Write your name here

Surname	Other names

Edexcel
International GCSE

Centre Number | | | | | |

Candidate Number | | | | |

Human Biology

Unit: 4HB0
Paper: 01

Tuesday 7 May 2013 – Morning
Time: 2 hours

Paper Reference
4HB0/01

You must have:
Ruler
Candidates may use a 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.*
- Show all the steps in any calculations and state the units.

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 ▶

P41558A

1/1/1/1/

P 4 1 5 5 8 A 0 1 2 8

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) A parasite is an organism which

(1)

☒ **A** provides food for another organism

☒ **B** feeds on a dead organism

☒ **C** obtains its food from a host organism

☒ **D** preys on another organism

(b) The fluid found in the lacteal vessels of the villi is

(1)

☒ **A** aqueous humour

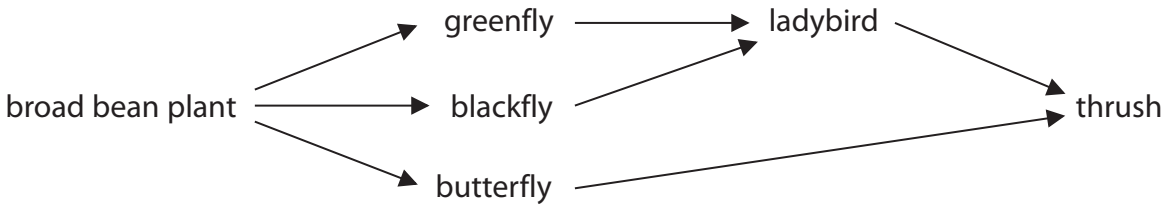
☒ **B** blood

☒ **C** lymph

☒ **D** plasma

(c) Which of the organisms in the diagram is a producer?

(1)



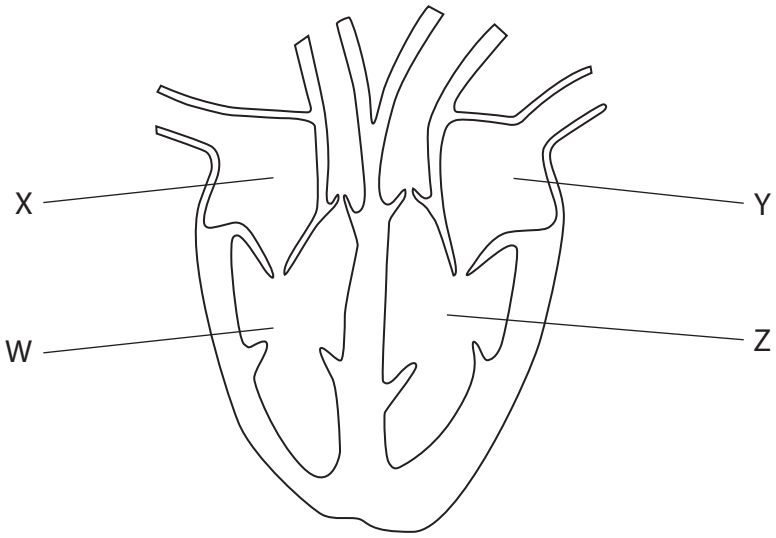
☒ **A** butterfly

☒ **B** broad bean plant

☒ **C** ladybird

☒ **D** thrush

(d) The diagram shows a human heart.



Which two chambers of the heart contain deoxygenated blood?

(1)

- ☒ **A** W and X
- ☒ **B** X and Y
- ☒ **C** Y and Z
- ☒ **D** W and Z

(e) Which of the following is a correct statement about tooth decay?

(1)

