

Write your name here

Surname	Other names
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**Pearson Edexcel** Centre Number 

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 Candidate Number 

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**International GCSE**

**Human Biology**  
**Unit: 4HB0**  
**Paper: 01**

Wednesday 6 May 2015 – Morning <b>Time: 2 hours</b>	Paper Reference <b>4HB0/01</b>
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**You must have:**  
Ruler  
Calculator.

Total Marks
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### 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.*
- Show all the steps in any calculations and state the units.
- 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 ☒.

### Information

- The total mark for this paper is 120.
- The marks for **each** question are shown in brackets  
– *use this as a guide as to how much time to spend on each question.*

### Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- 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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PEARSON

**Answer ALL questions.**

1 For each of the questions (a) to (j), choose an answer **A, B, C** or **D** and put a cross in the box . Mark only one answer for each question. If you change your mind about an answer, put a line through the box  and then mark your new answer with a cross .

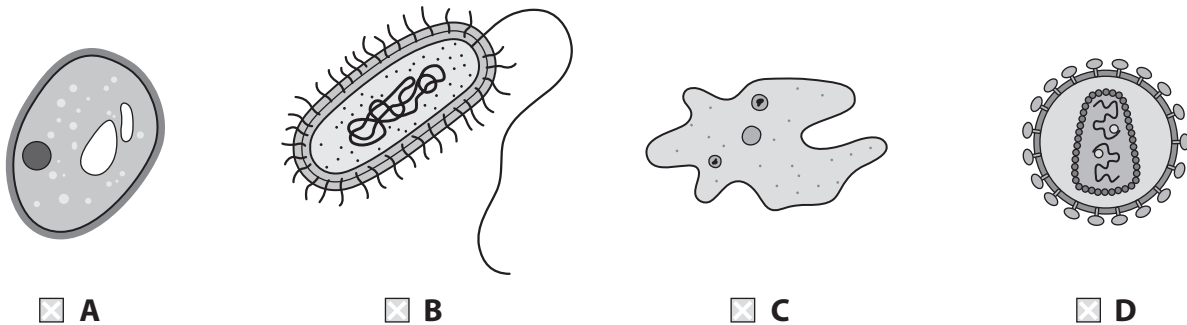
(a) Which organ provides the site for gas exchange between a pregnant woman and her growing fetus?

(1)

- A** placenta
- B** umbilical cord
- C** uterus
- D** cervix

(b) Which diagram shows a bacterial cell?

(1)



(c) Which hormones can be found in the contraceptive pill?

(1)

- A** oestrogen and FSH
- B** FSH and progesterone
- C** progesterone and oestrogen
- D** LH and oestrogen

(d) Which gas is the main cause of acid rain?

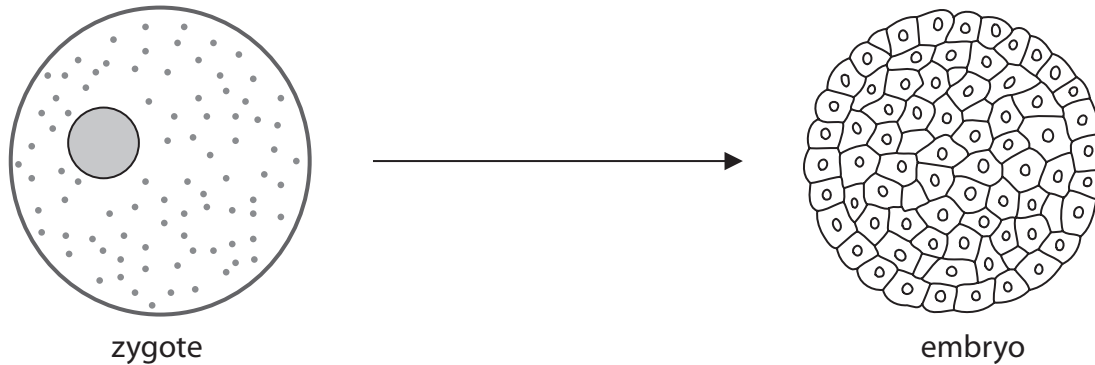
(1)

- A** carbon monoxide
- B** chlorofluorocarbons (CFCs)
- C** sulphur dioxide
- D** methane



(e) Which word describes the process shown in the diagram?

(1)



- A fertilisation
- B mitosis
- C inheritance
- D meiosis

(f) Bacteria are destroyed by drugs known as

(1)

- A antibodies
- B antibiotics
- C antigens
- D vaccines

(g) What name is given to the genetic make-up of an individual?

