Please check the examination details below before entering your candidate information

Candidate surname	Other names

Pearson Edexcel International GCSE (9–1)

Centre Number | | | | | |

Candidate Number | | | | |

Thursday 9 January 2020

Afternoon (Time: 1 hour 45 minutes) | Paper Reference **4HB1/01**

Human Biology

Unit: 4HB1

Paper: 01

You must have:
Ruler
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.
- 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 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.*

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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Pearson

Answer ALL questions.

1 (a) Food packaging gives information about the food it contains.

The photograph shows some of the information given on a package containing yogurt.

(Source: © studiomode / Alamy Stock Photo)

The instructions state that the yogurt should be stored in a fridge at 4°C.

Why should this instruction be followed?

(1)

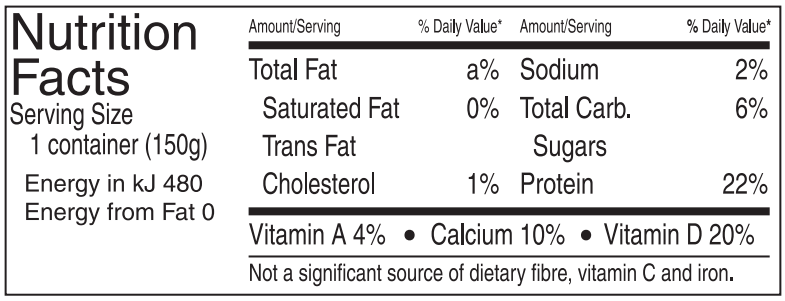
☒ **A** to make the yogurt taste better

☒ **B** to kill all bacteria in the yogurt

☒ **C** to slow down the growth of bacteria in the yogurt

☒ **D** to improve the appearance of the yogurt

(b) The diagram shows the nutritional label on a package containing yogurt.



Nutrition Facts

Serving Size
1 container (150g)
Energy in kJ 480
Energy from Fat 0

Amount/Serving	% Daily Value*	Amount/Serving	% Daily Value*
Total Fat	a%	Sodium	2%
Saturated Fat	0%	Total Carb.	6%
Trans Fat		Sugars	
Cholesterol	1%	Protein	22%

Vitamin A 4% • Calcium 10% • Vitamin D 20%

Not a significant source of dietary fibre, vitamin C and iron.

(i) State which nutrient on the label is required for growth and repair of body tissue.

(1)

.....

(ii) Why is this yogurt suitable for a person who wants to reduce their body mass?

(1)

☒ **A** it contains vitamins C and D

☒ **B** it contains less than 5 mg of cholesterol

☒ **C** it does not contain energy from carbohydrates

☒ **D** it does not contain energy from fat

(c) Yogurt contains reducing sugars.

Describe a method to test for reducing sugars.

(3)

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(Total for Question 1 = 6 marks)

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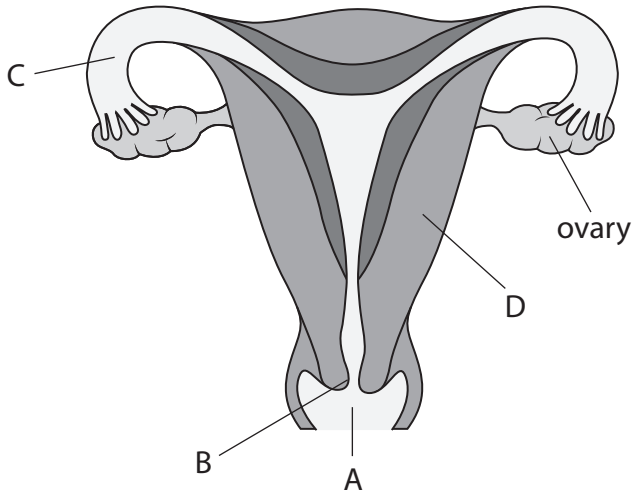
2 (a) The diagram shows some structures of the female reproductive system.



(i) Where are sperm deposited during sexual intercourse?

(1)

☒ **A**

☒ **B**

☒ **C**

☒ **D**

(ii) Which part of the female reproductive system contracts during birth to push the fetus downwards?

(1)

☒ **A**

☒ **B**

☒ **C**

☒ **D**

(iii) The ovaries produce female sex hormones.

The box lists words associated with the female reproductive system.