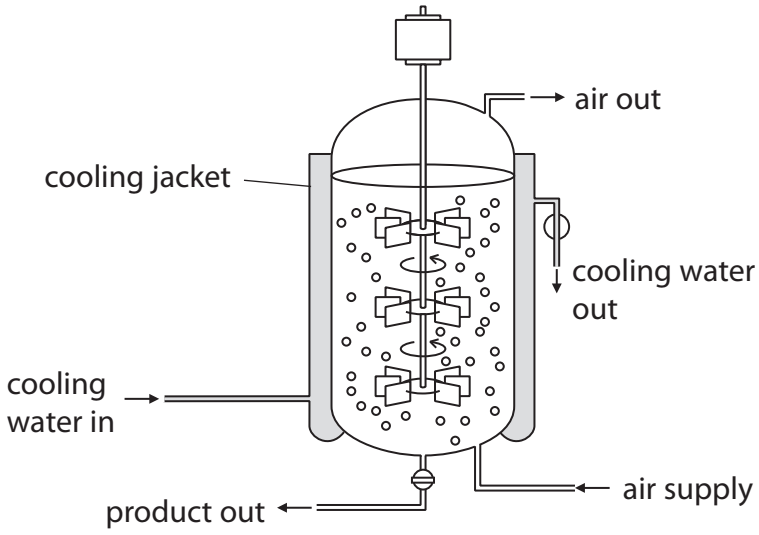
- ☒ **A** plaque eats away tooth enamel
- ☒ **B** bacteria remove tooth enamel
- ☒ **C** bacteria change sugar into acid which dissolves tooth enamel
- ☒ **D** decay is caused by the action of sugar on tooth enamel

(f) Which is the correct pathway that a nerve impulse travels along in a simple reflex action?

(1)

- ☒ **A** effector → motor neurone → relay neurone → sensory neurone → receptor
- ☒ **B** receptor → sensory neurone → relay neurone → motor neurone → effector
- ☒ **C** effector → sensory neurone → motor neurone → relay neurone → receptor
- ☒ **D** receptor → relay neurone → motor neurone → sensory neurone → effector

(g) The diagram shows a fermenter which is used to grow bacteria.



These bacteria produce a substance that kills other bacteria.

This substance is

(1)

- ☒ **A** a disinfectant
- ☒ **B** an antiseptic
- ☒ **C** a drug
- ☒ **D** an antibiotic

(h) The name of a hormone secreted by cells in the pancreas is

(1)

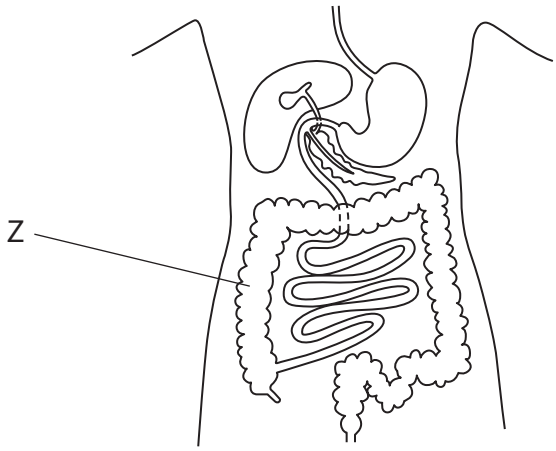
- ☒ **A** oestrogen
- ☒ **B** insulin
- ☒ **C** thyroxine
- ☒ **D** adrenaline

(i) Which of these mineral elements is essential for the formation of haemoglobin?

(1)

- ☒ **A** iron
- ☒ **B** magnesium
- ☒ **C** fluorine
- ☒ **D** calcium

(j) The diagram shows the human alimentary canal.



The function of the part labelled Z is

(1)

- ☒ **A** to digest cellulose
- ☒ **B** to absorb water from undigested food
- ☒ **C** to excrete urea
- ☒ **D** to absorb digested food

(Total for Question 1 = 10 marks)

2 The equation shows the process of photosynthesis.

carbon dioxide + water $\xrightarrow[\text{energy}]{\text{chlorophyll}}$ carbohydrate + [ ]

(a) Complete the equation by writing the correct word in the box.

(1)

(b) State the form of the energy shown in the equation.

(1)

.....

(c) Where does the plant obtain these substances?

(2)

carbon dioxide .....

water .....

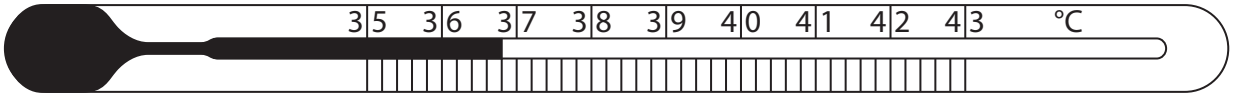
(d) Name the carbohydrate that is formed in photosynthesis.

(1)

.....

(Total for Question 2 = 5 marks)

3 Alison took the temperature in her mouth using this clinical thermometer.



(a) What was Alison's temperature?

(2)

.....

(b) Alison exercised vigorously for 10 minutes and then took her temperature again.