(1)

- A recessive
- B phenotype
- C codominance
- D genotype

(h) The name of the blood vessel that delivers blood to the kidneys is the

(1)

- A hepatic vein
- B hepatic artery
- C renal vein
- D renal artery



P 4 4 2 6 3 A 0 3 3 2

(i) Which row of the table describes the action of the intercostal muscles and the diaphragm when breathing out?

(1)

	Intercostal muscles	Diaphragm
<input type="checkbox"/> <b>A</b>	contract	relaxes
<input type="checkbox"/> <b>B</b>	relax	relaxes
<input type="checkbox"/> <b>C</b>	contract	contracts
<input type="checkbox"/> <b>D</b>	relax	contracts

(j) Anaerobic respiration is different from aerobic respiration because it

(1)

- A** releases energy
- B** requires oxygen
- C** uses glucose
- D** produces lactic acid

**(Total for Question 1 = 10 marks)**

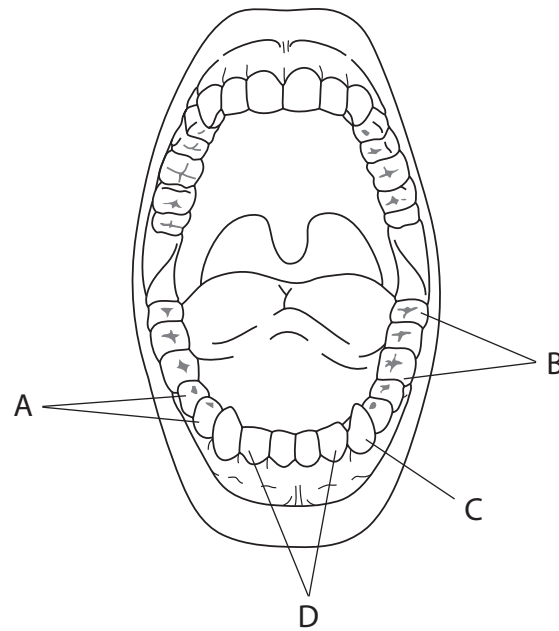


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P 4 4 2 6 3 A 0 5 3 2

2 The diagram shows the arrangement of teeth in the mouth of an adult.



(a) (i) Which of the teeth are designed to grip and tear food?

(1)

- A
- B
- C
- D

(ii) Describe how teeth A and B help with the digestion of food in the mouth.

(4)

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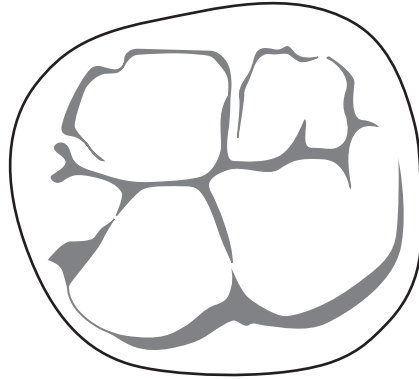
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(b) The diagram shows the top surface of a tooth found at the back of the mouth.



Suggest why teeth of this type are more likely to decay than other teeth.

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(c) Name a mineral ion needed to maintain strong, healthy teeth.

