Organisation part 14

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Name: _____

Class: _____

Date: _____

Time: **69 minutes**

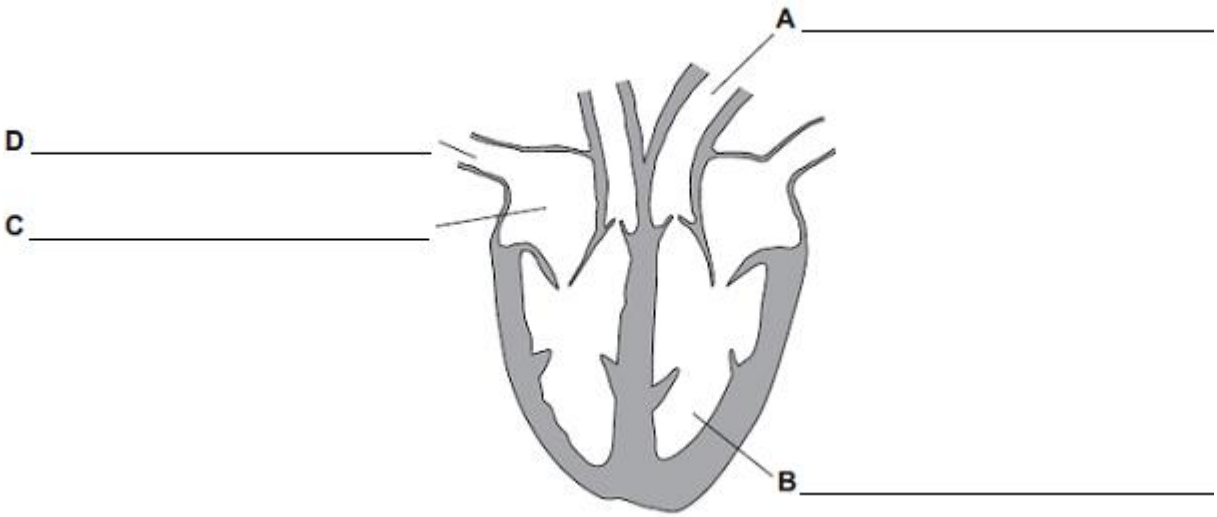
Marks: **69 marks**

Comments:

Q1.

Diagram 1 shows a section through the heart.

Diagram 1



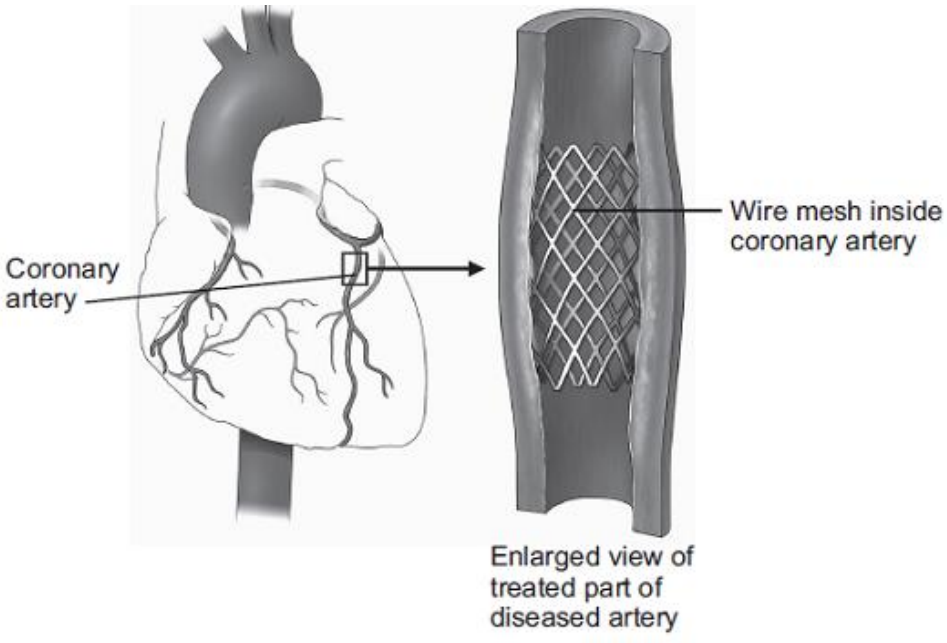
(a) Use words from the box to label parts **A**, **B**, **C** and **D**.

artery	**atrium**	**capillary**	**platelet**	**vein**	**ventricle**

(4)

(b) **Diagram 2** shows one treatment for a diseased coronary artery.

Diagram 2



(i) Name the treatment shown in **Diagram 2**.

_____

(1)

(ii) Explain how the treatment works.