FSH	wall	fertilisation	oestrogen	ovulation
lining	ADH	follicles	menstruation	

Use words from the box to complete the passage about the ovaries.

(3)

The ovaries produce a hormone called ..... .

This hormone repairs the uterus ..... following

menstruation. Once a month, one egg is released from the ovaries. This is

known as ..... .

(b) State why a pregnant female should have more calcium in her diet than a female who is not pregnant.

(1)

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(c) Some women breastfeed their babies.

Give one advantage of breastfeeding babies rather than feeding them bottled milk.

(1)

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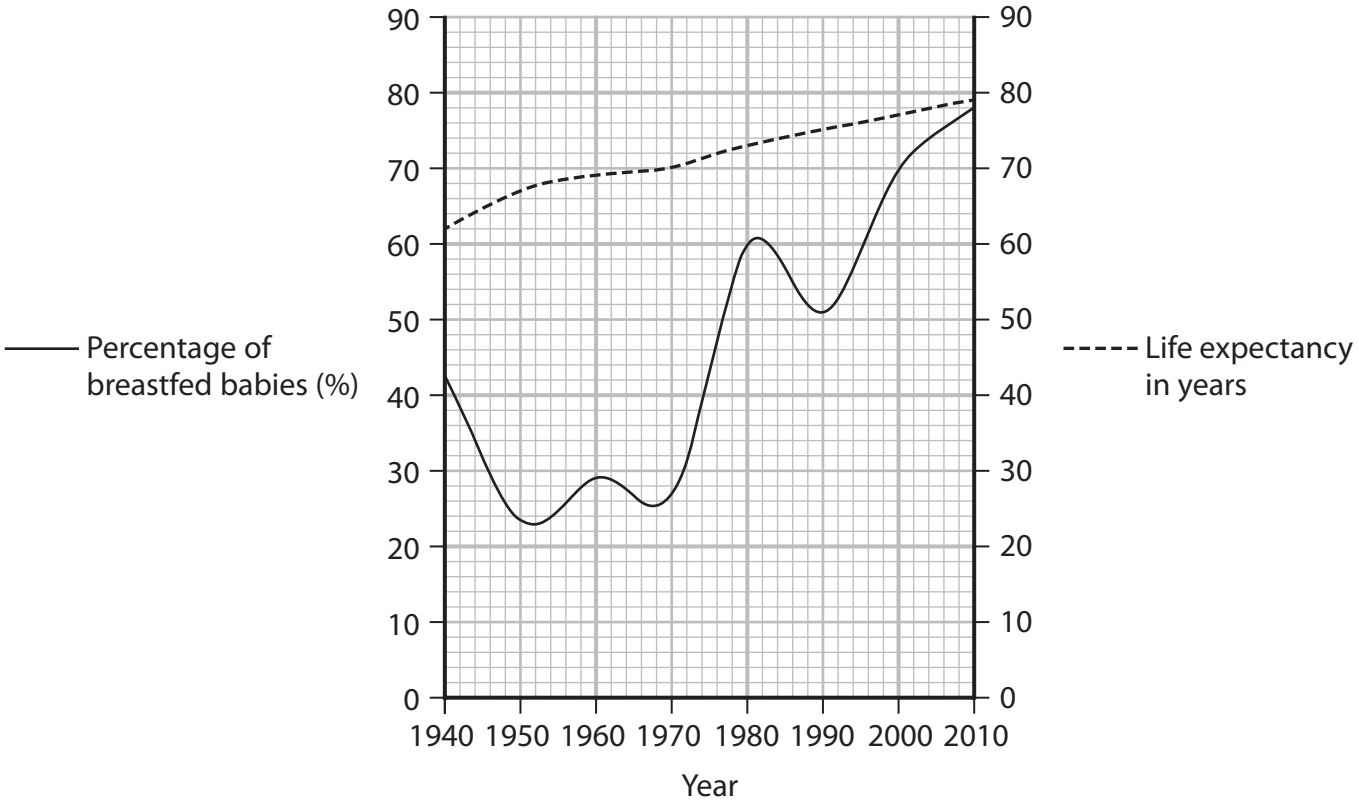
(d) The graph shows the percentage of babies that are breastfed and the life expectancy of breastfed babies from 1940 to 2010 in the UK.



(i) Compare the percentage of babies that were breastfed in 1940 with the percentage of babies that were breastfed in 2010.

(1)

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(ii) The graph suggests that breastfeeding has no effect on life expectancy.