(i) Suggest what Alison's temperature might now be. Show your answer by drawing on the thermometer.

(1)

(ii) Explain why Alison's temperature changes after exercise.

(2)

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(c) Describe **one** way in which this clinical thermometer is different from a laboratory thermometer used for measuring the temperature of a water bath.

(2)

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(Total for Question 3 = 7 marks)

4 The list shows four components of blood.

red blood cells	plasma	white blood cells	platelets

Complete the table by using words from the list to show the component of blood responsible for each function.

Each word or phrase may be used once, more than once or not at all.

(4)

Function	Component of blood responsible
transport of hormones	
transport of oxygen	
transport of products of digestion	
transport of urea	

(Total for Question 4 = 4 marks)

5 Complete the passage by writing a suitable word or words in each of the spaces.

(7)

A balanced diet is one that contains the correct amounts of carbohydrates,

..... and ..... with vitamins,

minerals, water and dietary fibre.

The fibre is important because it helps the gut to move food along by waves of

muscular contraction known as ..... . In addition the fibre

helps to prevent ..... and reduces the risk of a person

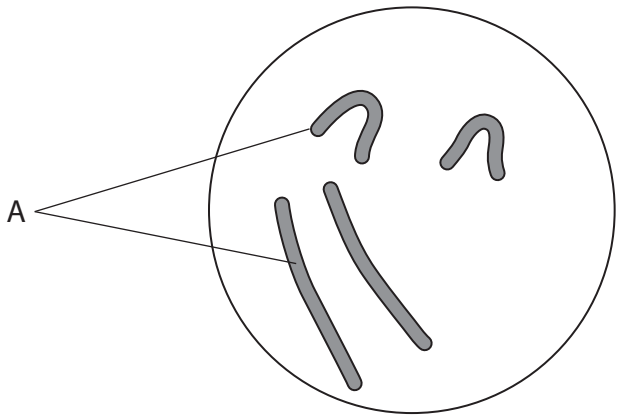
contracting ..... . Fibre consists largely of a molecule called

..... which is found in plant cell walls and it cannot be

digested because the human gut lacks the necessary ..... .

(Total for Question 5 = 7 marks)

6 The diagram shows the nucleus of a cell just before it divides by meiosis.



(a) (i) Name the structures labelled A.

(1)

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(ii) Name the molecule that makes up the structures labelled A.

(1)

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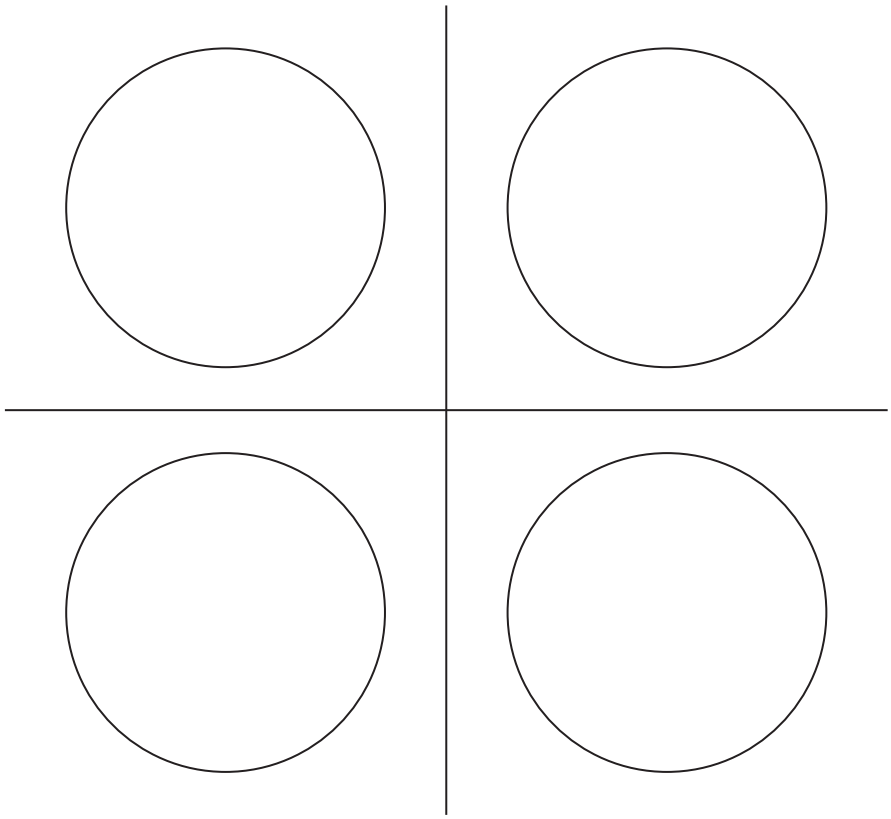
(b) Complete the diagrams to show the appearance of the four nuclei produced after meiosis.