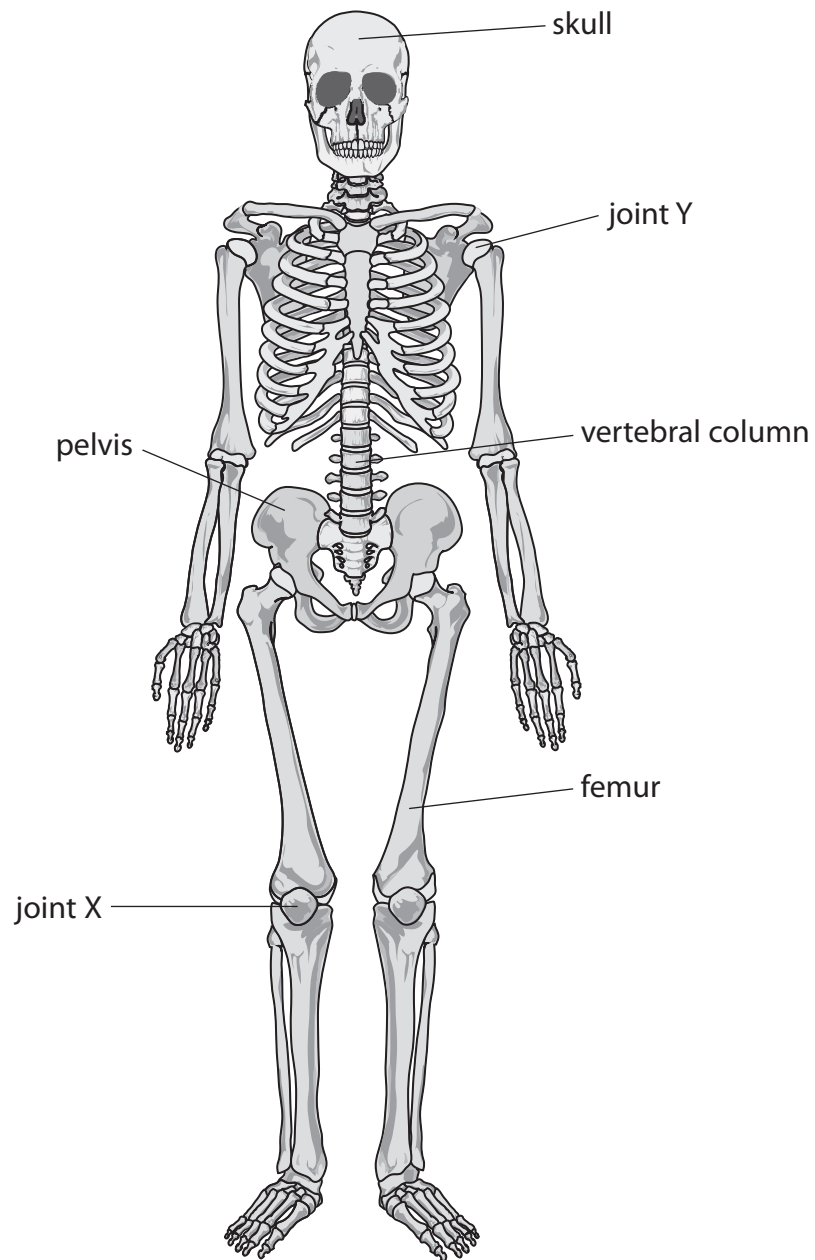
(1)

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**(Total for Question 2 = 10 marks)**



3 (a) The diagram shows a human skeleton.



(i) Name the type of joint shown by joint X in the diagram.

(1)





(ii) Explain how the structure of joint Y allows it to bring about movement.

(4)

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(iii) Place one tick (✓) in each row to show whether the structures form part of the axial or appendicular skeleton.

(3)

Structure	Axial skeleton	Appendicular skeleton
vertebral column		
femur		
skull		
pelvis		



(b) The passage describes the role of bones and muscles in movement.  
Use words from the box to complete the passage.  
You may use each word once, more than once or not at all.

(7)

involuntary	relaxes	mitochondria	contracts	
antagonistic	pushed	ligaments	pulled	ribosomes
muscles	voluntary	tendons		

Bones are moved by ..... muscles. These muscles are  
attached to bones by ..... and they work  
in ..... pairs. When one muscle in the  
pair ..... the other .....  
and bones are ..... in a particular direction. Muscle cells  
contain many ..... which release energy for movement.

**(Total for Question 3 = 15 marks)**



4 A student carries out an investigation to determine the effect of temperature on the action of salivary amylase on starch.

This is the student's method.

- pour some starch solution into a test tube
- add some salivary amylase to the starch solution
- add iodine to the amylase/starch solution
- place the amylase/starch solution into a water bath set at 40°C
- use a stopwatch to time how long it takes for the colour to change

Suggest how the student could improve his investigation.

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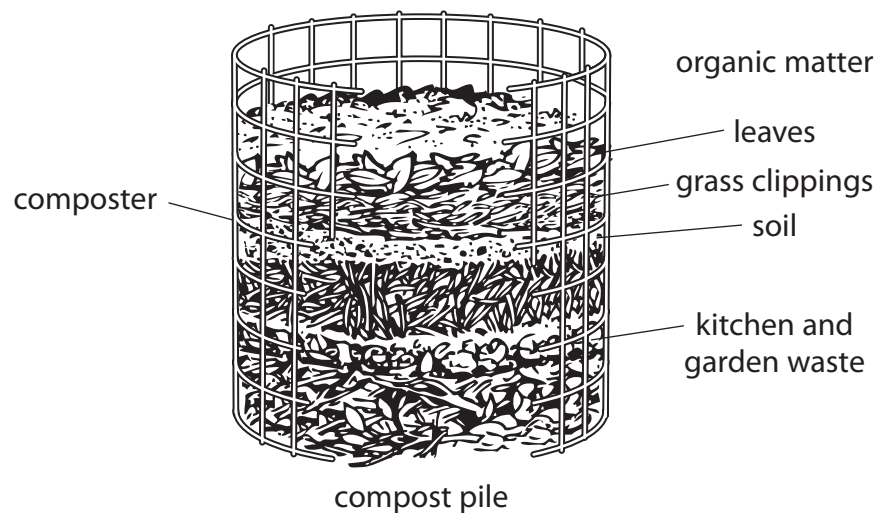
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(Total for Question 4 = 4 marks)