_____

_____

_____

_____

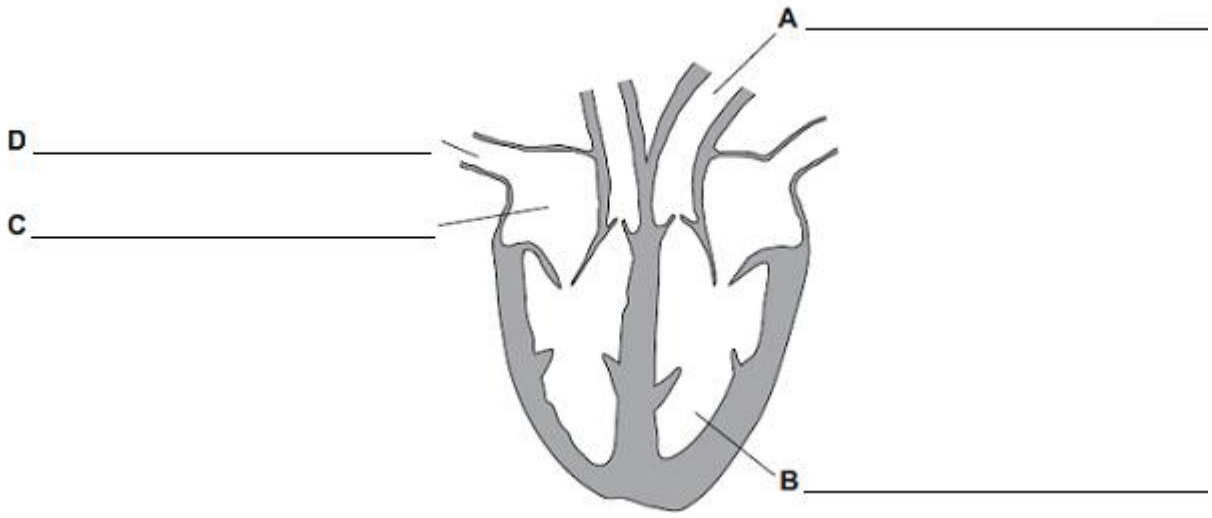
(2)

(Total 7 marks)

Q2.

Diagram 1 shows a section through the heart.

Diagram 1



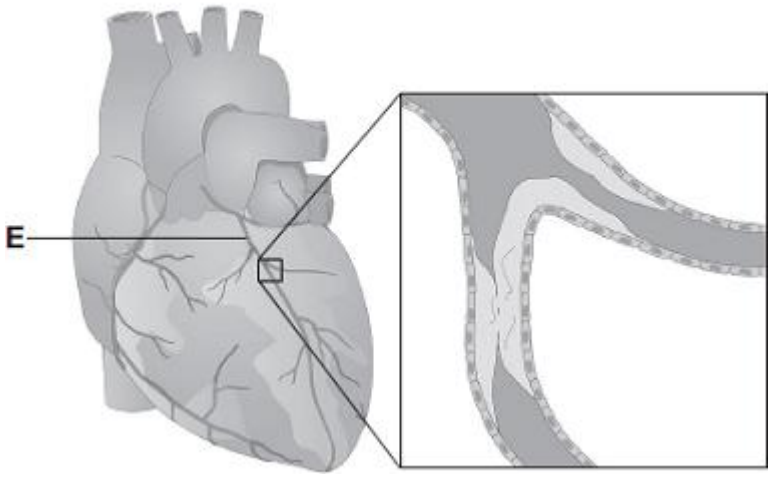
(a) On the diagram, name the parts labelled **A**, **B**, **C** and **D**.

(4)

(b) **Diagram 2** shows the blood vessels that supply the heart muscle.

Part of one of the blood vessels has become narrower.

Diagram 2



(i) Name blood vessel **E**.

_____

(1)

(ii) Give **one** method of treating the narrowed part of blood vessel **E**.

_____

(1)

(iii) Explain how the method of treatment works.

_____

_____

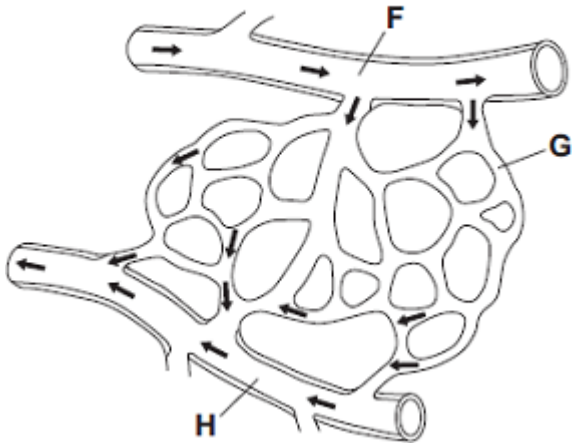
_____

_____

(2)

(c) **Diagram 3** shows part of the blood supply in the lungs.

Diagram 3



(i) Name the types of blood vessel labelled **F**, **G** and **H**.

F _____

G _____

H _____

(3)

(ii) Give **one** way in which the composition of the blood in vessel **F** is different from the composition of the blood in vessel **H**.

_____

(1)

(Total 12 marks)

Q3.

Plants exchange substances with the environment.

(a) Plant roots absorb water mainly by osmosis.
Plant roots absorb ions mainly by active transport.

Explain why roots need to use the two different methods to absorb water and ions.