(2)



(c) Complete the table to show four differences between meiosis and mitosis.

(4)

	Meiosis	Mitosis
1		
2		
3		
4		

(Total for Question 6 = 8 marks)

7 The boxes show four structures found in cells and five functions carried out in cells.

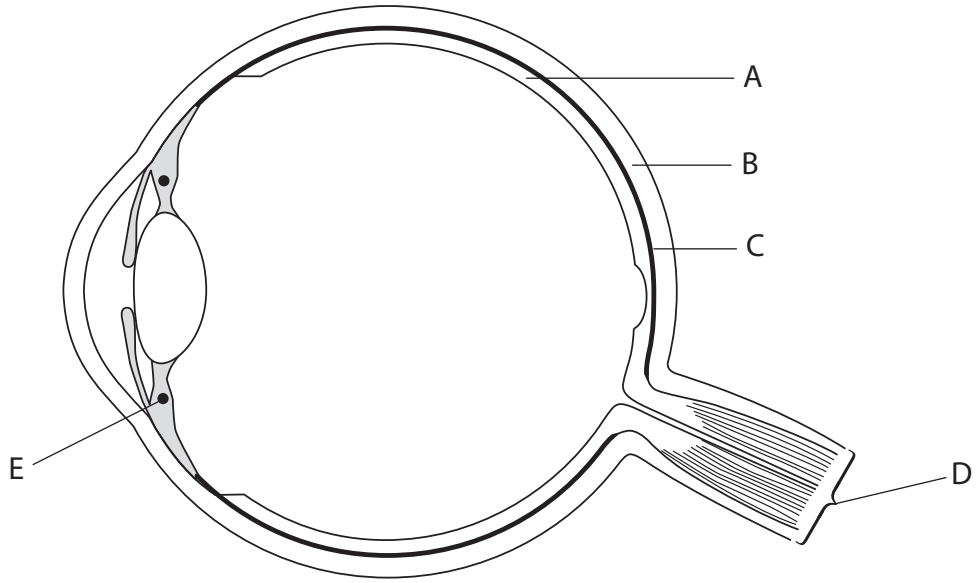
Match each structure to its correct function by drawing a straight line from each structure to its function.

(4)

Structure	Function
cell membrane	site of aerobic respiration
ribosomes	site of chemical reactions
cytoplasm	site of protein synthesis
mitochondria	site of exchange of molecules
	site of DNA production

(Total for Question 7 = 4 marks)

8 (a) The diagram shows a section through the human eye.



(i) Name the parts labelled A, B, C and D.

(4)

A .....

B .....

C .....

D .....

(ii) Using two lines labelled L, show **two** structures in the eye responsible for refracting light rays.

(2)

(iii) Describe the function of structure E.

(4)

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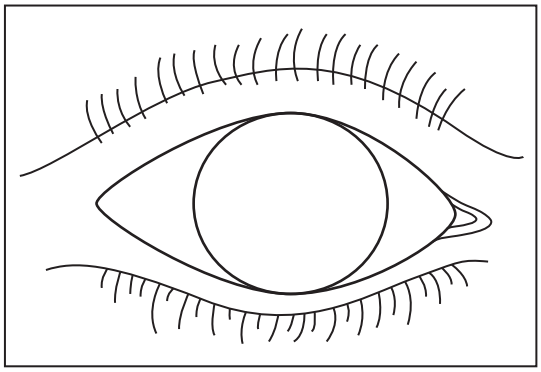
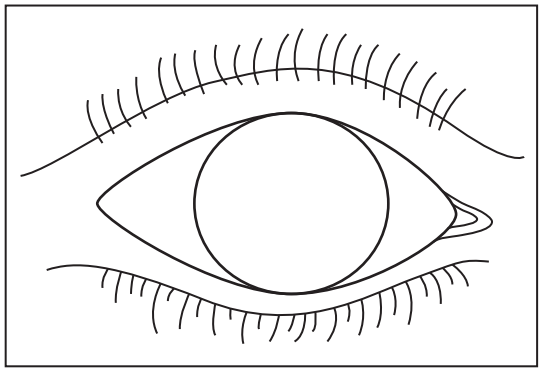
(b) Diagrams P and Q show the front view of a human eye.



