

Please check the examination details below before entering your candidate information

Candidate surname					Other names				
Centre Number					Candidate Number				
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Pearson Edexcel International GCSE (9–1)

Wednesday 29 October 2025

Morning (Time: 1 hour 45 minutes)

Paper reference **4HB1/01**

Human Biology

UNIT: 4HB1

Paper: 01

You must have:

Ruler

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- If pencil is used for diagrams/sketches/graphs it must be dark (HB or B).
- **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.*
- Show all the steps in any calculations and state the units.

Information

- The total mark for this paper is 90.
- The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*
- Candidates may use a calculator.

Advice

- Read each question carefully before you start to answer it.
- Write your answers neatly and in good English.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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M:1/1/1




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Answer ALL questions.

- 1 (a) The passage is about breathing.

Complete the sentences in the passage by using the correct words from the box.

(6)

biceps	bronchi	decreasing	down
in	increasing	intercostal	out
trachea	triceps	up	

A person breathes in because of the contraction of the

..... muscles. This causes the ribs to move

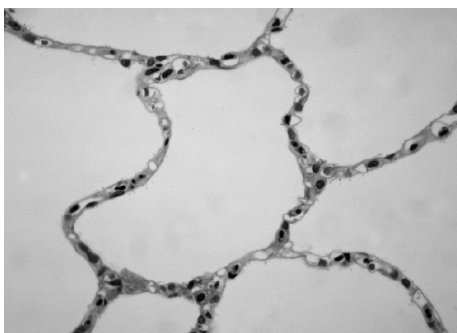
..... and

This results in the volume of the thorax and the

pressure in the lungs As a result, air is forced

from the mouth into the

- (b) Photograph 1 shows alveoli which are areas of gaseous exchange.



(Source: © Ed Reschke/Getty Images)

Photograph 1

- (i) Describe the process of gaseous exchange in the alveoli.

(2)

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(ii) Give two features of alveoli that are important for efficient gaseous exchange.

(2)

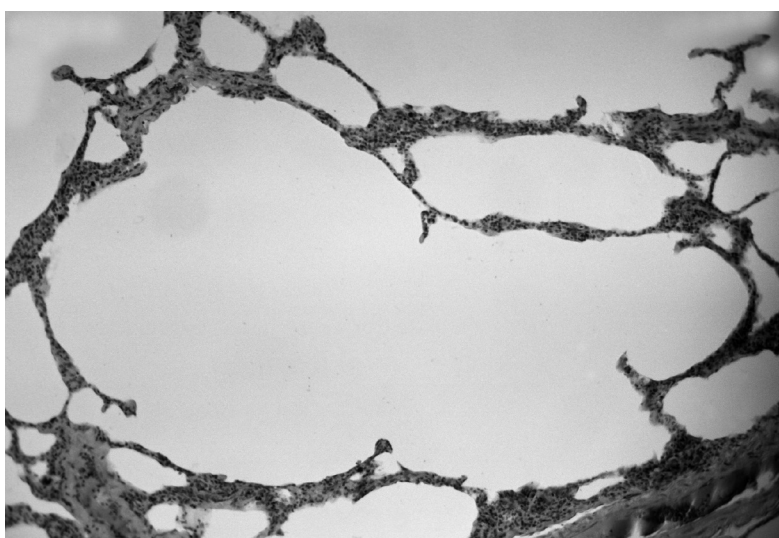
1

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2

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(c) Photograph 2 shows the alveoli of a person with emphysema.



(Source: © Ed Reschke/Getty Images)

Photograph 2

Explain how the structure of the alveoli in a person with emphysema affects the process of gaseous exchange in the lungs.