_____

_____

_____

_____

_____

_____

(4)

(b) What is meant by the *transpiration stream*?

_____

_____

_____

_____

_____

_____

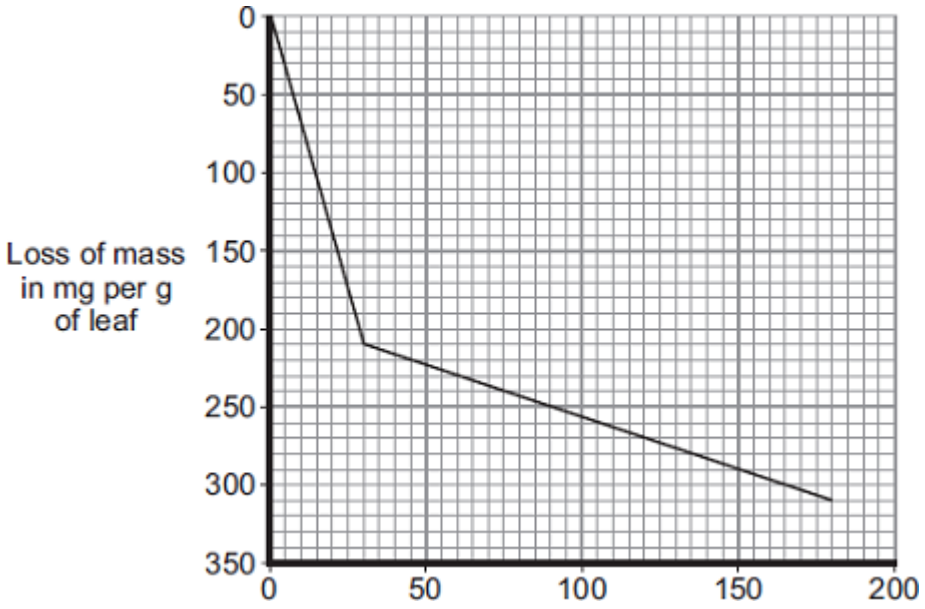
(3)

(c) Students investigated the loss of water vapour from leaves.

The students:

- cut some leaves off a plant
- measured the mass of these leaves every 30 minutes for 180 minutes.

The graph shows the students' results.



(i) The rate of mass loss in the first 30 minutes was 7 milligrams per gram of leaf per minute.

Calculate the rate of mass loss between 30 minutes and 180 minutes.

_____

_____

Rate of mass loss = _____ milligrams per gram of leaf per minute

(2)

(ii) The rate of mass loss between 0 and 30 minutes was very different from the rate of mass loss between 30 and 180 minutes.

Suggest an explanation for the difference between the two rates.

_____

_____

(2)

(Total 11 marks)

Q4.

The table is from a packet of biscuits.

Average values	Per 100 g	Per biscuit	UK guideline daily amounts	
			Adults	Children (5 – 10 years)
Energy	1974 kJ	446 kJ	8500 kJ	7500 kJ
Protein	7.1 g	1.1 g	45 g	24 g
Carbohydrate	62.8 g	9.3 g	230 g	220 g
Fat	21.3 g	3.2 g	70 g	70 g
Sodium	3.6 g	0.5 g	2.4 g	1.4 g

One day a ten-year-old child ate a whole packet of the biscuits.
The biscuits in the pack had a mass of 400 g.

(a) (i) How many grams of carbohydrate did the child eat?

_____

_____

Number of grams _____

(2)

(ii) The amount of carbohydrate you calculated in part (a)(i) was more than the UK guideline daily amount for the child.

How much more?

_____

Number of grams _____

(1)

(b) Give **two** possible health effects on the child of eating so many biscuits every day.

1. _____

2. _____

(2)

(Total 5 marks)

Q5.

The concentration of cholesterol in the blood affects people's health.

(a) Give **two** factors that affect the concentration of cholesterol in the blood.

1. _____

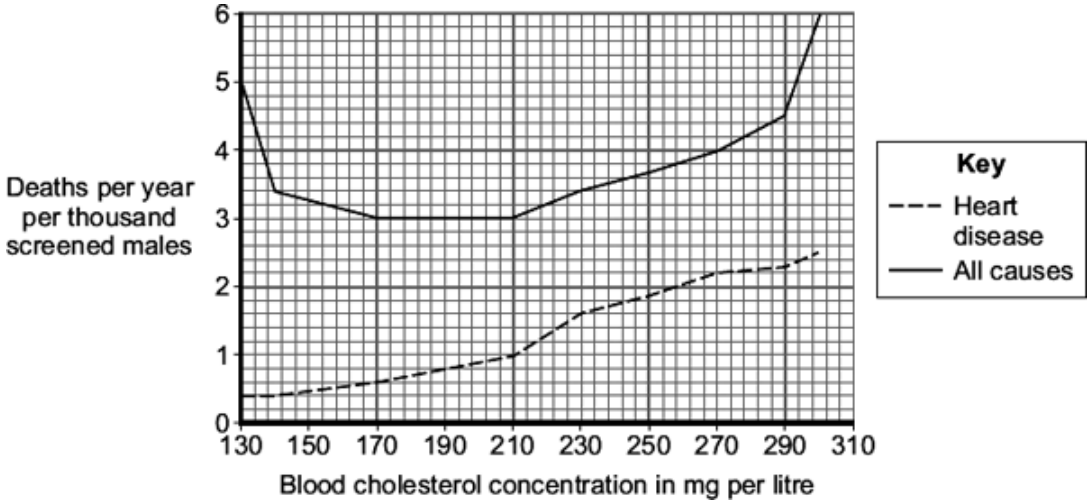
2. _____

(2)

(b) Doctors screened men for blood cholesterol concentration.