Describe how the graph shows this.

(2)

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(Total for Question 2 = 10 marks)

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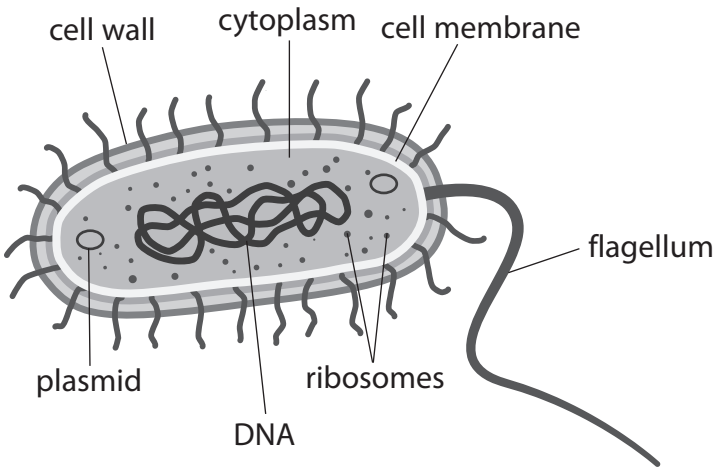
3 (a) The diagram shows a type of bacterial cell.



(i) The boxes give some structures found in the bacterial cell and some functions of cell structures.

Draw one straight line from each structure to its correct function.

(3)

Structure	Function
cell membrane	protects against pathogens
	helps the cell to move
ribosomes	makes proteins
	holds the genetic code
flagellum	controls which substances enter and exit the cell

(ii) State two structural differences between the bacterial cell and a sperm cell.

(2)

1 .....

.....

2 .....

.....

(b) Many bacteria absorb oxygen and nutrients from their environment. Oxygen and nutrients are used by bacteria in aerobic respiration.

(i) Which process transports oxygen into bacterial cells?

(1)

- ☒ **A** active transport
- ☒ **B** diffusion
- ☒ **C** excretion
- ☒ **D** osmosis

(ii) Complete the word equation for aerobic respiration.

(2)

oxygen + ... ⟶ ..... + water

(iii) Explain why respiration is important for bacteria.

(2)

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(Total for Question 3 = 10 marks)

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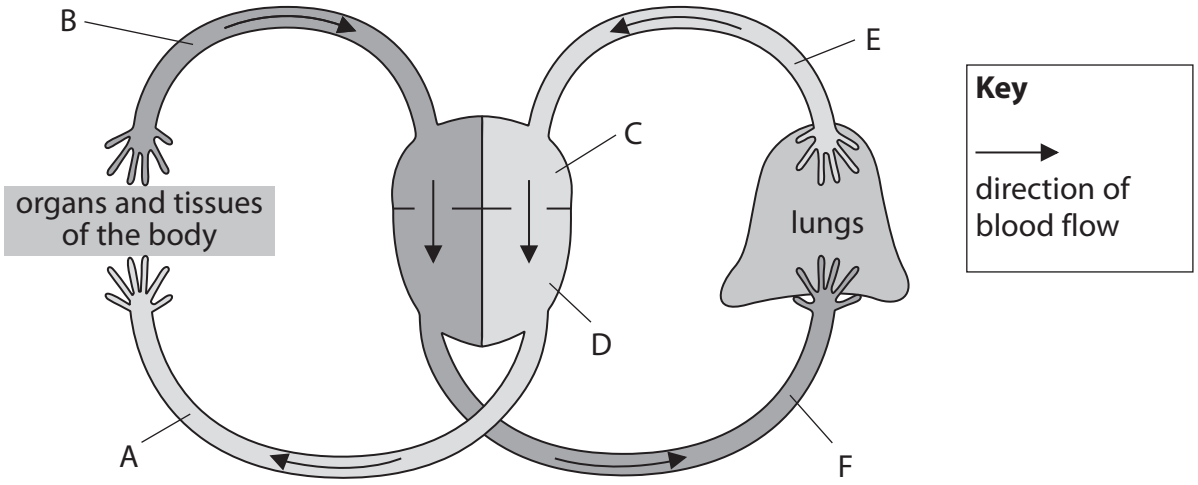
4 William Harvey was the first person to describe the circulation of blood around the body.

The diagram shows a model of the human circulatory system based on the research carried out by Harvey.



(a) Harvey suggested that each side of the heart was divided into two chambers.