(3)

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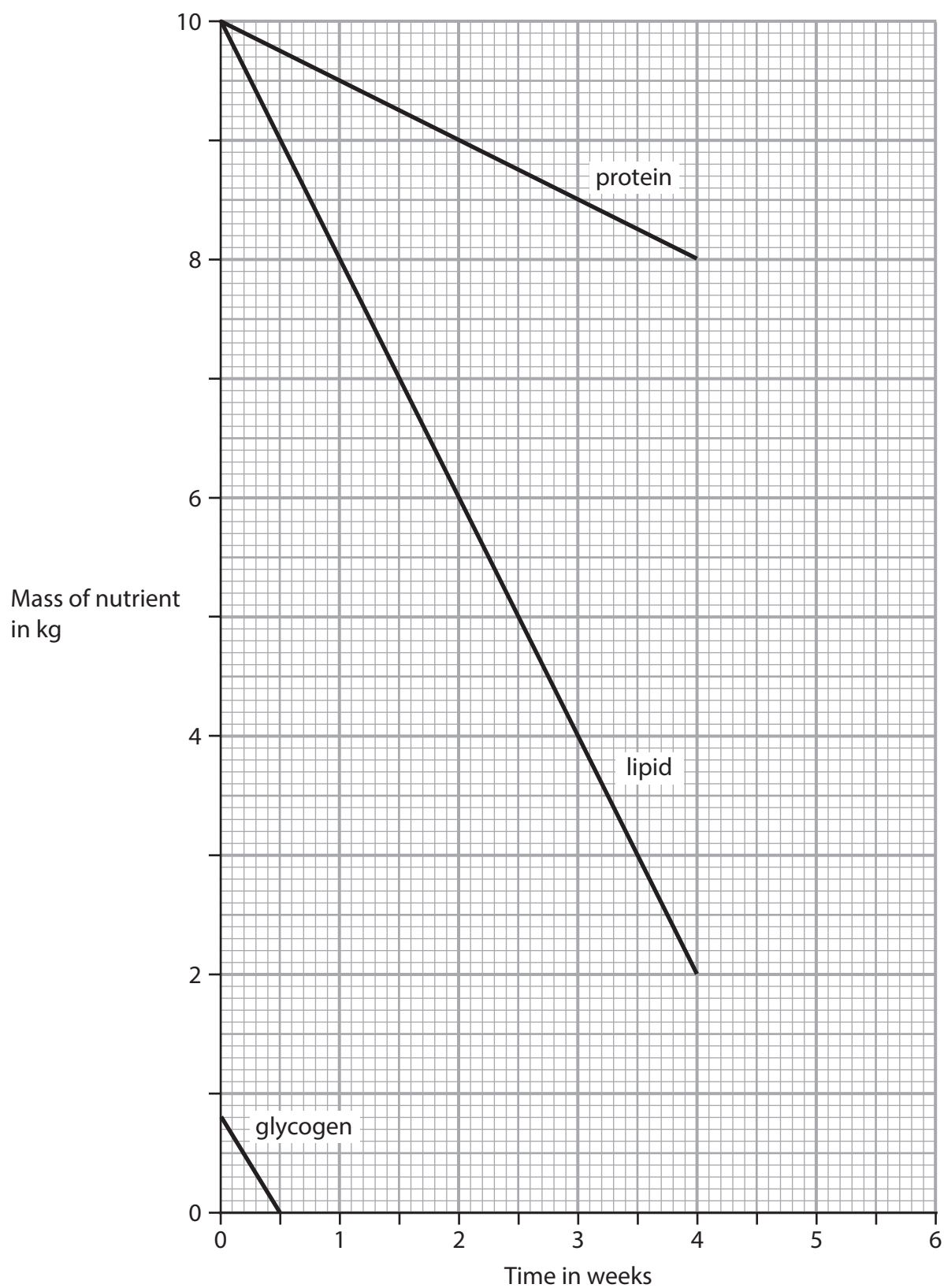
(Total for Question 1 = 13 marks)

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P 7 8 9 6 6 A 0 3 2 4

- 2 The graph shows how the mass of glycogen, lipid and protein would change if a person did not eat for four weeks.



(a) (i) State one organ in the body where glycogen is stored.

(1)

(ii) Describe how glucose in food forms glycogen in the body.

(3)

(b) Estimate how many weeks from the start of a person not eating until their lipid store would be used up.

(1)

number of weeks =



(c) (i) Determine the rate of loss of protein during the four weeks.