The doctors then compared death rates from heart disease with deaths from all causes in this screened group.

The graph shows the results.



(i) Which is the best conclusion that can be drawn from the data?

Tick (✓) **one** box.

There is a positive correlation between blood cholesterol concentration and deaths from all causes. ☐

There is a negative correlation between blood cholesterol concentration and deaths from all causes. ☐

Blood cholesterol concentration is only one of several factors affecting death from all causes. ☐

(1)

(ii) Based on the data in the graph **only**, which is the ideal range for blood cholesterol concentration?

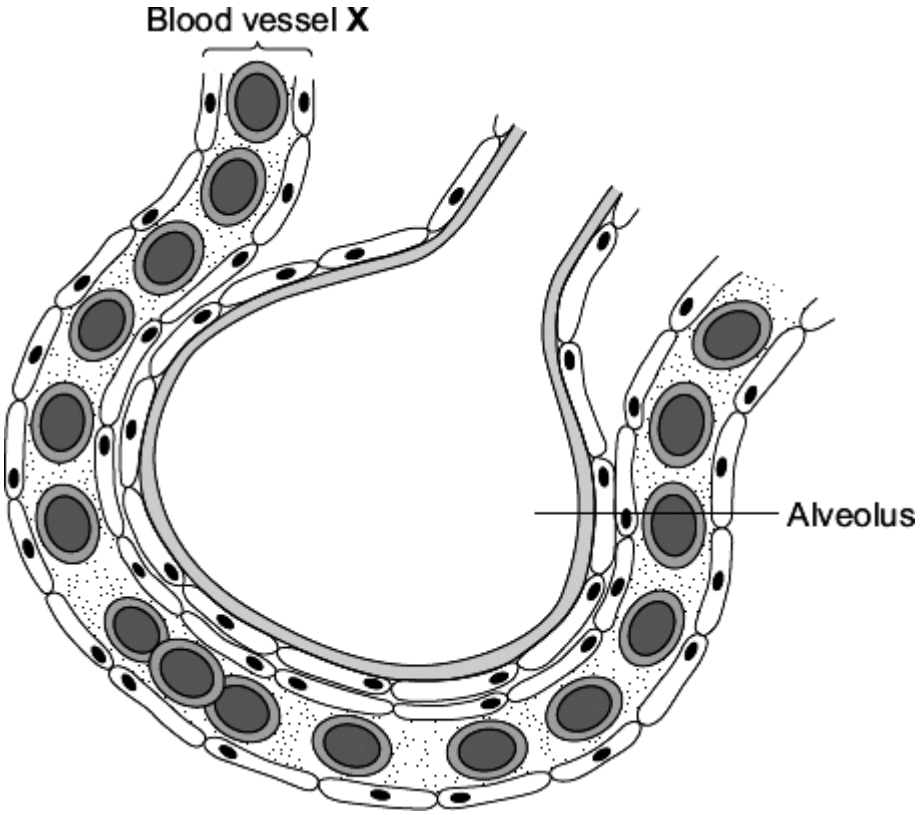
Range _____ to _____ mg cholesterol per litre.

(1)

(Total 4 marks)

Q6.

The diagram shows an alveolus and a blood vessel in the lung.



(a) Draw a ring around the correct answer to complete each sentence.

(i) Blood vessel **X** is

an artery.
a capillary.
a vein.

(1)

(ii) Gases pass across the wall of the alveolus by

diffusion.
evaporation.
fermentation.

(1)

(iii) The table compares the concentrations of some gases in inhaled air and exhaled air.

Complete the table.
Write 'lower' **or** 'higher' in each box.
One line has been completed for you as an example.

Gas	Concentration	
	Inhaled air	**Exhaled air**
Water vapour	lower	higher
Carbon dioxide		
Oxygen		

(2)

(b) Draw a ring around the correct answer to complete each sentence.

(i) Oxygen is carried in the blood mainly in

blood plasma.
red blood cells.
white blood cells.

(1)

(ii) In the blood, the oxygen combines with

carbon dioxide.
haemoglobin.
urea.

(1)

(Total 6 marks)

Q7.

Plants lose water vapour from their leaves. Most of this water vapour is lost through the stomata.

(a) Draw a ring around the correct answer to complete the sentence.

Plants lose water vapour by

distillation.
filtration.
transpiration.