State the names of chambers C and D.

(2)

chamber C .....

chamber D .....

(b) Harvey also suggested that blood is transported to and from the heart in different types of vessel.

Explain how the diagram supports Harvey's suggestion.

(4)

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(c) Before Harvey's discoveries some scientists thought that the blood was circulated around the body by the liver.

State why this idea is not correct.

(1)

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(d) Harvey's research did not include capillaries.

Describe the function of capillaries.

(2)

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(Total for Question 4 = 9 marks)

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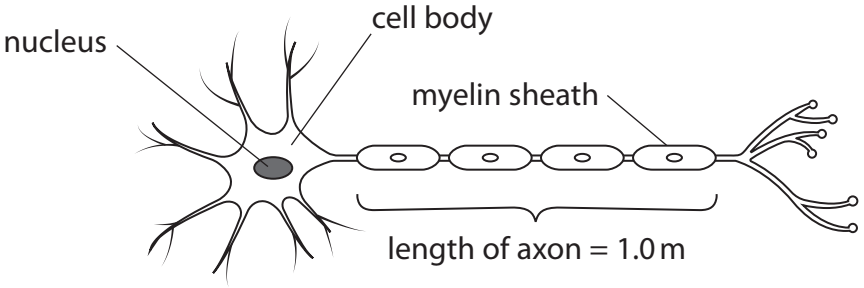
5 The diagram shows a motor neurone.

not to scale



(a) (i) The actual diameter of the nucleus of the motor neurone is 12 µm.

A student observes the motor neurone using a ×50 microscope lens.

Calculate the diameter of the image seen after magnification.

Give your answer in millimetres.

(2)

diameter = ... mm

(ii) Neurones transmit electrical impulses from one part of the body to another.

Suggest one function of the myelin sheath surrounding the axon.

(1)

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.....

(b) Nerve impulses travel at an average speed of 1.2×10^8 µm per second.

Hormones travel at an average speed of 1.5×10^6 µm per second.

(i) Explain this difference in speed.

(2)

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(ii) Calculate the time taken for a nerve impulse to travel along the axon of the motor neurone.

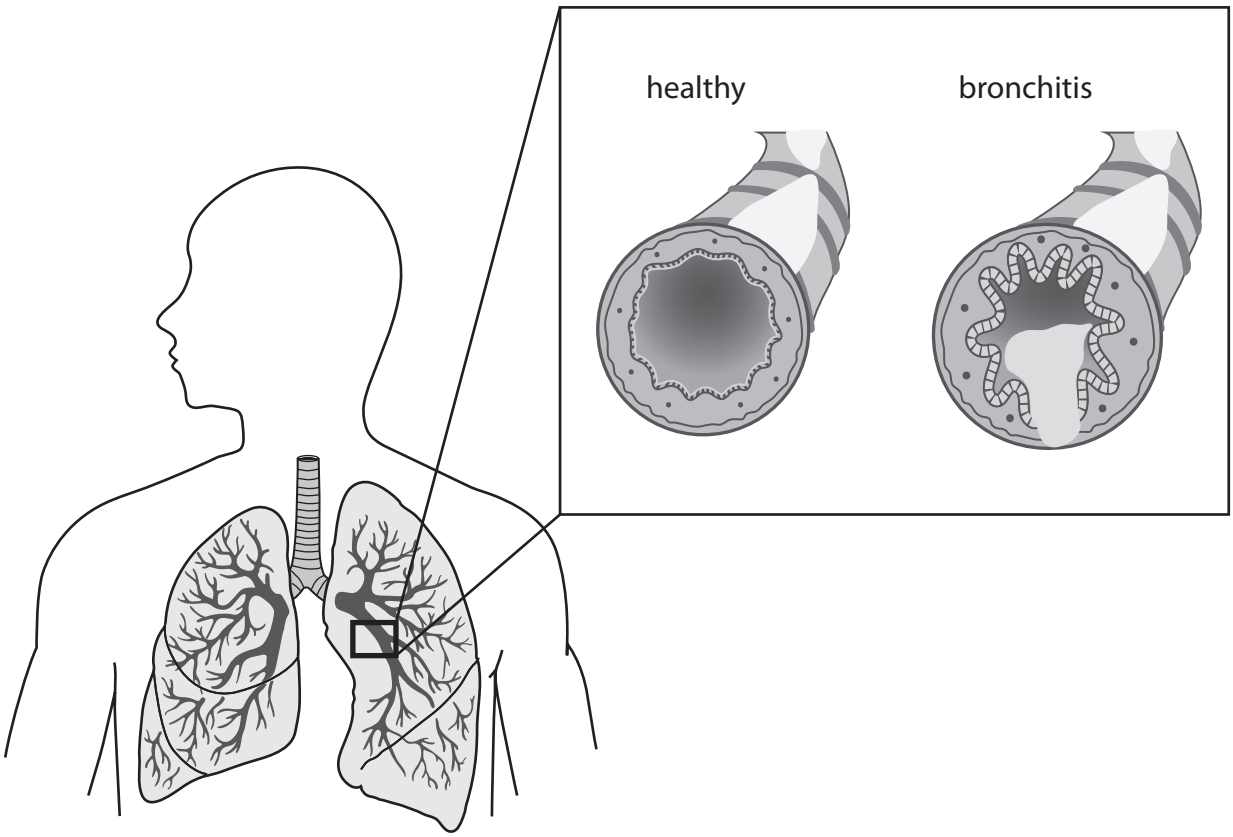
(3)