(2)

rate of loss of protein = kg per week

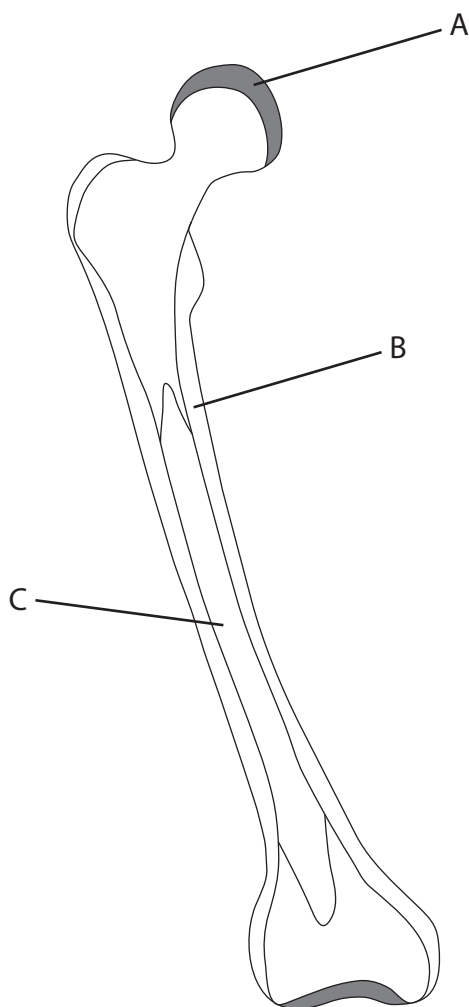
(ii) Explain the difference between the loss of protein and the loss of glycogen during the four weeks.

(4)

(Total for Question 2 = 11 marks)



3 The diagram shows a long bone from an upper limb.



(a) Name the types of tissue labelled A, B and C.

(3)

A

B

C

(b) (i) Name two mineral components of the diet needed for healthy bone growth.

(2)

1

2

(ii) Name one other component of the diet needed for healthy bone growth.

(1)

.....

- (c) Explain how you can tell that the bone shown in the diagram is an upper limb bone rather than a lower limb bone.

(3)

(Total for Question 3 = 9 marks)



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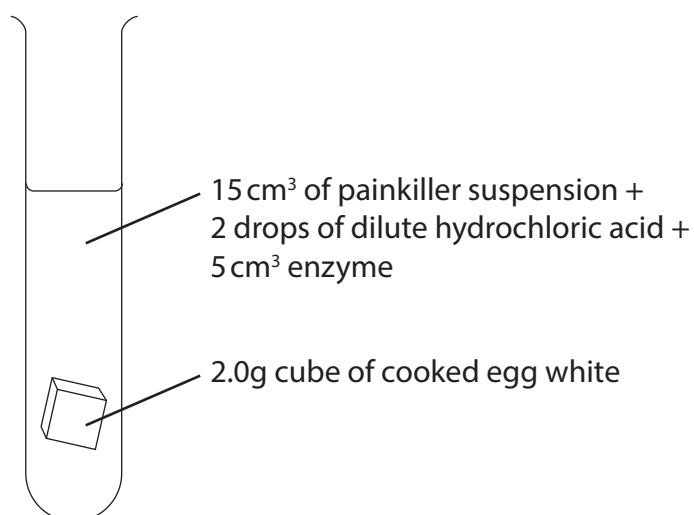
- 4 Painkillers such as aspirin, ibuprofen and paracetamol have a side effect of inhibiting some digestive enzymes.

A student sets up an investigation into this side effect using an enzyme from the stomach.

The student makes a suspension of each painkiller by crushing the painkiller and adding the powder to 15 cm^3 of water.

This is the student's method.

- use three test tubes
- add a 2.0g cube of cooked egg white (protein) to each tube
- add two drops of dilute hydrochloric acid to each tube
- add 5 cm^3 of enzyme solution to each tube
- add 15 cm^3 of a different painkiller suspension to each tube
- leave the tubes for 24 hours
- determine the mass of egg white broken down in each tube



The table shows some of the student's results.

Painkiller	Mass of egg white broken down in g	Percentage of original egg white remaining
aspirin	1.1	45
ibuprofen	1.3	
paracetamol	1.4	30

- (a) (i) State the name of the stomach enzyme that should be used in this investigation.