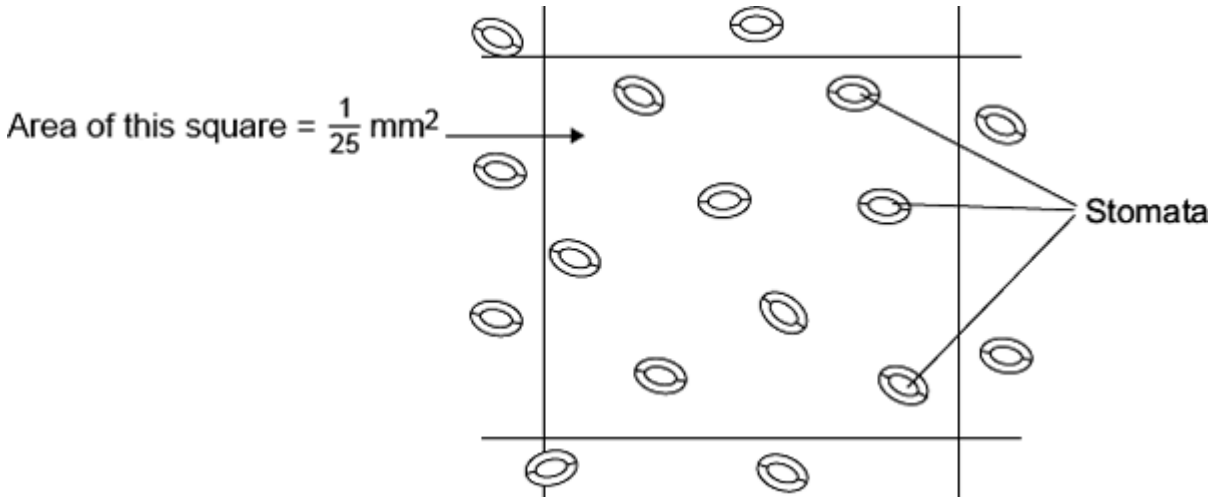
(1)

(b) A class of students investigated the number of stomata per mm^2 on the upper surface and on the lower surface of the leaves of three species of plant, **P**, **Q** and **R**.

The students placed samples of the surface cells onto a grid on a microscope.

Student **X** counted the stomata on the lower surface of a leaf from one of the plant species.

The diagram shows part of the grid that student **X** saw under the microscope.



(i) Complete the calculation to estimate the number of stomata per mm^2 on the lower surface of this leaf.

Number of stomata in $\frac{1}{25}$ mm^2 = _____

Number of stomata in 1 mm^2 = _____

(2)

The table shows the mean results for the class.

Plant species	Mean number of stomata per mm^2 of leaf	
	Upper surface of leaf	Lower surface of leaf
P	40	304
Q	0	11
R	85	195

(ii) Student **X** had counted the stomata on the lower surface of a leaf from one of the plant species.

Use your answer to part **(b)(i)**, and information in the table, to help you to answer this question.

From which plant species, **P**, **Q** or **R**, was student **X**'s leaf most likely to have been taken? ☐

(1)

(iii) Species **Q** is normally found growing in hot, dry conditions.

Explain **one** way in which species **Q** is adapted for living in hot, dry conditions.

Use information from the table.