time taken = ... s

(Total for Question 5 = 8 marks)

6 Chronic obstructive pulmonary disease (COPD) is a group of lung diseases that includes bronchitis and emphysema.

The diagram shows how bronchitis affects the lungs.



(a) Name the part of the lungs affected by bronchitis.

(1)

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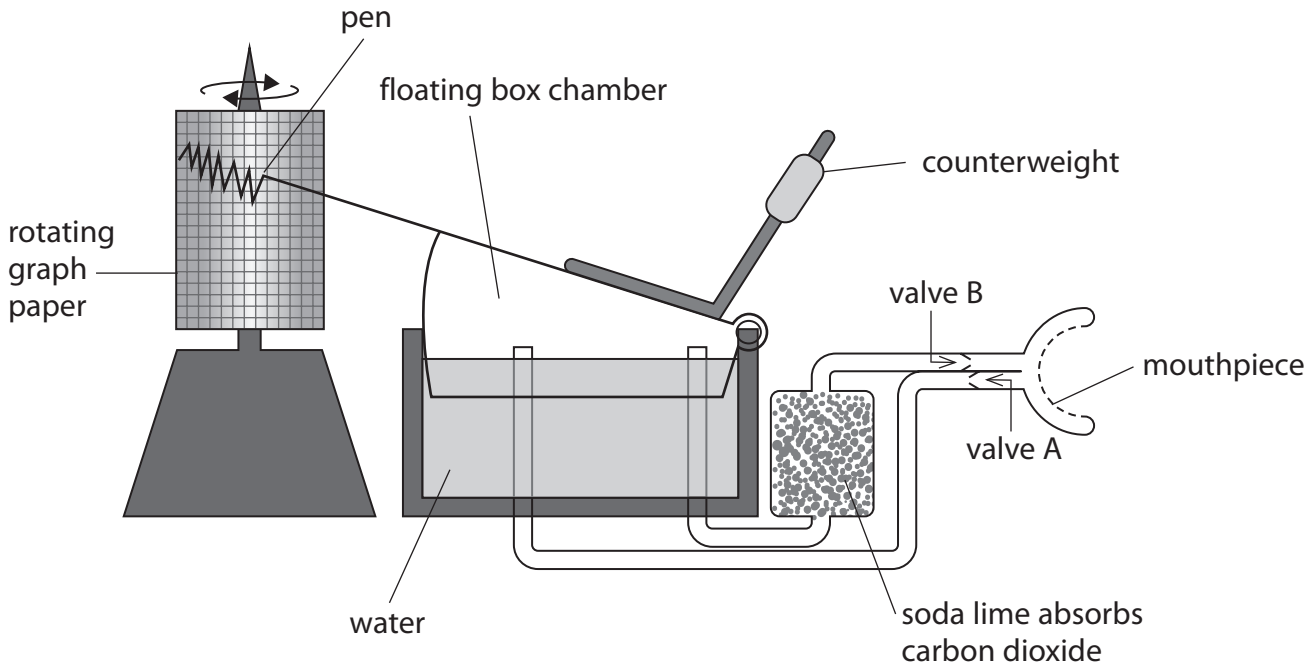
(b) The diagram shows a spirometer.

A spirometer measures how quickly a person breathes in and out.