P



Q

(i) Complete diagram P to show the pupil as it would appear in bright light.

(1)

(ii) Complete diagram Q to show the pupil as it would appear in dim light.

(1)

(iii) Explain how the different light conditions cause the pupil to change size.

(3)

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(c) Explain the advantage of having two eyes rather than one eye, for example when playing ball games.

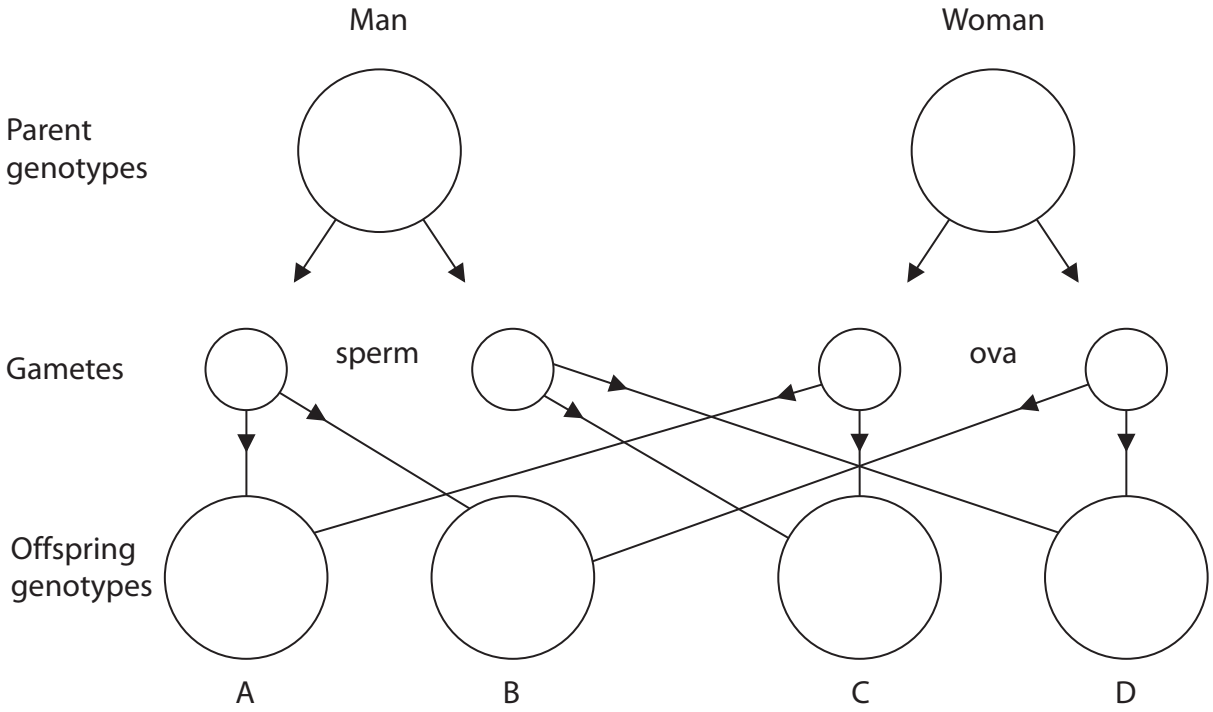
(3)

(Total for Question 8 = 18 marks)

9 The sex of a person is determined by two chromosomes, X and Y.

(a) (i) Complete the genetic cross by writing in the correct X and Y chromosomes in the circles.

(3)



(ii) State the sex of the offspring A, B, C and D.

(2)

A .....

B .....

C .....

D .....

(b) Some genetic conditions are sex-linked.

State what is meant by the term **sex-linked**.

(2)

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.....

(c) 'Night Blindness' is the inability to see clearly in dim light. It can be inherited through a rare dominant allele on the X chromosome.

(i) A man who had 'Night Blindness' as a result of the rare allele married a woman with normal vision. They produced children, half with normal vision and half with 'Night Blindness'.

