observation supports this statement?  
(1 mark)**

- ☐ **A tool Q has more colours than tool P**
- ☐ **B tool Q is more pointed than tool P**
- ☐ **C tool Q has fewer colours than tool P**
- ☐ **D tool Q is less pointed than tool P**

**(continued on the next page)**

**Turn over**

**2 continued.**

**(iii) Tools provide evidence for human evolution.**

**Use words from the list to complete the sentences below.  
(2 marks)**

**enlarge**

**human**

**migrate**

**mutate**

**natural**

**negative**

**Evolution is the change of inherited characteristics through**

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**selection.**

**These changes occur because genes**

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**(continued on the next page)**

**Turn over**

**2 continued.**

**(b) Fossils were also found in the soil around tool Q.**

**Describe TWO ways that stone tools and fossils can be dated to find out how old they are.  
(2 marks)**

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

\_\_\_\_\_

\_\_\_\_\_

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

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**(Total for Question 2 = 7 marks)**

\_\_\_\_\_

**Turn over**

**3 Alcohol is broken down by liver cells.**

**(a) Which process moves alcohol from the blood into the liver cells?  
(1 mark)**

☐ **A diffusion**

☐ **B respiration**

☐ **C osmosis**

☐ **D transpiration**

**(continued on the next page)**

**3 continued.**

**(b) If a person drinks too much alcohol, liver cells die and the person can develop cirrhosis of the liver.**

**The relative risk of developing cirrhosis of the liver is affected by two factors.**

- 1. The volume of alcohol a person drinks in one week.**
- 2. Whether the person drinks the alcohol on its own or with a meal.**

**Look at FIGURE 5 for Question 3(b) in the Diagram Booklet. It shows how these two factors affect the relative risk of people developing cirrhosis of the liver.**

**(continued on the next page)**

**Turn over**

**3 continued.**

- (i) Person A drinks alcohol on its own.**

**Person B drinks alcohol with their meals.**

**Calculate the difference in risk for these two people when each one drinks 24 units of alcohol per week.  
(3 marks)**

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**(continued on the next page)**

**Turn over**

**3 continued.**

**(ii) Using evidence from Figure 5, state TWO pieces of health advice for people about drinking alcohol.  
(2 marks)**

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

\_\_\_\_\_

\_\_\_\_\_

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

\_\_\_\_\_

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**(continued on the next page)**



**3 continued.**

**(c) Cystic fibrosis is a genetic condition that can also cause liver disease.**

**(i) State where genes are found in cells.  
(1 mark)**

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**3 continued.**

**(ii) Look at FIGURE 6 for Question 3(c) in the Diagram Booklet. It shows the inheritance of cystic fibrosis in a family.**

**F represents the dominant allele that does not cause cystic fibrosis.**

**f represents the recessive allele that causes cystic fibrosis.**

**A scientist states that the genotype of person B is Ff.**

**Explain why the scientist is correct.  
(2 marks)**

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**Turn over**

**3 continued.**

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**(iii) State the genotype of person C.  
(1 mark)**

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**(Total for Question 3 = 10 marks)**

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- 4 (a) Look at FIGURE 7 for Question 4(a) in the Diagram Booklet. It shows a height percentile chart for boys.**

**The numbers on the right-hand side of the graph show the percentiles of the population for each growth curve.**

- (i) A 10-year-old boy has a height of 140 cm.**

**Which is the percentile range for height for this boy?  
(1 mark)**

☐ **A 10th to 25th**

☐ **B 25th to 50th**

☐ **C 50th to 75th**

☐ **D 75th to 90th**

**(continued on the next page)**

**Turn over**

**4 continued.**

**(ii) State how percentile charts  
are used.  
(1 mark)**

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**4 continued.**

**(b) As we grow, we make new cells by mitosis and meiosis.**

**(i) The cells that are made can become specialised.**

**Look at FIGURE 8 for Question 4(b)(i) in the Diagram Booklet. It shows a diagram of a sperm cell.**

**Describe TWO ways that the sperm cell is specialised.  
(2 marks)**

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

\_\_\_\_\_

\_\_\_\_\_

**(continued on the next page)**

**Turn over**

**4 continued.**

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

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\_\_\_\_\_

**(continued on the next page)**

**4 continued.**

- (ii) Look at the table for Question 4(b)(ii) in the Diagram Booklet. Complete the table to show the results when a cell divides by mitosis or meiosis in humans.**