_____

_____

_____

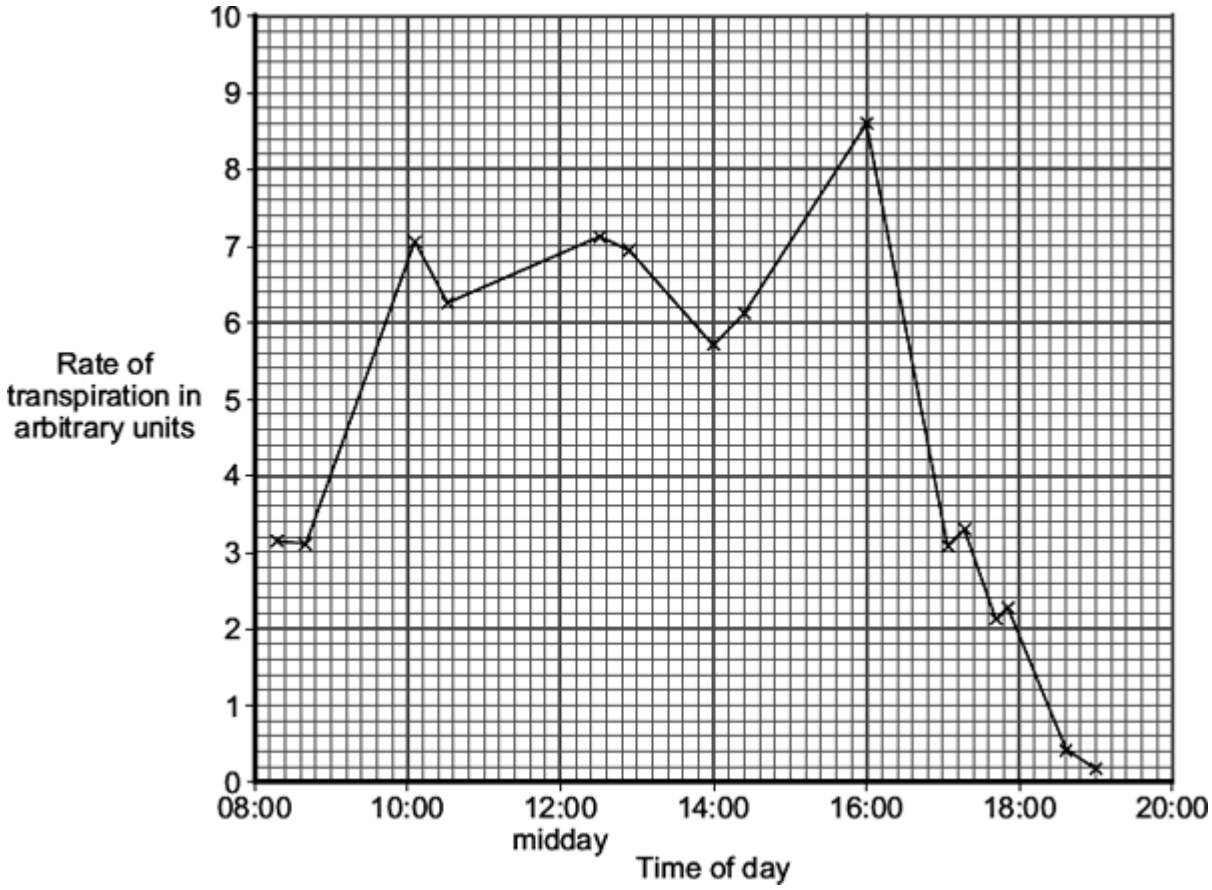
_____

(2)

(Total 6 marks)

Q8.

The graph shows the rate of transpiration from a plant at different times of the day.



Transpiration occurs mainly in the leaves of a plant.

(a) (i) What is *transpiration*?

_____

_____

_____

_____

(2)

(ii) Through which part of a leaf does most transpiration occur?

_____

(1)

(b) In this investigation, the rate of transpiration decreases between 16:00 hours and 19:00 hours.

(i) Calculate the average rate of decrease per hour in the rate of transpiration over this time.

Show clearly how you work out your answer.

_____

_____

_____

_____

Rate = _____ arbitrary units per hour

(2)

(ii) Suggest **one** explanation for the decrease in the rate of transpiration between 16:00 hours and 19:00 hours.

_____

_____

_____

_____

(2)

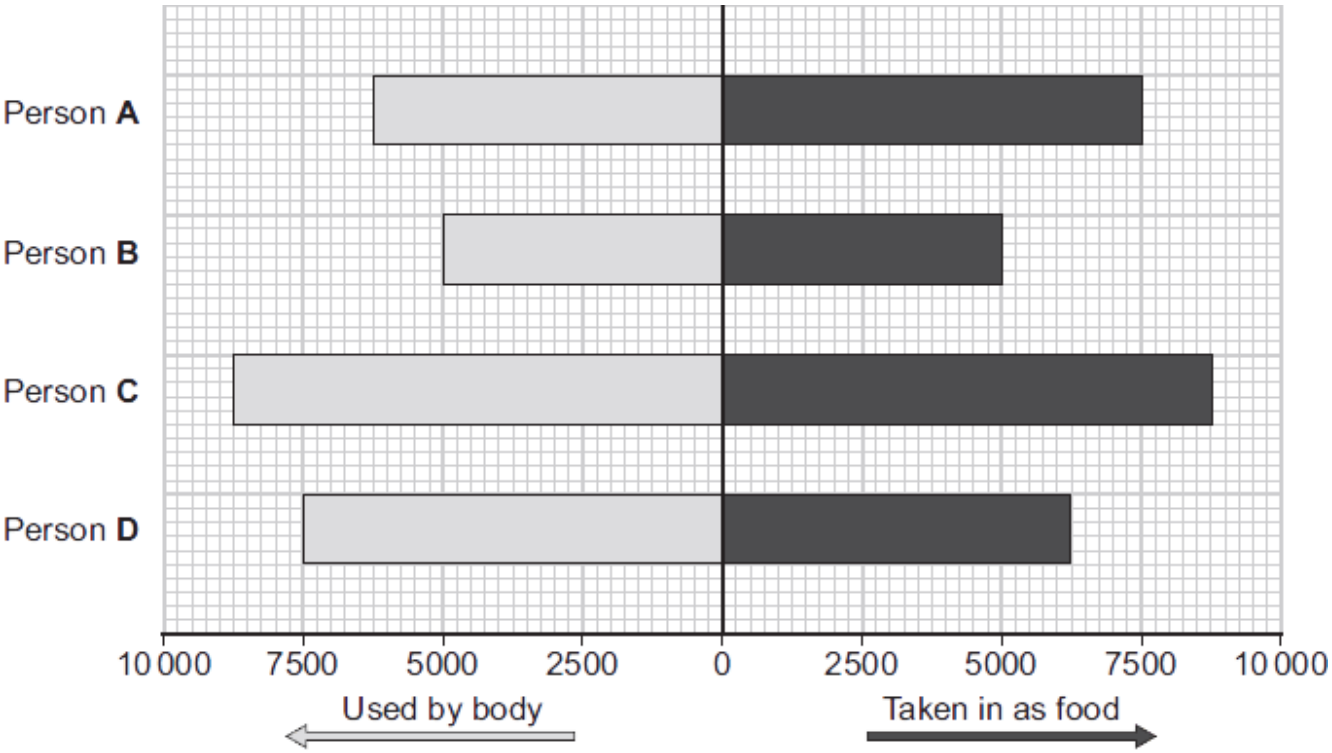
(Total 7 marks)

Q9.

