

Please check the examination details below before entering your candidate information

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| Candidate surname |  |  |  |  | Other names      |  |  |  |  |
| Centre Number     |  |  |  |  | Candidate Number |  |  |  |  |
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**Pearson Edexcel Level 1/Level 2 GCSE (9–1)**

**Friday 10 May 2024**

Morning (Time: 1 hour 10 minutes) **Paper reference** **1SC0/1BH**

**Combined Science**

**PAPER 1**

**Higher Tier**

**You must have:**  
Ruler, calculator

Total Marks

## Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided  
– *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.

## 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.

Turn over ►

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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 (a) Pepsin and trypsin are enzymes that break down proteins.

Figure 1 shows the results of an investigation into the activity of pepsin and trypsin at different pH levels.

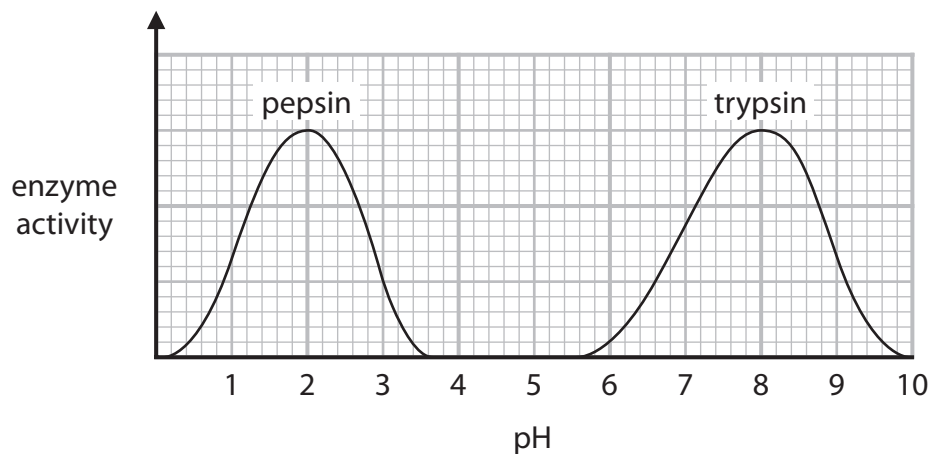


Figure 1

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

(1)

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

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

Use data from the graph to support your answer.

(3)

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

(1)

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

(3)

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

Give **one** way the temperature could be controlled.

(1)

**(Total for Question 1 = 9 marks)**

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

(i) Which type of pathogen causes malaria?

(1)

- ☐ **A** a bacterium
- ☐ **B** a fungus
- ☐ **C** a protist
- ☐ **D** a virus

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

(1)

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.....

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

Figure 2 shows the number of measles cases reported in England and Wales from 1985 to 2015.

| year | number of measles cases reported |
|------|----------------------------------|
| 1985 | 97 408                           |
| 1995 | 7 447                            |
| 2005 | 2 089                            |
| 2015 | 1 193                            |

**Figure 2**

Explain **one** conclusion that can be made about the change in the number of measles cases reported from 1985 to 2015.

(2)

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(c) Describe **two** ways the immune system will respond to an infection by a pathogen.

(2)

1 .....

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2 .....

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(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)

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(Total for Question 2 = 7 marks)

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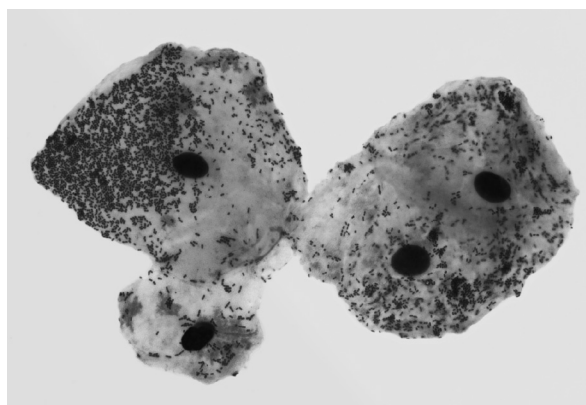
3 (a) A student made a microscope slide of cells taken from the inside of their mouth.

(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)

(ii) A light microscope was used to obtain an image similar to the one shown in Figure 3.



(Source: © STEVE GSCHMEISSNER/SCIENCE PHOTO LIBRARY)

**Figure 3**

Describe how the student used the light microscope to view these cells at a magnification of  $\times 400$ .

(3)

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

Explain the role of **one** other structure in the cytoplasm of a human cell.