(i) Describe how a spirometer is used to obtain a trace of a person's breathing pattern.

(4)

(ii) State one way to reduce risk to health when using a spirometer.

(1)

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(iii) Explain why a person with bronchitis needs to take a longer breath to obtain a normal tidal volume.

(2)

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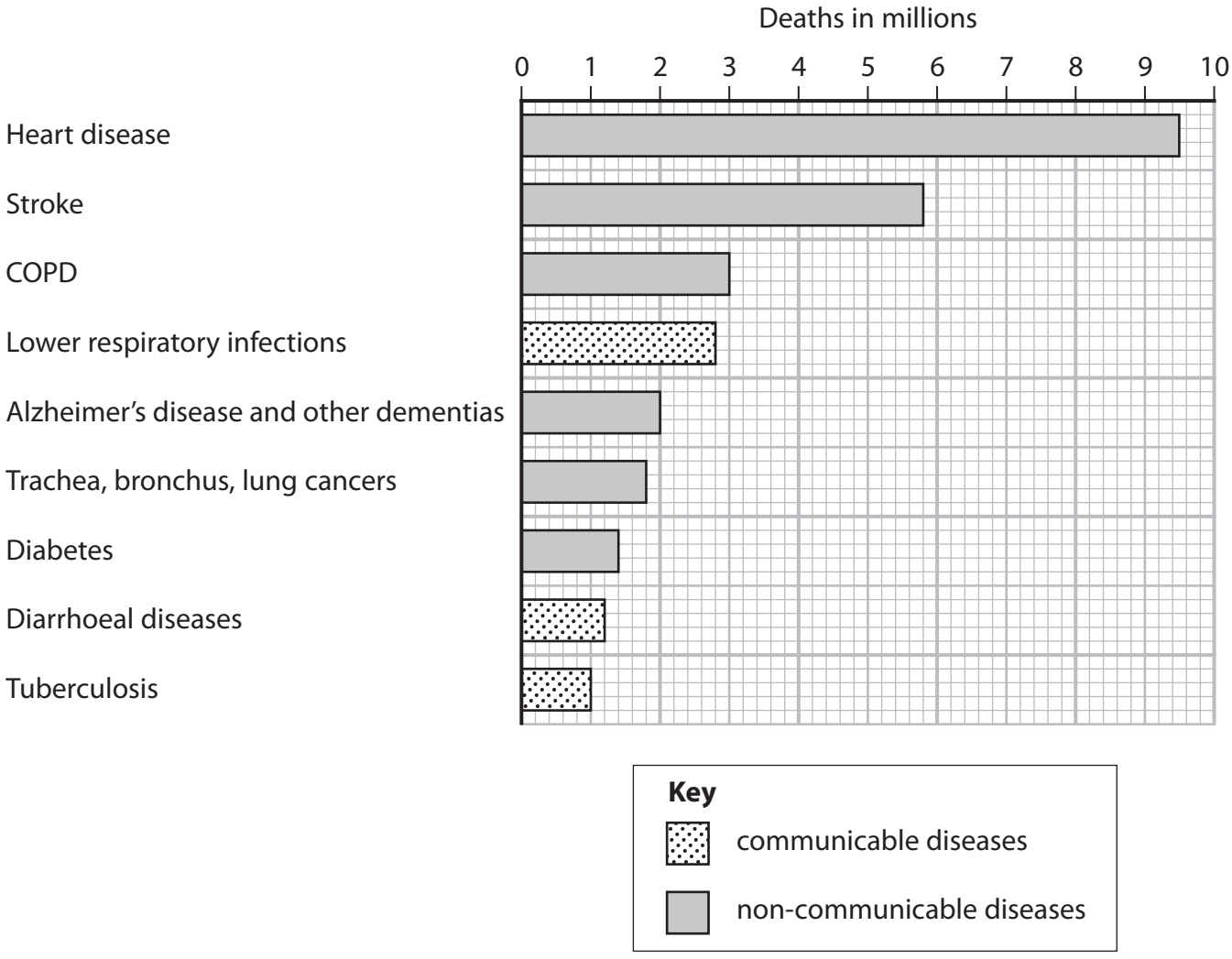
(c) The bar chart shows the number of deaths in millions from different health conditions worldwide in 2016.



(i) More deaths are caused by non-communicable diseases than by communicable diseases.

Suggest what is meant by the term **non-communicable disease**.

(1)

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.....

.....