- 5 Gardeners use compost to fertilise their soil.  
The diagram shows a composter, where organic matter is broken down by aerobic bacteria to produce compost.



- (a) (i) The bacteria that break down organic matter are non-pathogenic.

Non-pathogenic bacteria

(1)

- A do not cause disease
- B cause disease
- C prevent disease
- D cure disease

- (ii) Explain why bacteria break down organic matter more quickly in summer than in winter.

(2)

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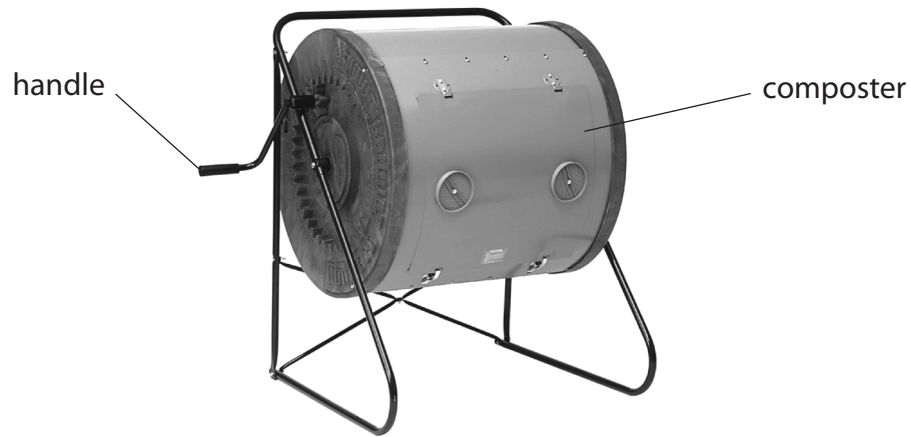
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(iii) This diagram shows a different type of composter. Every few days the gardener turns the handle to rotate the composter.



© LDS Earth Stewardship

Suggest why rotating the composter helps to break down the organic matter more quickly.

(3)

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(iv) Once the organic matter in a composter has been broken down by the bacteria, the fertiliser produced can be spread over the soil.

Suggest why fertiliser is useful to gardeners.

(2)

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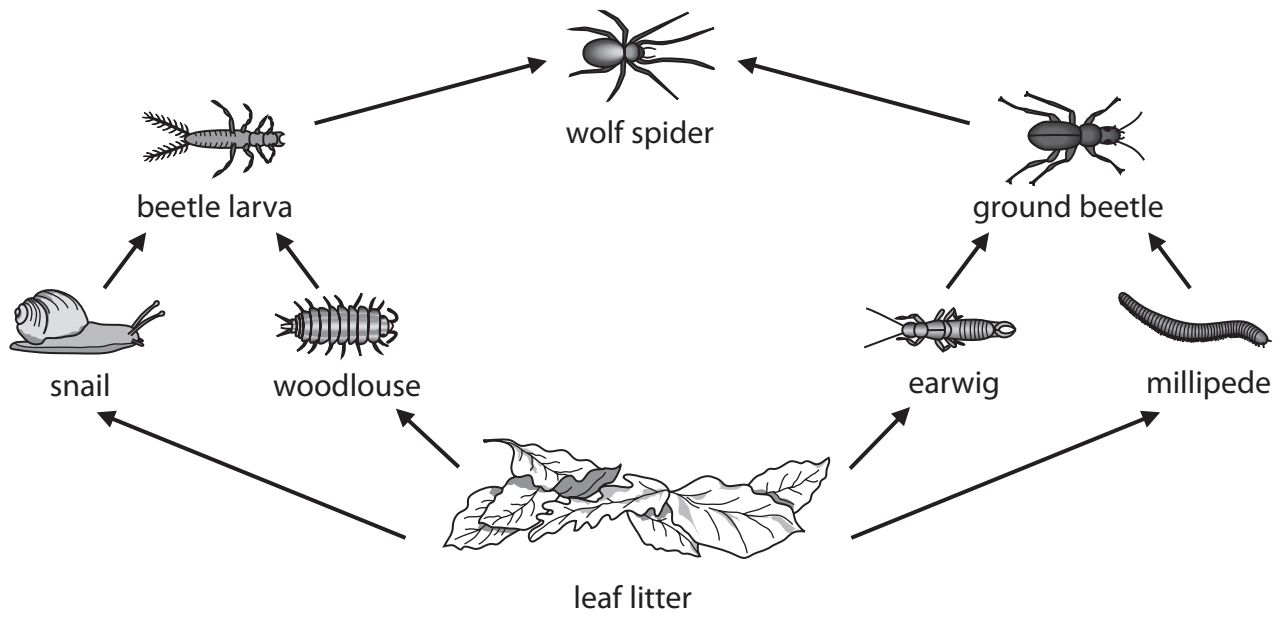
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(b) This food web shows some of the organisms found in a composter.