**Human body cells, except gametes, have 23 pairs of chromosomes.  
(4 marks)**

**(continued on the next page)**



**4 continued.**

**(c) The tips of plant roots are where many cells are dividing by mitosis.**

**(i) Which term describes the area of a root where many cells are dividing by mitosis?  
(1 mark)**

☐ **A meristem**

☐ **B root hair cell**

☐ **C xylem**

☐ **D phloem**

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**4 continued.**

**(ii) Plant root cells contain an enzyme that joins glucose molecules together to make starch.**

**Devise a plan to investigate the effect of pH on the activity of this enzyme.  
(3 marks)**

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**4 continued.**

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**(Total for Question 4 = 12 marks)**

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**5 (a) DNA molecules contain base pairs.**

**Describe how the base pairs are bonded together in a DNA molecule.  
(2 marks)**

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**5 continued.**

**(b) Look at FIGURE 9 for Question 5(b) in the Diagram Booklet. It shows part of a DNA molecule.**

**(i) Write the code for the complementary DNA strand in Figure 9.  
(2 marks)**

**(ii) Three bases code for each amino acid.**

**Which is the maximum number of amino acids coded for by this strand of DNA?  
(1 mark)**

☐ **A 3**

☐ **B 4**

☐ **C 6**

☐ **D 12**

**(continued on the next page)**

**Turn over**

**5 continued.**

**(iii) What is the shape of a  
DNA molecule?  
(1 mark)**

- ☐ **A triple stranded**
- ☐ **B single stranded**
- ☐ **C single helix**
- ☐ **D double helix**

**(continued on the next page)**

**5 continued.**

**(c) A student wanted to extract the DNA from fresh peas.**

**The student crushed the peas and added washing up liquid and water.**

**The enzyme protease was then added to this mixture.**

**(continued on the next page)**

**5 continued.**

- (i) Explain why the enzyme protease was added to the mixture.  
(2 marks)**

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**Turn over**



**5 continued.**

**(ii) The mixture was then heated and filtered.**

**Finally, the student poured the filtrate into a test tube and ice-cold ethanol was poured down the side of the test tube into the filtrate.**

**State why ice-cold ethanol was poured into the filtrate.  
(1 mark)**

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**Turn over**

**5 continued.**

**(iii) The student wanted to compare the mass of DNA found in fresh peas with the mass of DNA found in fresh beans.**

**Give TWO variables the student would need to control to make this a valid comparison.  
(2 marks)**

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

**2** \_\_\_\_\_  
\_\_\_\_\_  
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**(Total for Question 5 = 11 marks)**

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**Turn over**

**6 (a) Look at FIGURE 10 for Question 6(a) in the Diagram Booklet. It shows the number of people diagnosed with sexually transmitted infections (STIs) in the UK during 2017.**

**(i) State the sexually transmitted infection that has the median number of people diagnosed.  
(1 mark)**

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**(continued on the next page)**

**6 continued.**

- (ii) The population of the UK in 2017 was 66 million people.**

**Calculate the total number of people diagnosed with chlamydia in the UK in 2017.  
(2 marks)**

**\_\_\_\_\_ people**

**(continued on the next page)**

**Turn over**

**6 continued.**

**(iii) State why chlamydia  
can be described as a  
communicable disease.  
(1 mark)**

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**(iv) Give ONE way the transmission  
of chlamydia can be prevented.  
(1 mark)**

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**Turn over**

**6 continued.**

**(v) Explain why chlamydia can be treated with antibiotics.  
(2 marks)**

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**6 continued.**

**\*(b) When a person is infected with a disease, the immune system will respond to protect their body.**

**Explain how the immune system will respond to an infection caused by bacteria.  
(6 marks)**

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**Turn over**

**6 continued.**

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**Turn over**



**6 continued.**

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**(Total for Question 6 = 13 marks)**

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