(ii) In 2000, the number of deaths from heart disease was 7.0 million.

Calculate the percentage change in the number of deaths from heart disease from 2000 to 2016.

(3)

percentage change = ...%

(iii) Suggest a reason for the change in the number of deaths from heart disease from 2000 to 2016.

(1)

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(Total for Question 6 = 13 marks)

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7 The table gives the percentage of overweight people in different age groups for six countries.

Country	Percentage overweight		Percentage overweight for each age group					
	Males	Females	18–24	25–34	35–44	45–64	65–74	75 years and over
Croatia	67.5	48.3	22.3	38.1	53.7	69.2	73.1	65.7
Malta	66.8	55.2	36.0	52.5	62.7	69.0	74.1	65.3
Poland	64.1	46.7	19.3	38.7	52.8	66.0	73.2	65.5
Portugal	57.6	50.0	23.6	35.1	49.9	63.5	69.3	71.2
Turkey	56.4	56.3	22.4	44.2	64.9	75.4	66.2	56.5
UK	60.2	51.8	29.0	47.3	56.0	64.0	62.8	52.6

(Source from: https://ec.europa.eu/eurostat/statistics-explained/images/5/59/Share_of_overweight_population_by_sex_and_age%2C_2014.png)

(a) (i) The ratio of overweight females to overweight males in the UK is 1:1.2

Calculate the ratio of overweight females to overweight males in Croatia.

Write your answer in the form of 1: n

(2)

ratio = ...

(ii) Give two trends shown in the data.

(2)

1 .....

.....

2 .....

.....

(iii) Give two reasons why the data for a country might be unreliable.

(2)

1 .....

.....

2 .....

.....

(b) (i) Individuals who are overweight or obese have an increased risk of diabetes.

People with diabetes can have high blood glucose levels.

Explain how blood glucose levels are reduced in a person who does not have diabetes.

(3)

(ii) Suggest why one symptom of diabetes is frequent urination.

(2)

(Total for Question 7 = 11 marks)

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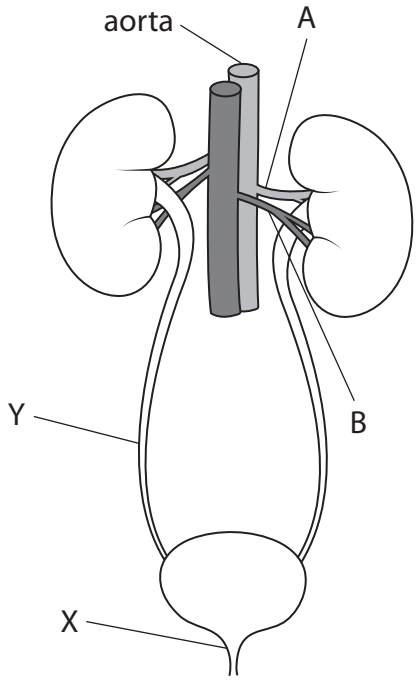
8 The diagram shows part of the human renal system.



(a) (i) Give the names of structures X and Y.

(2)

structure X .....

structure Y .....

(ii) Describe the function of the aorta.

(2)

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(iii) Compare the composition of the blood in vessels A and B.

(2)