(i) How many of the organisms in the food web are secondary consumers?

(1)

(ii) Flatworms can also be found in compost heaps.

- flatworms only eat the millipedes
- flatworms are not eaten by any other organism in the food web

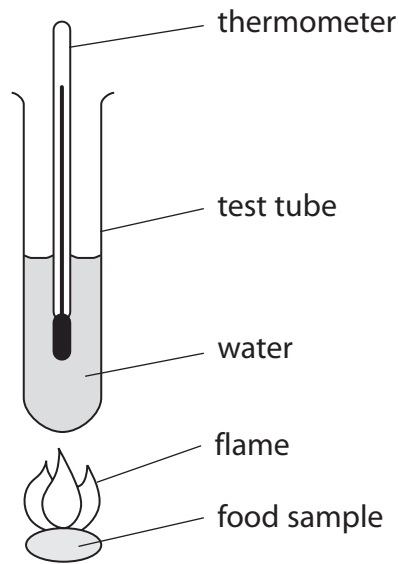
Explain how the introduction of flatworms might affect the number of ground beetles and earwigs in the food web.

(3)

(Total for Question 5 = 12 marks)



6 This apparatus is used to investigate the amount of energy available in food.



(a) (i) Describe how the apparatus can be used to investigate the energy available in different foods.

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(ii) A student uses this apparatus to compare the amount of energy available in two different foods.

What variable should she control to obtain valid results?

(1)

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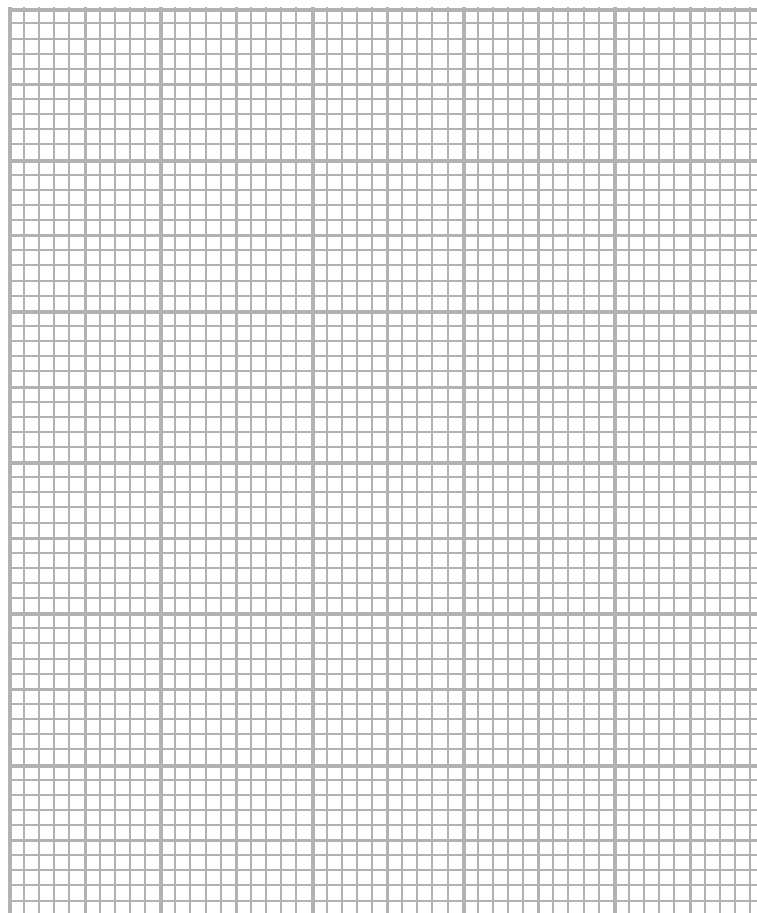
(b) The amount of energy available is measured in kilojoules (kJ).

