

# Specimen Paper

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
3	
4	
5	
TOTAL	



AQA Level 1/2 Certificate in Science: Double Award  
Specimen Paper

## Double Award

### Biology Paper 1H

**For this paper you must have:**

- a ruler.

You may use a calculator.

**Time allowed**

- 60 minutes

**Instructions**

- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.

**Information**

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 60.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.

**Advice**

- In all calculations, show clearly how you work out your answer.

Answer **all** questions in the spaces provided.

**There are no questions printed on this page**

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ANSWER IN THE SPACES PROVIDED**

1 Energy is obtained from both aerobic and anaerobic respiration during exercise.

1 (a) Give **three** differences between aerobic and anaerobic respiration in humans.

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(3 marks)

**Question 1 continues on the next page**

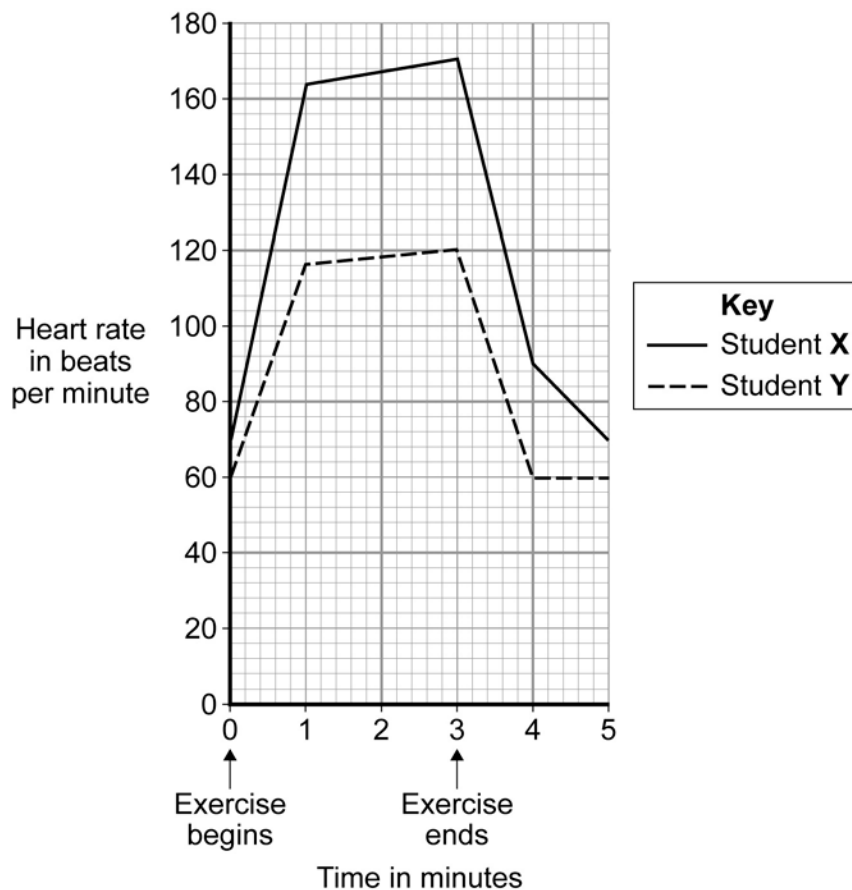
**Turn over ►**

1 (b) Two students did the same step-up exercise for 3 minutes.



One of the students was fit. The other student was unfit.

The graph shows how the students' heart rate changed during the exercise and after the exercise.



Use the information in the graph to suggest which student was the fitter.

Explain your answer.