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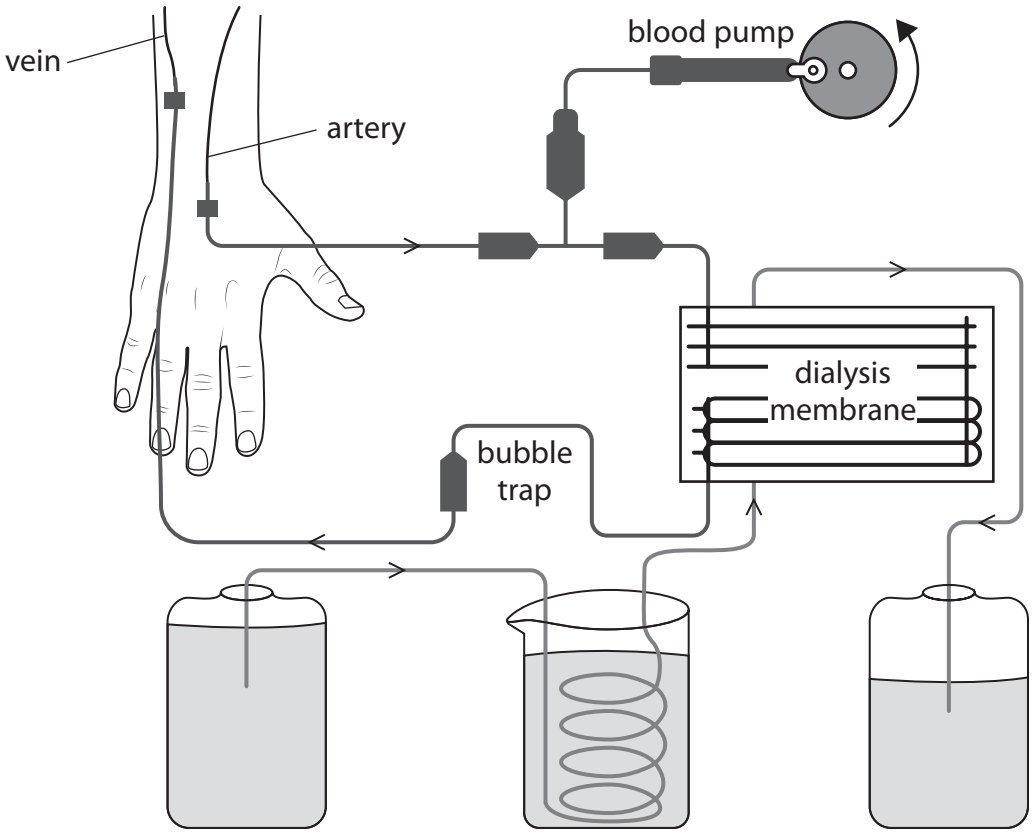
(b) Dialysis is a treatment used for people with kidney failure.

Blood containing waste substances is pumped through a dialysis machine. The dialysis machine filters the waste from the blood. The cleaned blood is then returned to the patient.

The diagram shows how a dialysis machine filters the blood of a person with kidney failure.



(i) Explain how diffusion removes waste substances from the patient's blood inside the dialysis machine.

(4)

(ii) A chemical is added to the patient's blood as it enters the dialysis machine. This chemical prevents the blood from clotting.

Explain why it is important to add this chemical as the blood enters the machine, rather than just before the blood returns to the body.

(3)

(Total for Question 8 = 13 marks)

9 In sports such as archery and shooting, beta-blockers are used illegally by some competitors to help reduce the effects of stress and anxiety, which can affect performance.

(a) (i) Suggest why the use of beta-blockers in competitive sport is illegal.

(1)

(ii) Stress and anxiety can cause an increase in the release of adrenaline.

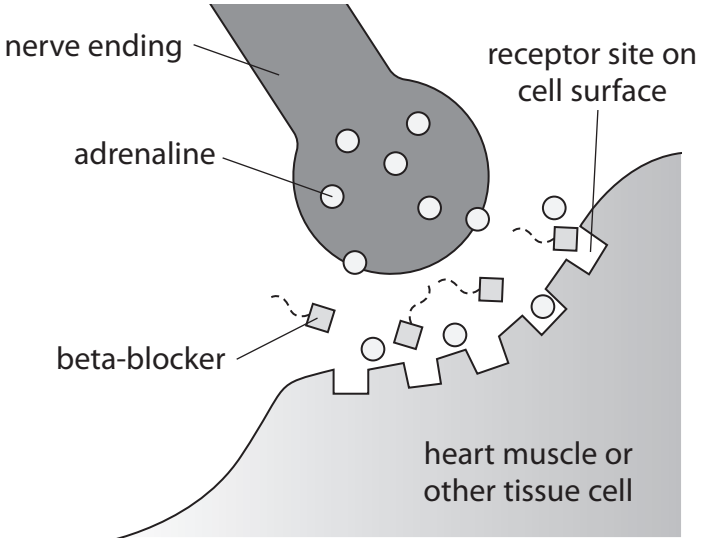
Explain the effects of adrenaline on the body.

(4)

(b) Adrenaline acts as a hormone and as a neurotransmitter.

Beta-blockers act at the junction between nerve endings and body tissues where adrenaline is found.

The diagram shows the action of beta-blockers at a synapse.



(i) Explain how beta-blockers reduce symptoms of stress and anxiety.

(3)

(ii) Suggest how the action of beta-blockers would be a disadvantage in active sports such as athletics.

(2)

(Total for Question 9 = 10 marks)

TOTAL FOR PAPER = 90 MARKS

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