The table shows the amount of energy available per 10 g of different foods.

Food type	Energy available per 10 grams of food (kJ)
broccoli	10
orange	25
bread	50
chicken	120
butter	300

(i) Draw a bar graph to display the data from the table.

(5)





(ii) Suggest three reasons for the variation in the amount of energy available in the different foods.

(3)

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(c) Explain why the average daily energy requirement for teenage males is different from the requirement for males over 60 years of age.

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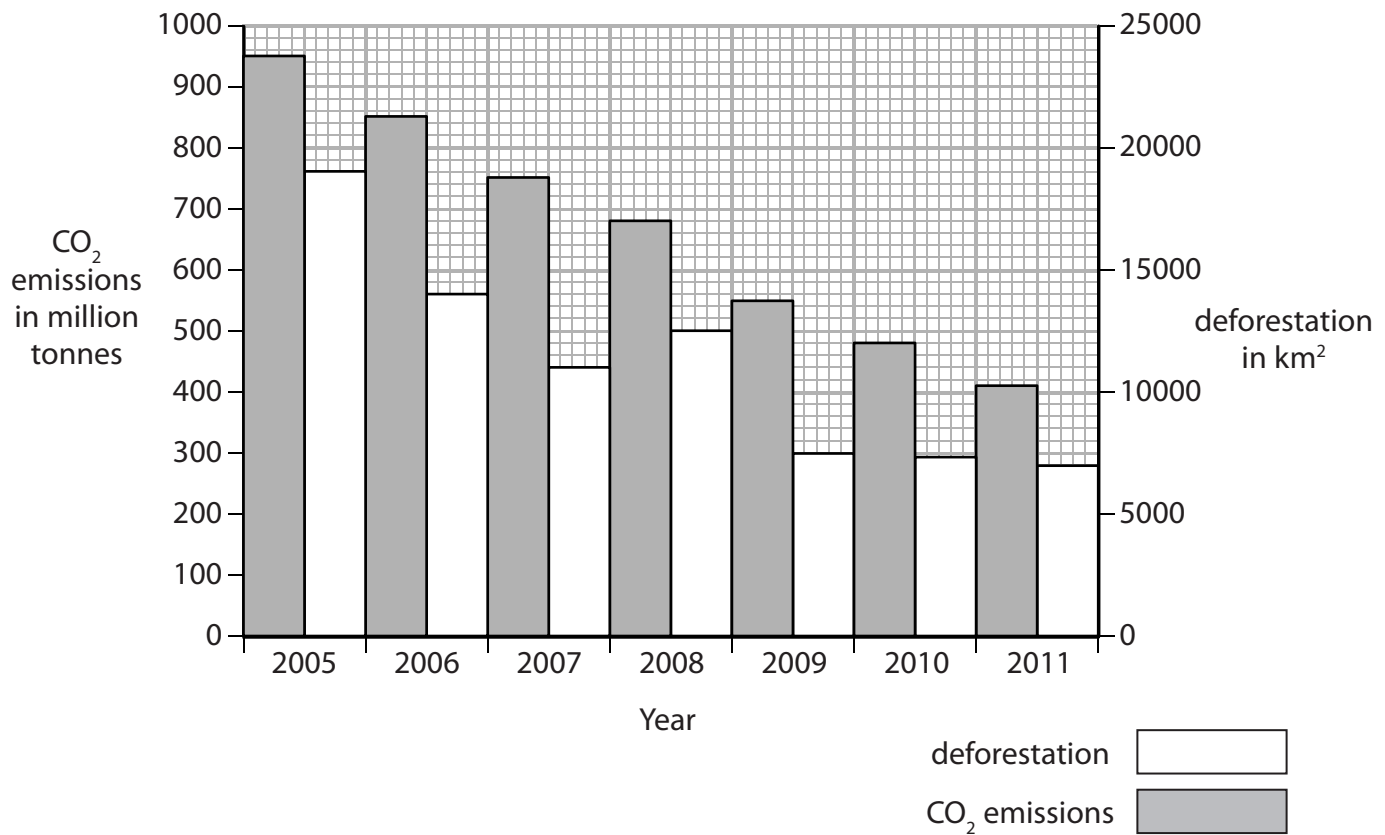
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**(Total for Question 6 = 15 marks)**



7 (a) The bar graph shows the levels of deforestation and carbon dioxide (CO<sub>2</sub>) emissions each year in the Brazilian Amazon between 2005 and 2011.