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(3 marks)

**1 (c)** Explain the advantage to the students of the change in heart rate during exercise.

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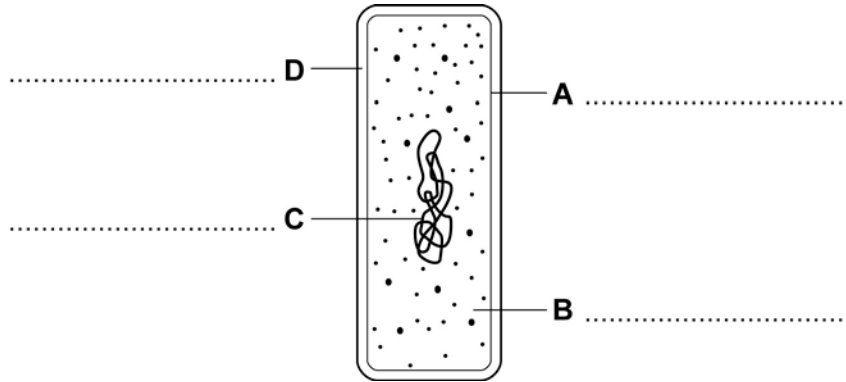
(4 marks)

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**Turn over for the next question**

**Turn over ►**

2 The diagram shows a bacterium.



2 (a) On the diagram, name the structures labelled **A**, **B**, **C** and **D**. (4 marks)

2 (b) Diseases caused by viruses are more difficult to treat than diseases caused by bacteria. Explain why.

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(3 marks)

2 (c) Describe how immunisation protects us from a disease.

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(3 marks)

- 2 (d)** Hepatitis B vaccine contains proteins that are identical to the hepatitis antigen. These proteins are produced using genetically engineered bacteria.

Use your knowledge of genetic engineering and the structure of DNA to describe, as fully as you can, how the proteins are produced.

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*(6 marks)*

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**Turn over for the next question**

**Turn over** ►

**3** An oak wood contained the following:

- 200 oak trees
- 150 000 primary consumers
- 120 000 secondary consumers.

**3 (a)** A scientist estimated the total amount of energy flow through each level of the pyramid per year.

The results are shown in the table.

	<b>Energy in kJ per m<sup>2</sup> per year</b>
Energy absorbed by oak trees	4 600 000
Energy in sugar produced by trees	44 000
Energy transferred to primary consumers	2 920
Energy transferred to secondary consumers	700

**3 (a) (i)** Calculate the percentage of energy absorbed by the trees that is transferred to sugar by photosynthesis.

Show clearly how you work out your answer.

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Answer ..... %  
(2 marks)



**3 (a) (ii)** Suggest **two** reasons why a large proportion of the energy absorbed by the trees is **not** transferred to sugar.

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(2 marks)

**3 (a) (iii)** Some of the energy in the primary consumers is **not** passed on to the secondary consumers. Explain why.

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(3 marks)

**3 (b)** Conditions may change considerably during the course of a summer's day.

Suggest how different factors interact to determine the rate of photosynthesis at different times of the day.

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(3 marks)

**Question 3 continues on the next page**

**Turn over ►**

**3 (c)** In autumn, the leaves fall from the oak trees. The fallen leaves contain carbohydrates.

Explain how the carbon in these carbohydrates is made available for the oak trees to use again.

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(3 marks)

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- 4 The gemsbok is a large herbivore that lives in herds in desert areas of South Africa. Gemsboks feed on plants that are adapted to living in dry conditions. There are not many rivers, lakes or ponds that can provide drinking water for the animals. The desert areas are hot during the day but cool at night.



- 4 (a) A few lions live in the desert areas. They hunt and feed on the gemsboks.

Use information from the photograph of the gemsbok to suggest and explain **two** ways in which the gemsbok could avoid being killed by lions.