Using the symbol **N** for the dominant allele and the symbol **n** for the recessive allele, state the genotypes of

(4)

the father .....

the mother .....

the children with normal vision .....

the children with 'Night Blindness' .....

(ii) 'Night Blindness' can also be caused by a vitamin deficiency in the diet.

Name this vitamin.

(1)

.....

(Total for Question 9 = 12 marks)

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10 The table contains descriptions of three practical techniques.

For each technique state **one** safety precaution and give **one** reason for each precaution.

(6)

Practical technique	Precaution	Reason
Heating glucose with Benedict's solution		
Handling Petri dishes containing bacteria		
Cutting a piece of potato using a razor blade		

(Total for Question 10 = 6 marks)

11 The kidney is one of the excretory organs of the body.

(a) (i) Name the final fluid produced by a normal kidney.

(1)

.....

(ii) Name the blood vessel that carries blood away from the kidney.

(1)

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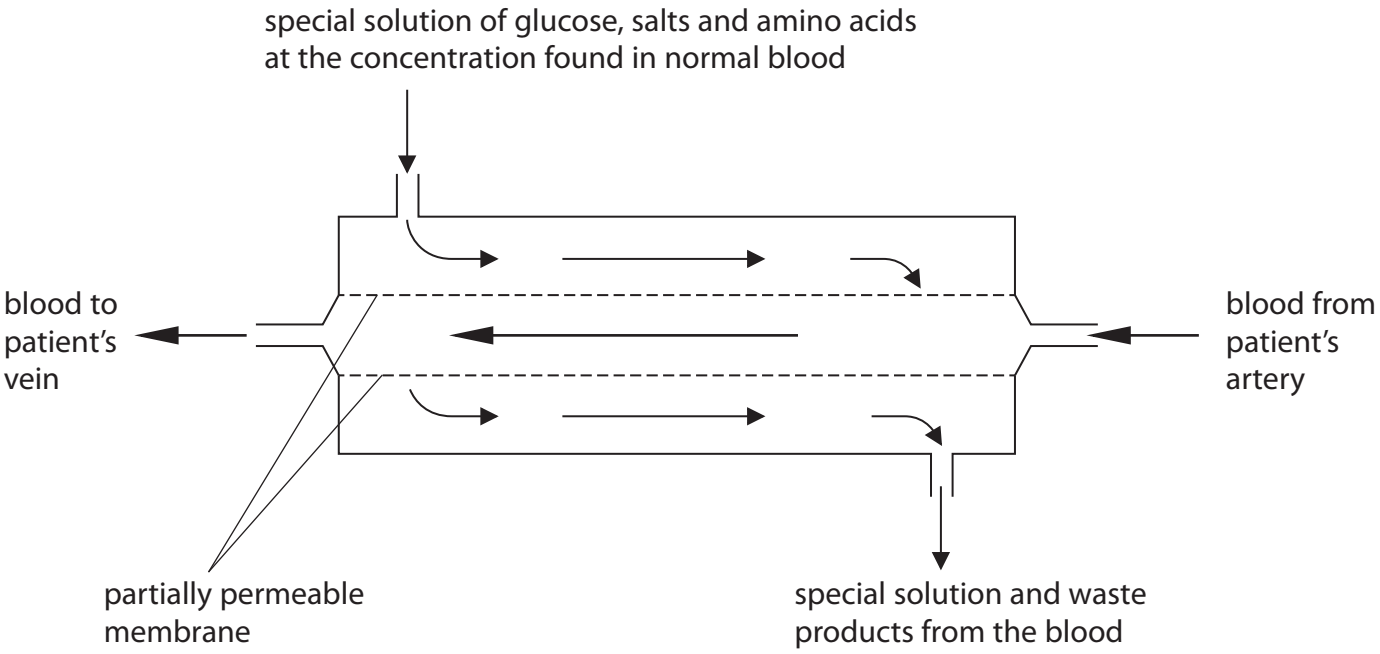
(b) A person who has kidney failure may be treated every few days by dialysis.

The diagram shows a dialysis machine. In this machine a special solution flows round the outside of an inner tube which carries the patient's blood.



(i) Name the main waste product in the solution leaving the dialysis machine.

(1)

(ii) Explain the function of the partially permeable membrane.

(2)

(iii) In a normal kidney, which structure carries out the function of the partially permeable membrane?

(1)

(iv) The concentrations of glucose, salts and amino acids in the special solution need to be closely controlled.