(2)

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- (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)

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- (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)

1 .....

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2 .....

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(Total for Question 3 = 11 marks)



- 4 (a) Figure 4 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.

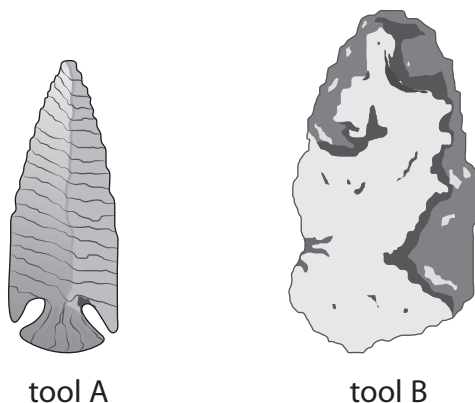


Figure 4

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

(1)

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

(2)

- (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)

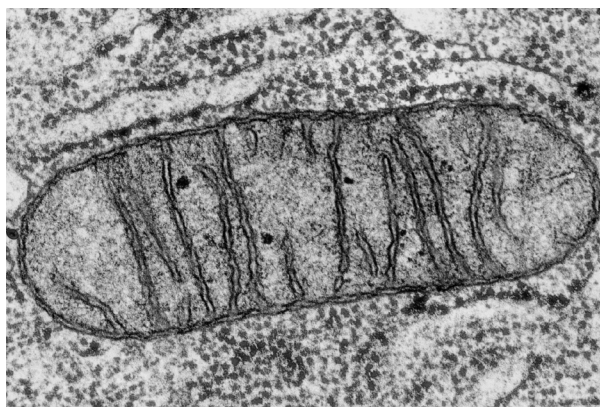
1 .....

2 .....



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

Figure 5 shows a mitochondrion viewed using an electron microscope.



(Source: © CNRI/SCIENCE PHOTO LIBRARY)

**Figure 5**

- (i) At a magnification of  $\times 62\,000$  this mitochondrion has a length of  $434\text{ mm}$ .

Calculate the actual length of this mitochondrion.

Give your answer in micrometres ( $\mu\text{m}$ ).

(3)

.....  $\mu\text{m}$

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

(2)

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**(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)

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

(1)

- ☐ **A** discovery
- ☐ **B** development
- ☐ **C** preclinical
- ☐ **D** clinical



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

The percentage of people who reported muscle pain was recorded.

Figure 6 shows the results of this study.

| years after starting to take statins or placebo | people reporting muscle pain taking statins (%) | people reporting muscle pain taking placebo (%) |
|-------------------------------------------------|-------------------------------------------------|-------------------------------------------------|
| 1                                               | 14.8                                            | 14.0                                            |
| 2                                               | 7.4                                             | 7.5                                             |
| 3                                               | 5.1                                             | 5.3                                             |
| 4                                               | 3.0                                             | 3.1                                             |

**Figure 6**

(i) In year one, 9 199 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)

..... people



- (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)

- (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)

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.

Figure 7 shows the three stages of the cell cycle.

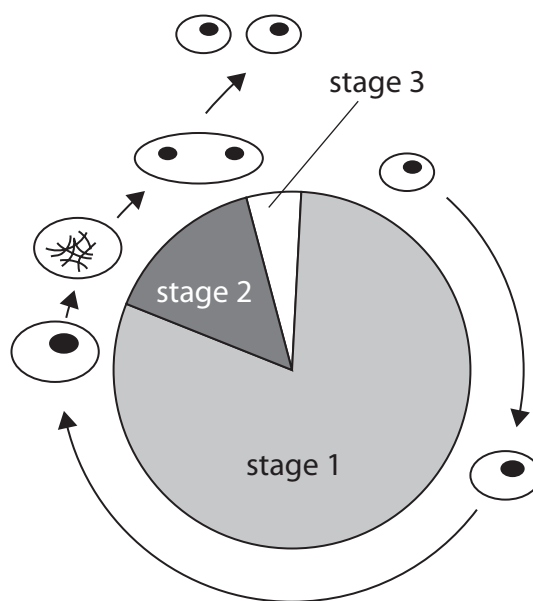


**Figure 7**

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

(6)

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

(1)

(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)

- ☐ **A** cell- elongation
- ☐ **B** differentiation
- ☐ **C** cell wall synthesis
- ☐ **D** transpiration



- (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)

(Total for Question 6 = 12 marks)

**TOTAL FOR PAPER = 60 MARKS**

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