Scientists measured the amount of energy used by four people, **A**, **B**, **C** and **D**.

The scientists also measured the amount of energy taken in as food by each person.

The chart shows the scientists' results.



Mean energy in kJ per day

(a) (i) What was the mean amount of energy used by **D**?

_____ kJ per day

(1)

(ii) The amount of energy used by **D** is different from the amounts of energy used by **A**, **B** and **C**.

Suggest **two** reasons why.

_____

_____

_____

_____

(2)

(b) The data in the bar chart was collected over twelve months.

Which person, **A**, **B**, **C** or **D**, would gain body mass over the twelve months?

Give a reason for your answer.

_____

_____

_____

_____

(2)

(c) In the UK many people are obese.
Doctors advise obese people to lose mass.

Suggest **two** different ways an obese person could lose mass.

_____

_____

_____

_____

(2)

(Total 7 marks)

Q10.

In a living organism, the cells are organised into organs, systems and tissues.

(a) Use words from the box to complete the list of these structures in order of size.

organs	**systems**	**tissues**

The smallest structure is at the top of the list and the largest is at the bottom.

1 **cells**

(smallest)

2 _____

3 _____

4 _____

(largest)

5 **organism**

(1)

(b) **List A** gives three tissues found in the human body.
List B gives four functions of tissues.

Draw a straight line from each tissue in **List A** to its correct function in **List B**.

List A – Tissue	**List B – Function**
	Covers many parts of the body
Muscular tissue	
	Contracts to cause movement
Glandular tissue	
	Divides by meiosis
Epithelial tissue	
	Releases hormones or enzymes

(3)
(Total 4 marks)

Q1.

(a) **A** artery

allow aorta

1

B ventricle

ignore references to left and right

1

C atrium

ignore references to left and right
allow atria

1

D vein

allow vena cava

1

(b) (i) stent

1

(ii) keeps (artery) open

1

so (more) blood can flow through

allow blood can flow (more) easily
ignore ref to blood clots

1

[7]

Q2.

(a) A aorta

ignore left and right

1

B ventricle

1

C atrium

allow atria

1

D vena cava

1

(b) (i) (coronary) artery

allow arteriole

1

(ii) stent / description

accept (coronary) by-pass operation

allow statins
allow diets low in cholesterol
allow balloon (angioplasty)

1

(iii) (stent) keeps artery open
must relate to (b)(ii)

1

or
ignore reference to capillary / vein

(by-pass) new blood vessel / vein connecting around narrowed region;

or

(statins / low cholesterol diet) remove some of the cholesterol blockage

or

(balloon) widens / opens the blood vessel

1

which allows (more) blood through or allows blood to go around the blockage

(c) (i) F artery
accept arteriole / branch of pulmonary artery

1

G capillary

1

H vein
H accept venule / branch of pulmonary vein;

1

(ii) F (Pulmonary artery) has <u>less</u> oxygen / <u>more</u> carbon dioxide / <u>more</u> glucose / sugar
accept F (Pulmonary artery) is deoxygenated
accept converse for H (Pulmonary vein)
'It' refers to F

1

[12]

Q3.

(a) solution in soil is more dilute (than in root cells)
concentration of water higher in the soil (than in root cells)

1

so water moves from the dilute to the more concentrated region
*so water moves <u>down</u> (its) concentration gradient **or** water moves from a high concentration <u>of water</u> to a lower concentration*

1

concentration of ions in soil less (than that in root cells)

1

so energy needed to move ions

or

ions are moved against concentration gradient

the direction of the concentration gradient must be expressed clearly

accept correct reference to water potential or to concentrations of water

1

(b) any **three** from:

- movement of water from roots / root hairs (up stem)
- via xylem
- to the leaves
- (water) evaporates
- via stomata

3

(c) (i) 0.67/0.7

accept 0.66, 0.6666666... or ⅔ or 0.6

*correct answer gains **2** marks with or without working*

$\frac{100}{150}$

if answer incorrect allow evidence of $\frac{100}{150}$ *for **1** mark*

*do **not** accept 0.6 or 0.70*

2

(ii) <u>during the first 30 minutes</u>

any **one** from:

- it was warmer
- it was windier
- it was less humid
- there was more water (vapour) in the leaves

1

so there was more evaporation

ignore 'water loss'

or

stomata open during first 30 minutes **or** closed after 30 minutes (1)

so faster (rate of) evaporation in first 30 min **or** reducing (rate of)

evaporation after 30 min (1)

1

[11]

Q4.