Explain the effects on the patient if the concentrations were always lower than those found in the blood.

(4)

(c) The long-term treatment of kidney failure is to have a kidney transplant.

State two advantages and two disadvantages of having a kidney transplant.

(4)

advantage 1 .....

.....

advantage 2 .....

.....

disadvantage 1 .....

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disadvantage 2 .....

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(Total for Question 11 = 14 marks)

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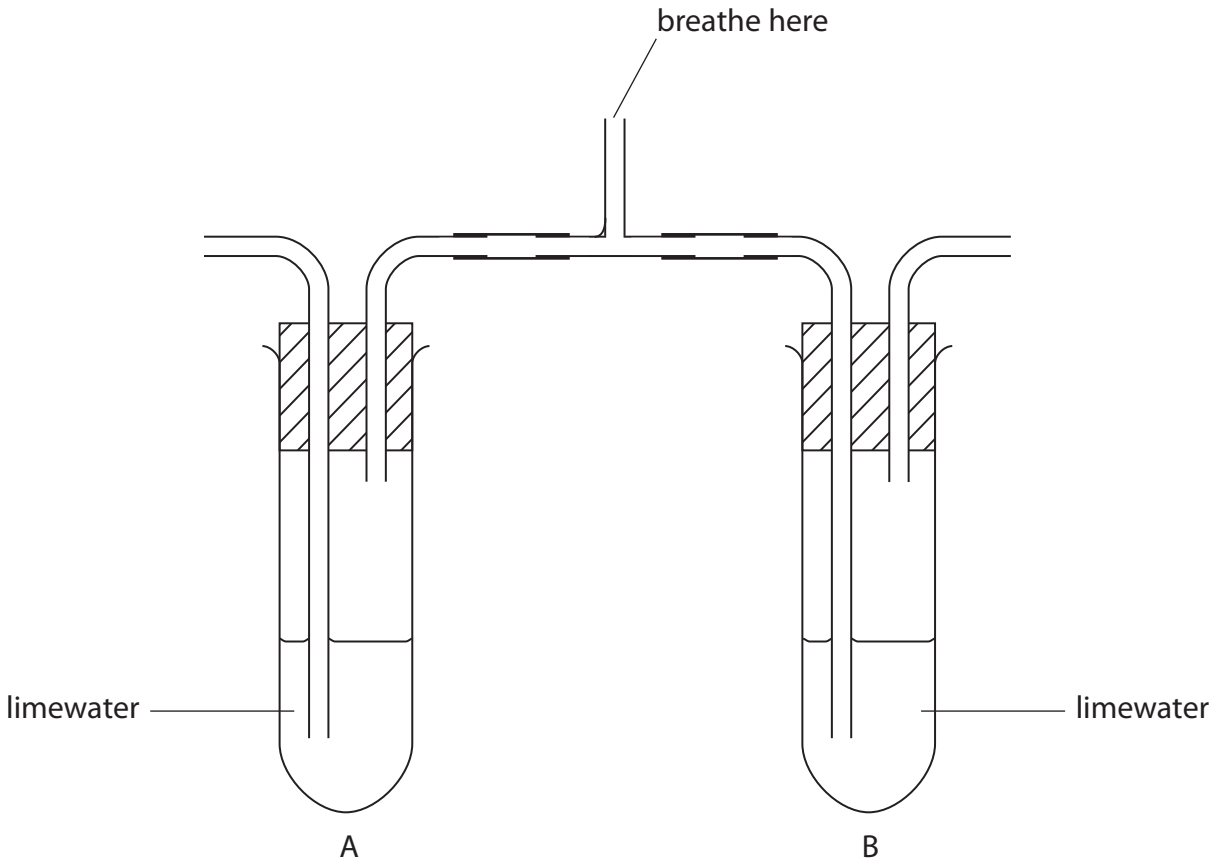
12 (a) The diagram shows a piece of apparatus that can be used to prove that we breathe out (exhale) more carbon dioxide than we breathe in (inhale).



(i) Describe how you would use the apparatus to show the difference in carbon dioxide between inhaled and exhaled air.

(2)

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(ii) Complete the table to show the appearance of the limewater in tube A and in tube B after the experiment in part (i).

(2)

Tube A	Tube B

(b) Explain why it is important that the volume of limewater should be the same in both tubes.