(1)

- (ii) Describe the action of this enzyme in the stomach.

(2)

- (b) (i) Calculate the percentage of egg white remaining at the end of the investigation in the tube containing ibuprofen.

(3)

percentage remaining =

- (ii) Name the painkiller that has the greatest effect on the digestion of the protein.

(1)



(c) (i) Describe a suitable control that should be used for this investigation.

(3)

(ii) Describe how the reliability of the results could be improved.

(2)

(iii) The student controls certain variables in their method.

State two other variables that they should control during this investigation.

(2)

1

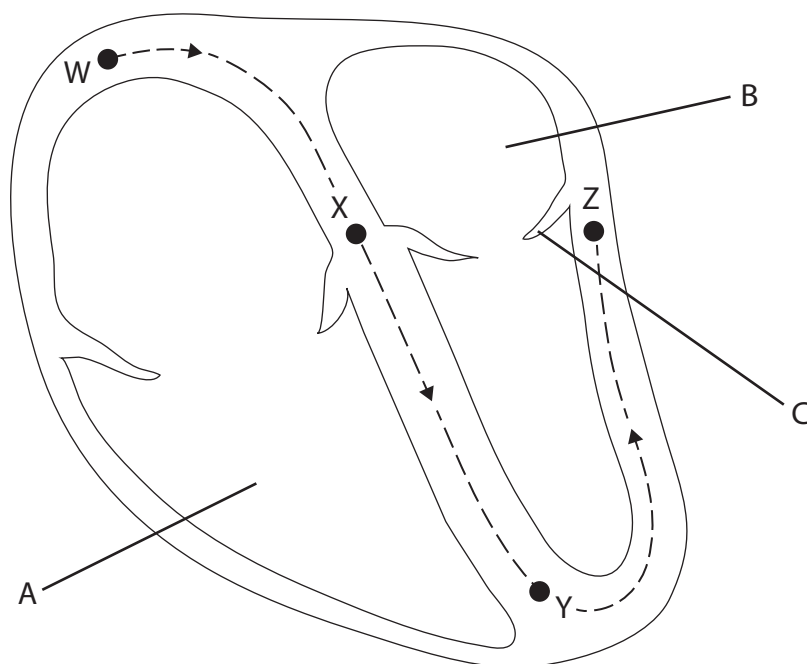
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(Total for Question 4 = 14 marks)



5 The diagram shows a section through a heart (not to scale).

The pathway taken by an impulse, which causes the heart to contract, is also shown.



Key

----- pathway of impulse

(a) (i) Name part A and part B.

(2)

A

B

(ii) Explain the function of part C.

(4)

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- (b) The time taken for the impulse to travel along each section of the pathway is shown in the table.

Section of pathway	Distance travelled by impulse in mm	Time taken in seconds
W to X	40	0.070
X to Y	105	0.130
Y to Z	115	0.050

- (i) Calculate the mean speed of the impulse travelling from W to Z.

Write your answer in standard form.

(4)

mean speed = mm per second

- (ii) Explain why it is important that the heart muscle in areas W, X, Y and Z contracts in this order.

(2)

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(c) The diagram of the heart is not drawn to scale.

Give two ways that the walls of the heart would differ if the diagram was drawn to scale.

(2)

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(Total for Question 5 = 14 marks)

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6 Diagram 1 shows two neurones found in a reflex arc.