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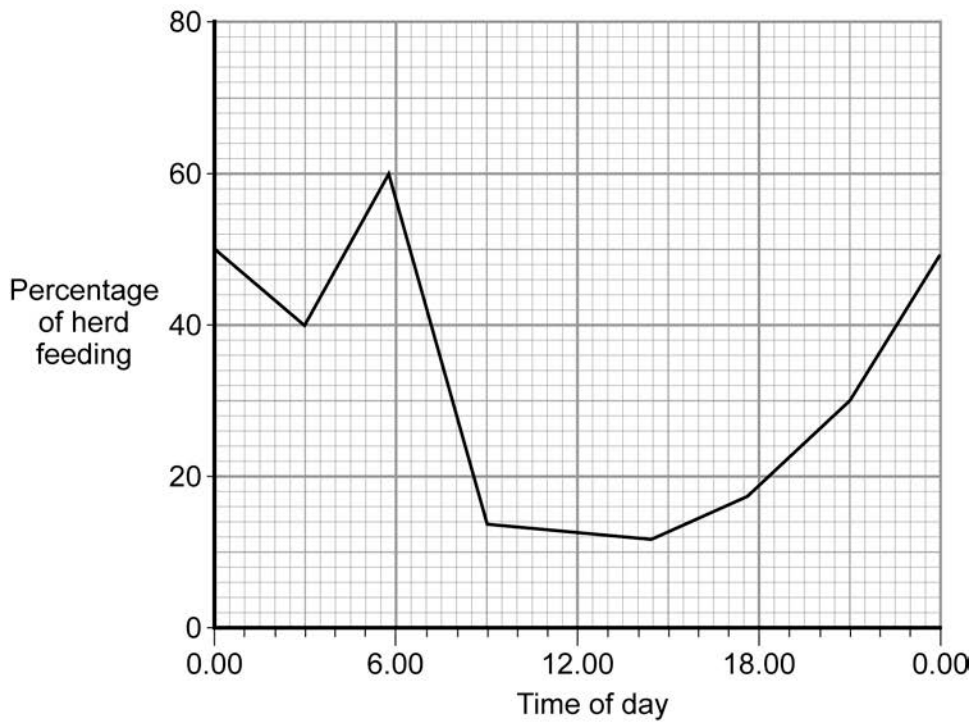
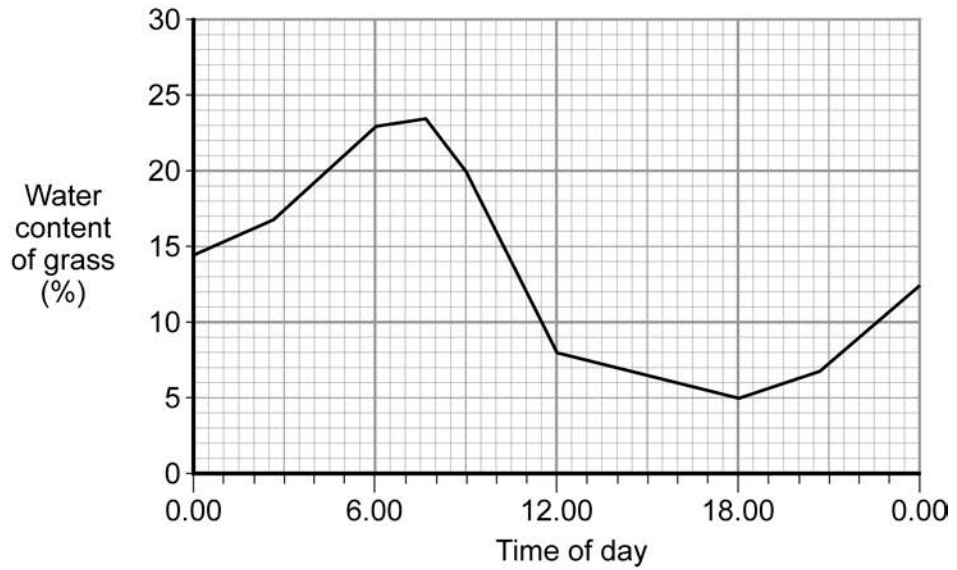
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(2 marks)

**Question 4 continues on the next page**

**Turn over ►**

**4 (b)** The graphs show the water content of the desert grass and the percentage of gemsboks feeding at different times of day.



**4 (b) (i)** Suggest why the water content of the grass changes during the day.

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(1 mark)

4 (b) (ii) Between which times of day are more than 25 % of the herd feeding?

..... and .....

(1 mark)

4 (b) (iii) Explain **one** advantage to the gemsbok of feeding mainly at these times.

