AQA GCSE BIOLOGY (HIGHER) · 8461

BIOLOGY



EXAM QUESTION PACK

4.2.2 ANIMAL TISSUES, ORGANS AND ORGAN SYSTEMS (PACK 5)

SCORE	PERCENTAGE
/190	%

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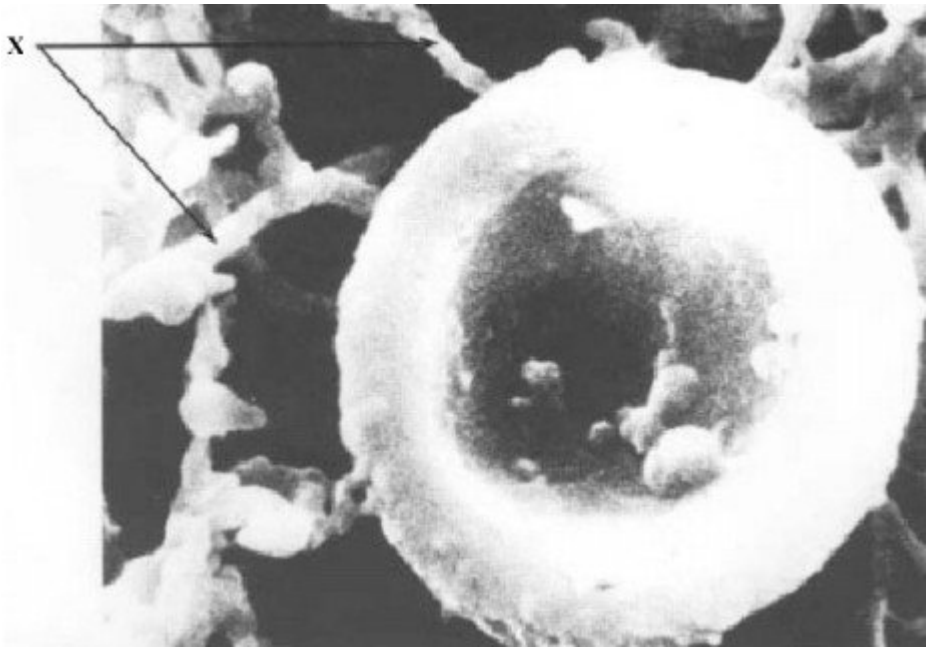
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Q1.

The photograph shows a red blood cell in part of a blood clot. The fibres labelled **X** are produced in the early stages of the clotting process.



(a) Suggest how the fibres labelled **X** help in blood clot formation.

_____

(1)

(b) The average diameter of a real red blood cell is 0.008 millimetres.
On the photograph, the diameter of the red blood cell is 100 millimetres.

Use the formula to calculate the magnification of the photograph.

Diameter on photograph = Real diameter × Magnification

_____

_____

_____

Magnification = _____

(2)

(c) Some blood capillaries have an internal diameter of approximately 0.01 millimetres.

(i) Use information given in part (b) to explain why only one red blood cell at a time can pass through a capillary.

_____

(1)

(ii) Explain the advantages of red blood cells passing through a capillary one at a time.

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_____

_____

_____

_____

_____

_____

(3)

(Total 7 marks)

Q2.

Complete the table by writing the correct process next to its description.