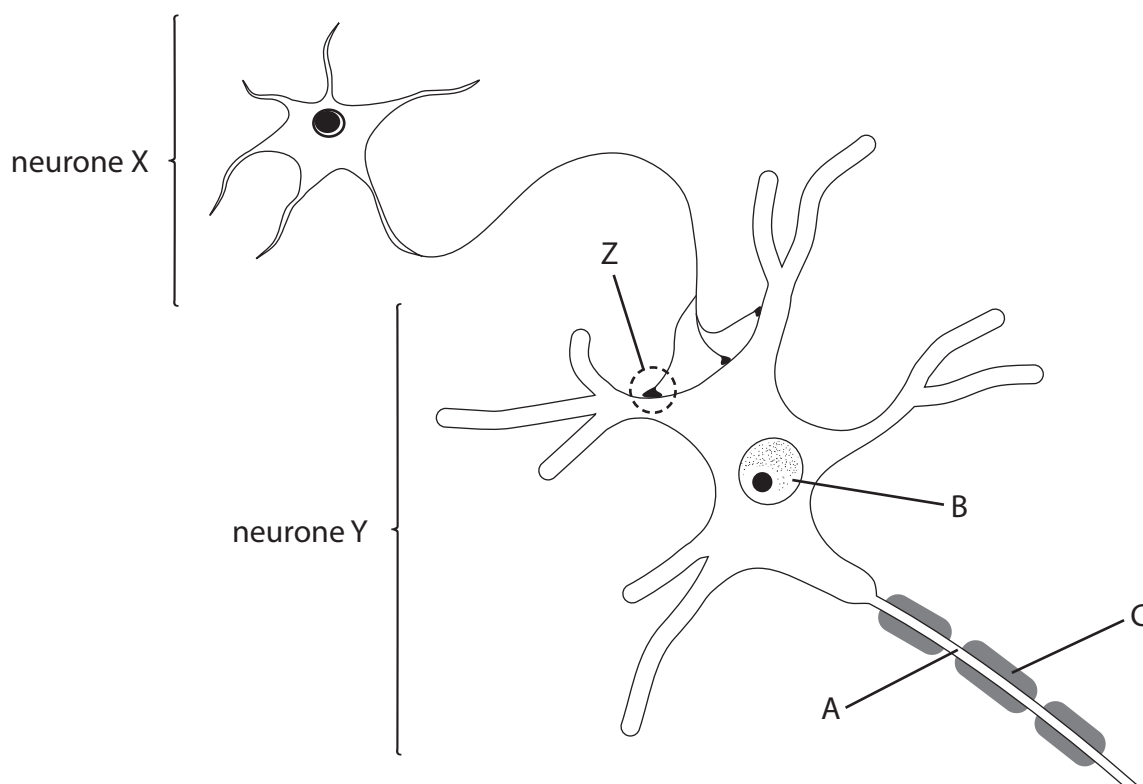


Diagram 1

(a) (i) Name the parts of the neurone labelled A, B and C.

(3)

A

B

C

(ii) Identify the type of neurone labelled X and the type of neurone labelled Y.

(2)

X

Y

(iii) Explain how a nerve impulse passes from neurone X to neurone Y at point Z.

(6)

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Handwriting practice area with horizontal dotted lines.



(b) Diagram 2 shows a reflex arc for the withdrawal of a hand from a hot object.

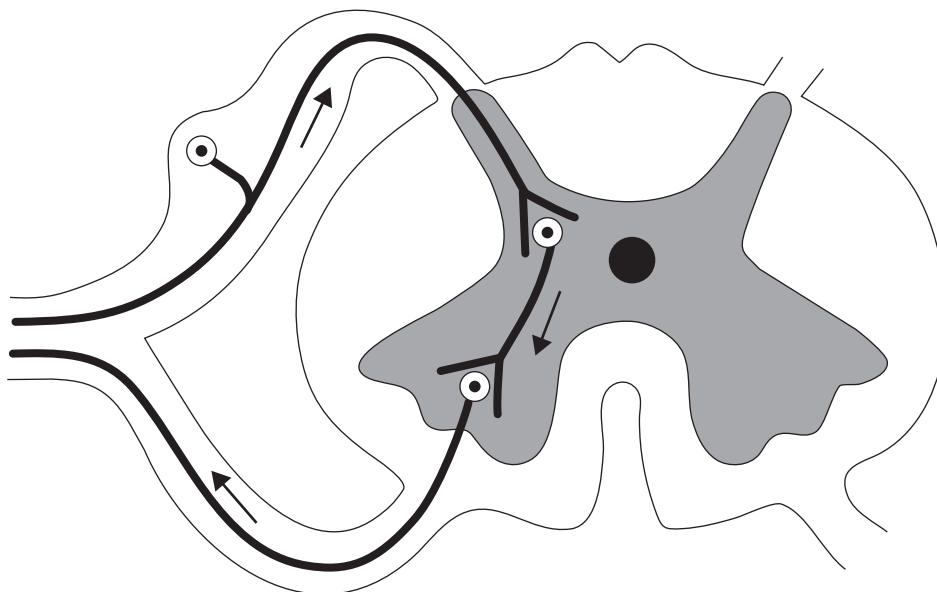


Diagram 2

(i) Identify the position of neurone X and neurone Y by adding suitable label lines to diagram 2.