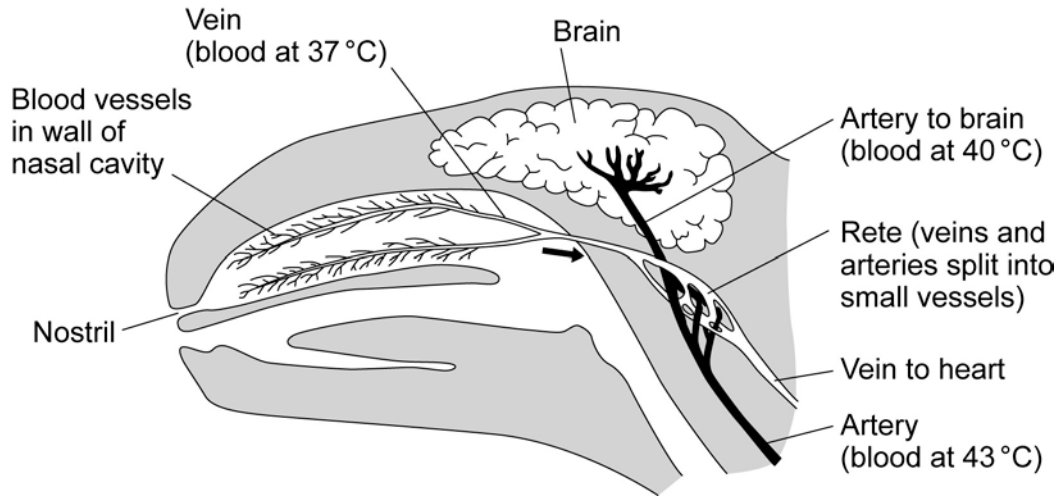
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**4 (c)** Although the gemsbok lives in hot conditions, it does not sweat. During the day its body temperature can rise, but it is important that blood reaching the brain does not rise above 40 °C. The diagram shows how the gemsbok's blood system is adapted to cool the blood that flows to the brain.



**4 (c) (i)** Suggest an advantage to the gemsbok of not sweating.

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 (1 mark)

**4 (c) (ii)** Suggest how the blood is cooled in the cavities of the nose.

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 (2 marks)

**4 (c) (iii)** Suggest how the structure of the rete helps in keeping the brain cool.

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 (2 marks)

**Turn over for the next question**

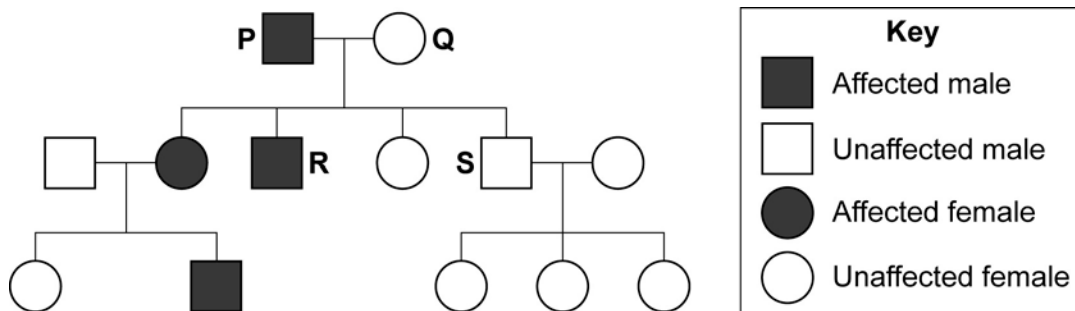
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- 5 Sometimes babies are born with extra fingers or toes, as shown in the photograph.  
This condition is called polydactyly.



The diagram shows the inheritance of polydactyly in a family.





- 5 (a)** Polydactyly is caused by a dominant allele, **D**.  
The recessive allele of the gene is represented by **d**.

Use **one** genetic diagram to show the inheritance of the polydactyly gene by **R** and **S**.

(4 marks)

**Question 5 continues on the next page**

**Turn over ►**

5 (b) Embryos can be screened for genetic disorders.

Many people would favour the use of embryo screening for cystic fibrosis but not for polydactyly.

Compare the issues involved in the use of embryo screening for cystic fibrosis and for polydactyly.

You should use your knowledge and understanding of the process and the two conditions.

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(6 marks)

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**END OF QUESTIONS**

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