Choose your answers from the list in the box

breathing	**diffusion**	**digestion**	**osmosis**	**respiration**

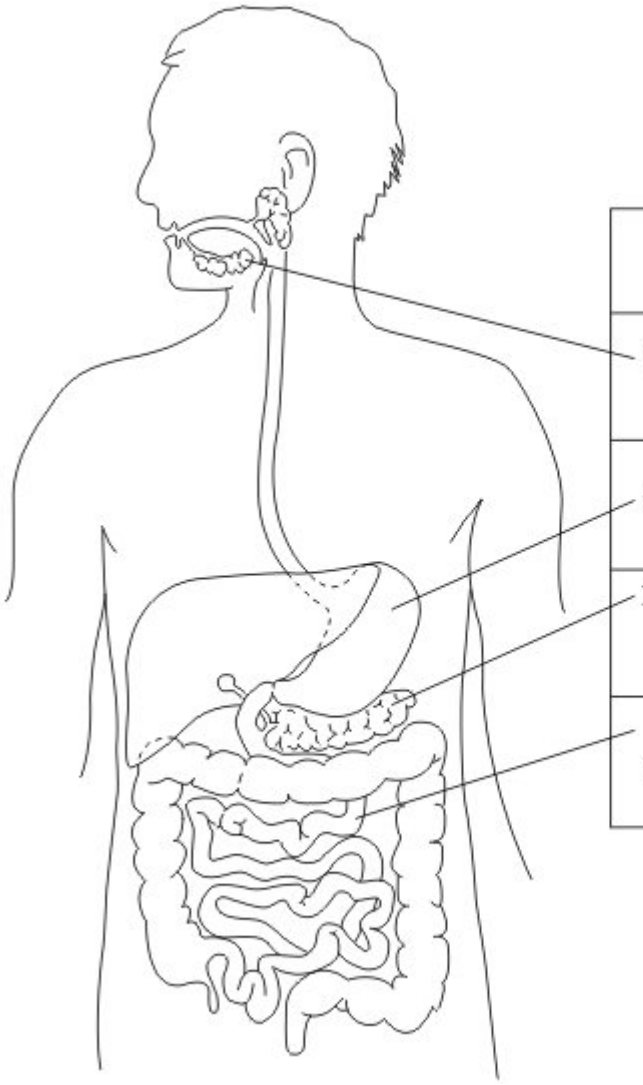
Description	Process
Moving air in and out of the lungs	
The movement of particles of a substance from high to low concentration	
The release of energy from glucose	

(Total 3 marks)

Q3.

The diagram gives information about some parts of the human digestive system.

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Organ	pH of digestive juice	Enzymes produced
Salivary gland	7	Amylase
Stomach	2	Protease
Pancreas	8.5	Amylase Lipase Protease
Small intestine	8.5	Amylase Lipase Protease

(a) (i) Name the organ which **makes** bile.

_____

(1)

(ii) Label this organ with the letter **X** on the diagram.

(1)

Information in the table may help you to answer parts (b) and (c).

(b) Name **two** parts of the digestive system where protein is digested.

1. _____

2. _____

(2)

(c) Suggest **two** reasons why starch is not digested in the stomach.

1. _____

_____

2. _____

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_____

(2)

(Total 6 marks)

Q4.

(a) (i) Name the red pigment found in red blood cells.

_____

(1)

(ii) Describe, in detail, the function of this red pigment.

_____

_____

_____

_____

(2)

(b) Describe **one** other way in which the structure of a red blood cell is different from the structure of a white blood cell.

_____

_____

(1)

(Total 4 marks)

Q5.

Complete each sentence about the heart by choosing the correct words from the box.

an artery	an atrium	a cuspid valve
a semi-luna valve	a vein	

A ventricle fills with blood by the contraction of _____ .

When a ventricle contracts, blood is forced into _____ .

When a ventricle relaxes, the backflow of blood into it is prevented by the closing of

_____ .

(Total 3 marks)

Q6.

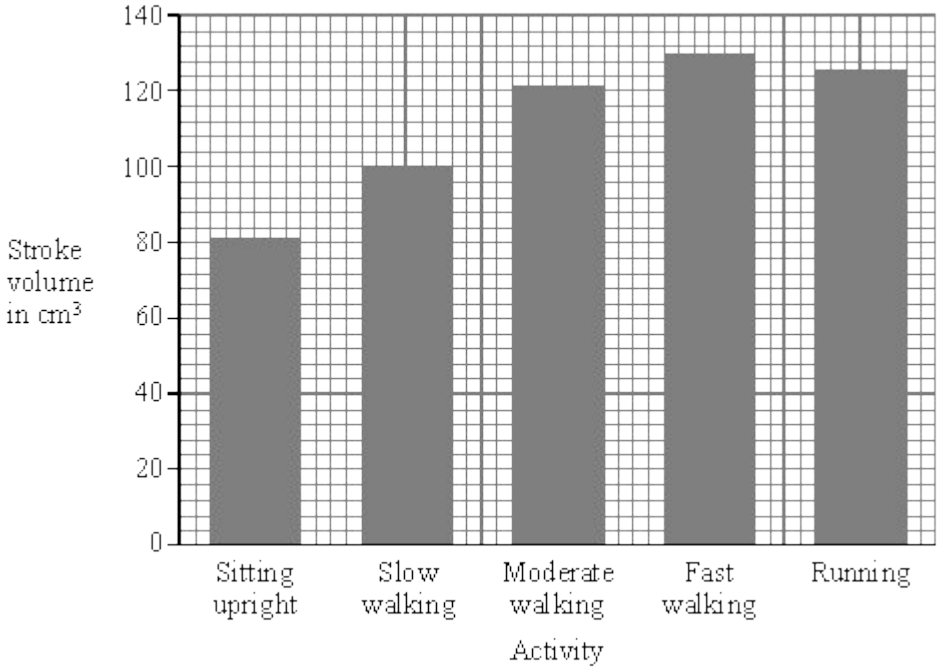
A person did five different activities in turn. These activities needed increasing amounts of energy. For each activity two measurements were made. These were the rate of