(i) Calculate the difference in the level of deforestation in 2011 compared with the level in 2005.

(2)

difference = ..... km<sup>2</sup>

(ii) Use the bar graph to compare the trends in deforestation and CO<sub>2</sub> emissions between 2005 and 2011.

(2)

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(b) (i) Describe how deforestation can lead to a greater imbalance of oxygen and carbon dioxide in the atmosphere.

(2)

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(ii) Describe how deforestation leads to soil erosion.

(3)

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(c) Excess carbon dioxide in the atmosphere can lead to global warming.

Describe the consequences of global warming.

(3)

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(d) Eutrophication is another environmental problem.

Describe how eutrophication might occur in some lakes.

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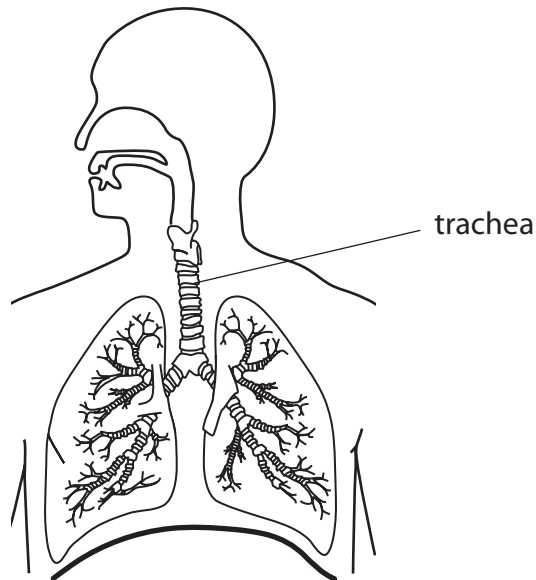
**(Total for Question 7 = 14 marks)**



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8 The diagram shows the human respiratory system.



(a) Ciliated cells are found in the trachea.

(i) Draw a diagram of a ciliated cell.

Label the cilia, the cell membrane and the nucleus.

(4)

(ii) The smoke from cigarettes can prevent the normal functioning of cilia. Explain the effect that this could have on the health of a person who smokes cigarettes.

(3)

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(b) (i) Cigarette smoke contains substances that are harmful to the body.

Draw a straight line from each substance to its harmful effect on the body.

(2)

<b>Substance</b>	<b>Effect on the body</b>
<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">tar</div>	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin-bottom: 10px;">slows down responses</div> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin-bottom: 10px;">raises blood pressure</div> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin-bottom: 10px;">prevents gas exchange</div> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin-bottom: 10px;">decreases heart rate</div> <div style="border: 1px solid black; padding: 5px; width: fit-content;">causes lung cancer</div>
<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">nicotine</div>	

(ii) Explain why the birth weight of babies born to mothers who smoke tends to be lower than those born to mothers who are non-smokers.

(3)

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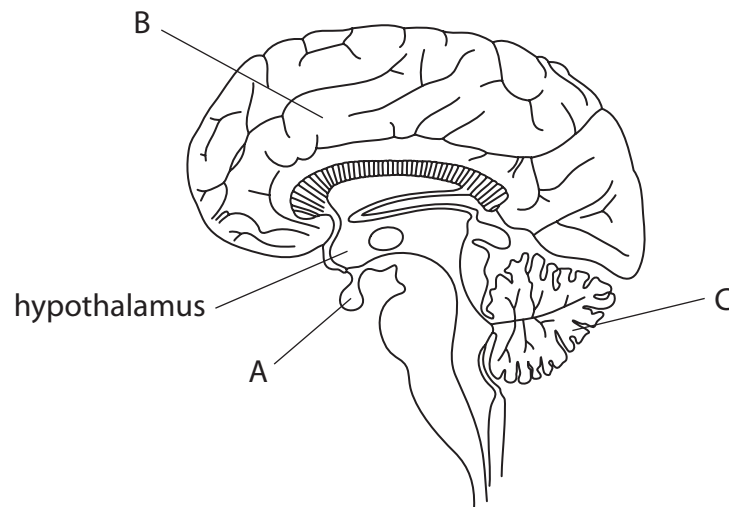
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**(Total for Question 8 = 12 marks)**



9 The diagram shows a side-view of the human brain.



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

(3)

A.....

