

Edexcel style

Pearson Edexcel Level 1/Level 2 GCSE (9–1) in Combined Science

Paper 1: Biology 1 (Higher Tier) – Practice Paper

1SC0/1BH · Higher Tier · Practice paper

Time allowed: 1 hour 10 minutes

Candidate name	
Centre number	
Candidate number	

Materials

- Calculator
- Ruler
- You may use a calculator.

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.
- 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.
- 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.

Time: 1 hour 10 minutes. 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) Put a cross in the box next to your answer.

Which structure in a bacterial cell is a small ring of DNA?

A	flagellum	
B	cell wall	
C	plasmid	
D	ribosome	

(1)

(b) Describe how an egg cell is adapted to its function.

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(2)

(c) A student observed cells from the lining of the cheek with a light microscope.

The image of one cell was 16 mm wide.

The magnification was $\times 800$.

Calculate the real width of the cell in micrometres (μm).

(2)

(d) A ribosome has a diameter of 25 nm.

Give the diameter of the ribosome in metres in standard form.

(1)

(e) The student first focused on the cells using the lowest power objective lens and then changed to a higher power objective lens.

Explain why the student started with the lowest power objective lens.

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(2)

(f) Explain why ribosomes cannot be seen using the student's light microscope.

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(1)

(g) Put a cross in the box next to your answer.

What is the function of the cilia on ciliated epithelial cells in the airways?

A	to absorb oxygen	
B	to move mucus away from the lungs	
C	to produce antibodies	
D	to digest pathogens	

(1)

(Total for Question 1 = 10 marks)

2 A student investigated the effect of pH on the activity of a protease enzyme.

The student mixed protease with a cloudy milk powder suspension and a buffer solution. The protease breaks down the protein in the milk powder and the mixture becomes clear. The student timed how long it took for the mixture to become clear.

The table shows the student's results.

pH	Time for the mixture to become clear in s
2	300
4	150
6	90
8	120
10	did not clear

pH	Time for the mixture to become clear in s
	after 600

(ai) Give the optimum pH of the protease from these results.

(1)

(aii) Explain why the student placed the tubes of protease and milk powder suspension in a water bath at 37 °C before mixing them.

(2)

(aiii) The student repeated the investigation at pH 6 using a higher concentration of milk powder.

Explain how increasing the concentration of the substrate affects the rate of an enzyme-controlled reaction.

(2)

(bi) In a different investigation, a cylinder of potato with a mass of 5.00 g was placed in a concentrated sugar solution. After 40 minutes its mass was 4.65 g.

Calculate the percentage change in mass of the potato cylinder.

(2)

(bii) Explain why the potato cylinder lost mass.

(2)

Which process requires energy from respiration?

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What happens during interphase of the cell cycle?

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(b) A student looked at a stained slide of cells from an onion root tip.

Calculate the percentage of cells undergoing mitosis.

(2)

(1)

(d) *A person touches a very hot pan and quickly moves their hand away.

Explain how the structures in a reflex arc bring about this response, and why the response is faster than a response that involves conscious thought.

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(6)

(Total for Question 3 = 10 marks)

4

(a) Put a cross in the box next to your answer.

In DNA, which base pairs with cytosine?

A	adenine	
B	guanine	
C	thymine	
D	uracil	

(1)

(bi) A student extracted DNA from strawberries.

The student mashed the strawberries with a solution of detergent and salt.

Explain why detergent and salt were added.

(2)

(bii) The student then poured ice-cold ethanol down the side of the tube.

State why ice-cold ethanol was used.

(1)

(ci) In pea plants, the allele for tall stems (T) is dominant to the allele for short stems (t).

A heterozygous tall plant is crossed with a short plant.

Draw a Punnett square to show the possible genotypes of the offspring.

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(2)

(cii) Give the expected ratio of tall plants to short plants in the offspring.

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(1)

(d) A sample of DNA contains 30% adenine.

Calculate the percentage of guanine in the sample.

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(2)

(e) Put a cross in the box next to your answer.

What is a gene?

A	a section of DNA that codes for a specific protein	
B	a pair of chromosomes	
C	a different form of an allele	
D	a cell with half the number of chromosomes	

(1)

(Total for Question 4 = 10 marks)

5

(a) Arctic hares living in areas with snow for most of the year have white fur.
The ancestors of these hares had brown fur.

Explain how a population of hares with white fur could have evolved by natural selection.

(4)

(b) The fossil Ardi had a brain volume of about 350 cm³.
Modern humans have a brain volume of about 1350 cm³.

Calculate how many times larger the brain volume of modern humans is than the brain volume of Ardi.

Give your answer to 1 decimal place.

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(2)

(c) Put a cross in the box next to your answer.

Which fossil hominid is known as 'Lucy'?

A	Ardipithecus ramidus	
B	Australopithecus afarensis	
C	Homo habilis	
D	Homo erectus	

(1)

(d) Human insulin can be produced by genetically modified bacteria.

Describe how the human insulin gene is inserted into a bacterial plasmid.

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(2)

(e) Put a cross in the box next to your answer.

In the three-domain system of classification, in which domain are fungi placed?

A	Archaea	
B	Bacteria	
C	Eukarya	
D	Prokaryota	

(1)

(Total for Question 5 = 10 marks)

6 This question is about health and disease.

(a) Put a cross in the box next to your answer.

How is cholera spread?

A	by droplets in the air	
B	by drinking contaminated water	
C	by sexual contact	

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(6)

(Total for Question 6 = 10 marks)

END OF QUESTIONS