(2)

(ii) Suggest two other reflex actions that occur in the body.

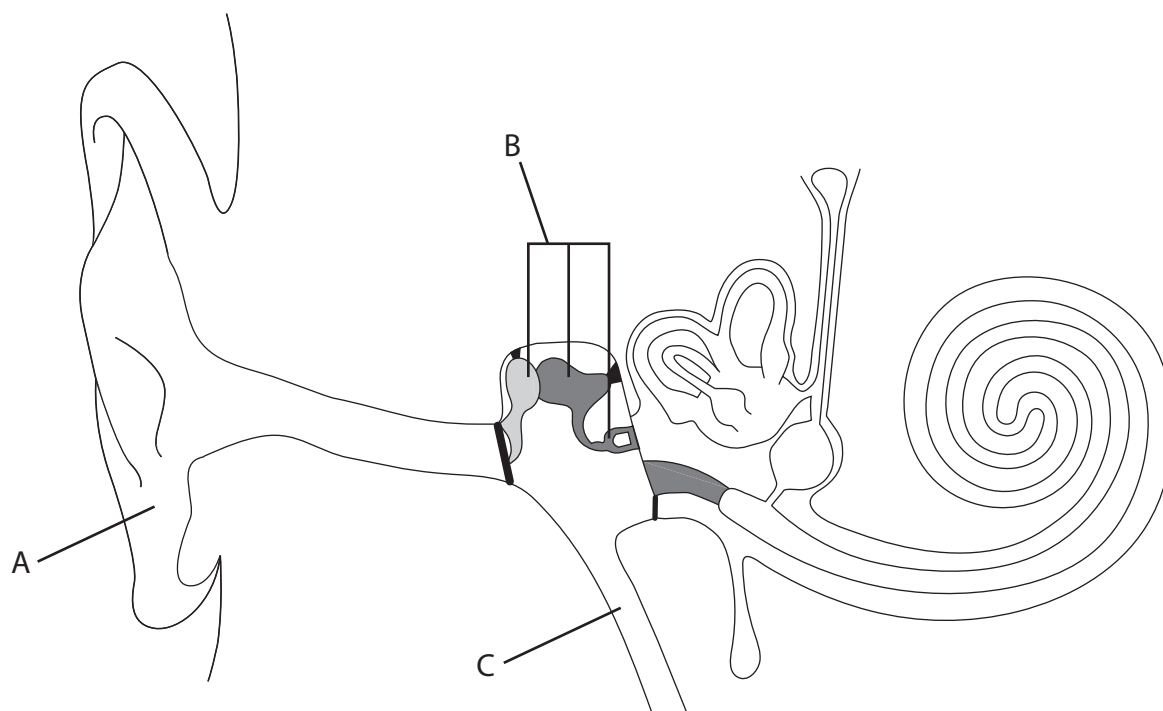
(2)

1

2

(Total for Question 6 = 15 marks)

7 (a) The diagram shows a section through the ear.



Describe the function of each of the parts labelled A, B and C.

(6)

A

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B

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C

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- (b) An investigation is carried out to test how well a person's ears can detect different frequencies of sound.

The results are shown in the table.

Frequency of sound in Hz	Minimum loudness of sound detected in dB	
	right ear	left ear
250	4	50
500	9	62
1000	10	75
2000	3	76
4000	8	85
8000	20	100

- (i) Describe a method that could be used for this investigation.

(5)



- (ii) The normal range of minimum loudness that can be detected is between 1 dB and 25 dB at each frequency.

A person with a serious loss of hearing needs the loudness to be 120 dB at each frequency to detect the sound.

Comment on the conclusions that can be made about the hearing of the person in the investigation.

(3)

(Total for Question 7 = 14 marks)

TOTAL FOR PAPER = 90 MARKS



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