B.....

C.....

(ii) Which of these parts link the senses with the muscles that cause voluntary movement?

(1)

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(b) (i) Describe how information from the external environment is detected by the eye and then sent to the brain.

(5)

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(ii) The muscles in the iris adjust the size of the pupil to control the amount of light that enters the eye.

Complete the table by writing either 'contract' or 'relax' in each box to show how the muscles in the iris respond to bright and dim light.

(2)

	Radial muscles	Circular muscles
bright light		
dim light		



(c) Describe the role of the hypothalamus in controlling body temperature.

(3)

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**(Total for Question 9 = 14 marks)**

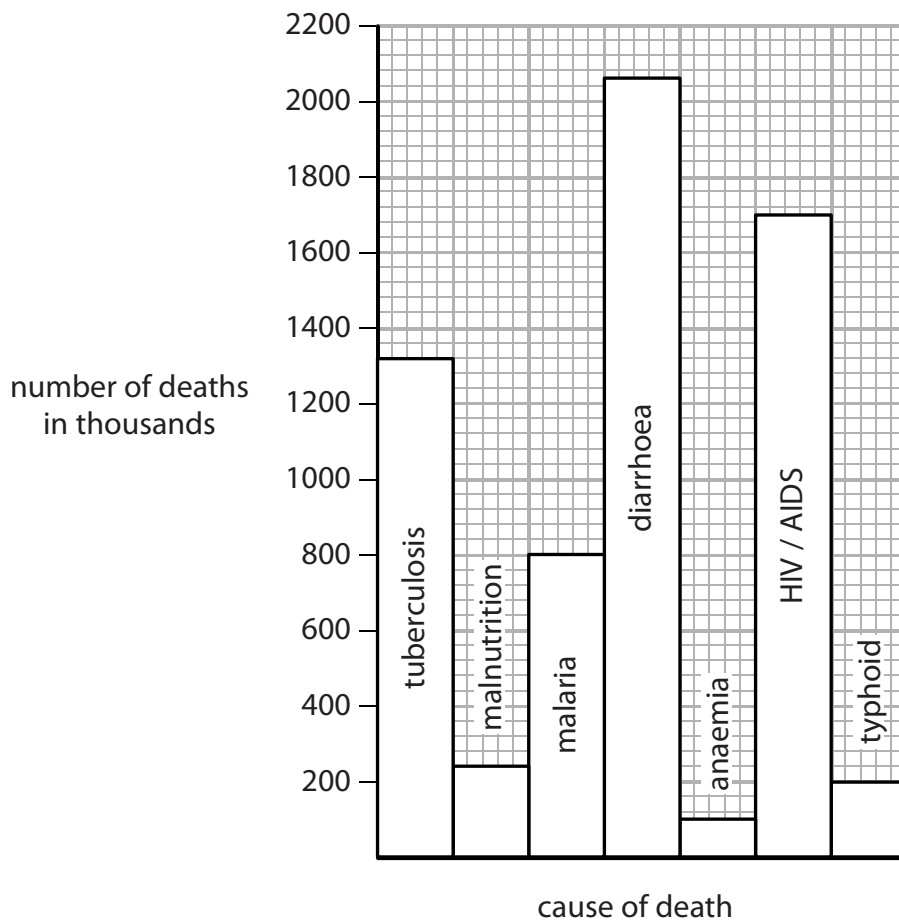


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**10** Nutritional diseases are caused by an inadequate diet and communicable diseases are those that can be transmitted from one person to another.

The bar graph shows the number of people, in thousands, that died from certain nutritional and communicable diseases in 2008.



(a) In 2008, an estimated 15.6 million people died from all nutritional and communicable diseases.

Calculate the percentage of these deaths that were caused by malaria.

(3)

percentage = .....%



(b) Complete the table by writing the name of each disease from the bar graph to show whether it is a communicable disease or a nutritional disease.

Two have been done for you.

(3)

Communicable disease	Nutritional disease
diarrhoea	anaemia

(c) Explain how oral rehydration therapy is used in the treatment of diarrhoea.

(4)

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



11 Genetic mutation can cause a change in a characteristic of an organism.

Use the idea of natural selection to explain how a change in a characteristic can become more common in a population.

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**(Total for Question 11 = 4 marks)**

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**TOTAL FOR PAPER = 120 MARKS**

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