(3)

(c) Name one safety precaution that should be taken when carrying out this experiment.

(1)

(d) State how and explain why the results would be different if a person had exercised for five minutes before using the apparatus.

(4)

(Total for Question 12 = 12 marks)

13 Chronic bronchitis is a disease of the lungs.

(a) Describe the symptoms of bronchitis.

(2)

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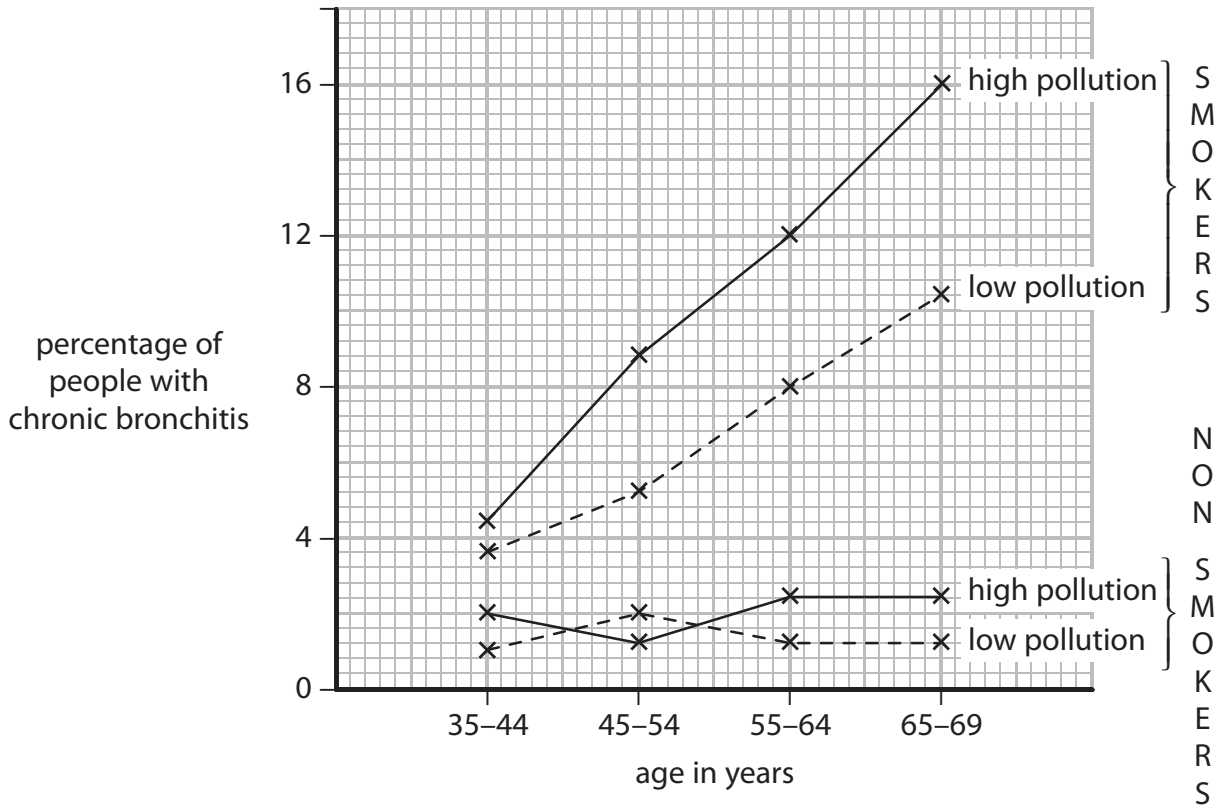
(b) Scientists carried out a study to find the percentage of people between the ages of 35 and 69 who had chronic bronchitis.

They investigated smokers and non-smokers living in areas of high and low atmospheric pollution.



(i) Name three atmospheric pollutants which are likely to be present in areas of high atmospheric pollution.

(3)

1 .....

2 .....

3 .....

(ii) State the percentage of people aged between 35 and 44 living in high pollution areas that were

(2)

smokers with bronchitis .....

non-smokers with bronchitis .....

(iii) Use the graph to describe the effect of atmospheric pollution on the incidence of bronchitis.

(3)

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(iv) Explain whether smoking or atmospheric pollution has the greater effect on the incidence of bronchitis.

(3)

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(Total for Question 13 = 13 marks)

TOTAL FOR PAPER = 120 MARKS

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