(a) (i) 251.2

*award **2** marks for correct answer, irrespective of working.*
*if incorrect or no answer 62.8 x 4 or equivalent gains **1** mark*

2

(ii) 31.2

allow ecf from (a)(i); answer to (a)(i) – 220

1

(b) any **two** from:

- overweight / obesity **or** increased BMI
  allow get fat
  ignore get heavier
- (Type 2) diabetes
  allow high blood sugar
- high blood pressure
- cardiovascular / heart disease **or** heart problems **or** disease of blood vessels **or** clogged arteries
- high cholesterol
- arthritis / worn joints
- tooth decay

2

[5]

Q5.

(a) any **two** from:

- diet
  ignore exercise
  accept any reasonable reference to diet
  *do **not** accept salt / blood pressure*
  ignore age / gender / HDL / LDL
- heredity / genes / genetic makeup
- reference to cholesterol production by liver

2

(b) (i) Blood cholesterol concentration is only one of several factors affecting death from all causes

1

(ii) 170 – 210

accept 210 - 170

1

[4]

Q6.

(a) (i) capillary

1

(ii) diffusion

1

(iii)

Carbon dioxide	low(er)	high(er)

1

Oxygen	high(er)	low(er)

1 *mark for each correct row*

1

(b) (i) red blood cells

1

(ii) haemoglobin

1

[6]

Q7.

(a) transpiration

1

(b) (i) 200

correct answer with or without working

if answer incorrect:

*allow **1** mark for 8 × 25 **or***

*allow **1** mark for answer from candidate's count × 25*

2

(ii) **R**

*allow **P** or **Q** if candidate's answer to (b)(i) nearer to value for one of those*

*do **not** allow **R** if the answer to (b)(i) would give an answer of **P** or **Q***

allow R if (b)(i) is blank

1

(iii) few stomat

allow no stomata on upper surface / all stomata on lower surface

1

little / less transpiration **or** little / less water (vapour) loss / enable water to be

retained

allow no water loss from upper surface

1

[6]

Q8.

(a) (i) water loss

extra substance(s) cancel

*if transpiration stream described max **1** mark*

1

as a vapour / by evaporation

ignore stomata

1

(ii) stomata / stoma / guard cells

ignore epidermis

1

(b) (i) 2.8

*correct answer with or without working gains **2** marks*

if answer incorrect:

*allow **1** mark for (8.6 - 0.2) ÷ 3 **or** 8.4 ÷ 3*

2

(ii) warmer at 16:00 / gets cooler

***or** reverse argument for 19.00*

1

faster diffusion / evaporation

accept sun setting as equivalent to heat or light marking points

or

lighter at 16:00 / gets darker (1)

if no environmental factor still allow reason mark

stomata open / more open (1)

eg 'stomata close later in the day'

or

(more) windy at 16:00 / gets less windy (1)

removal of (more) water vapour / steeper gradient (1)

or

air is less humid at 16.00 (1)

allow rain at 19.00

faster diffusion or steeper gradient (1)

1

[7]

Q9.

(a) (i) 7500

ignore units

1

(ii) any **two** from

if examples given they must be correct

(differences in)

- age
- gender / sex
- activity /amount of exercise

allow job / lifestyle
ignore fitness / health / medication

- metabolism / metabolic rate

allow BMR

- genetic differences
- body weight / mass / size / physique

allow BMI

- pregnancy
- proportion of muscle to fat

2

(b) **A**

if box empty, allow in explanation

1

more energy taken in than used

accept more food taken in than used
allow correct numbers if comparative
ignore incorrect numbers if comparison correct

1

(c) eat less (food / carbohydrates / fat / calories)

accept a medical treatment such as gastric band / slimming pills / liposuction
ignore balanced / healthy / diet
allow go to weight watchers etc.
ignore burn off more

1

exercise (more) **or** go to the gym

1

[7]

Q10.

(a) in sequence:

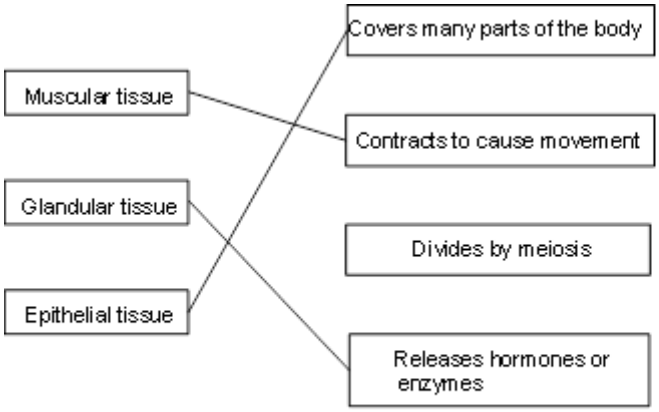
2 = tissue(s)

3 = organ(s)

4 = system(s)

1

(b)



***1** mark for each correct line*
extra line(s) from one tissue cancel

3

[4]