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contraction of the left ventricle and its stroke volume (the volume of blood pumped at each beat). From these measurements the cardiac volume was calculated.

Some of these results are shown in the table and the bar chart.

Activity	Rate of contraction of left ventricle in beats per minute	Cardiac output in cm^3 per minute
Sitting upright	68	5 500
Slow walking		8 000
Moderate walking	98	12 000
Fast walking	130	17 500
Running	150	19 000



(a) (i) Describe how a person can count the rate of beating of the left ventricle.

_____

_____

(1)

(ii) Calculate the rate of ventricle contraction in beats per minute when the person was walking slowly. Show clearly how you work out your final answer.

_____

_____

_____

_____

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Rate of ventricle contraction _____ beats per minute.

(2)

(iii) The pattern of results for stroke volume shows an anomalous result when the person is running. In what way is it anomalous?

_____

_____

(1)

(iv) There was a change in cardiac output when the person's movement changed from fast walking to running. How did the heart produce this change?

_____

_____

(1)

(b) Over a period of time, regular exercise can strengthen the heart muscle. This change in the heart muscle enables a person to run for longer before lactic acid build up occurs. Explain the reason for this.

_____

_____

_____

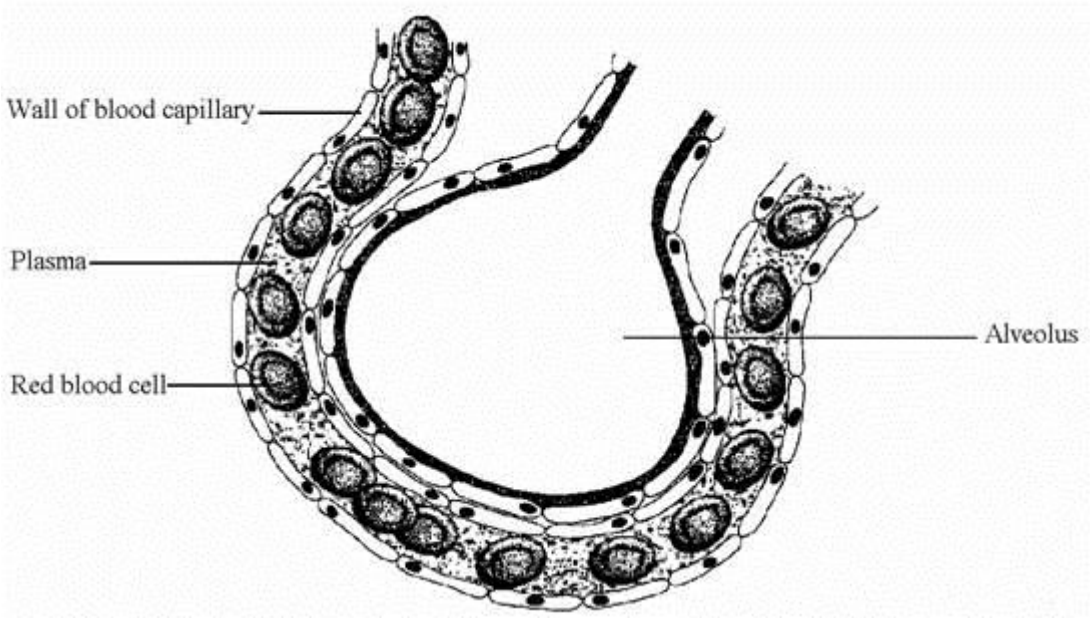
_____

(2)

(Total 7 marks)

Q7.

The diagram shows a part of a lung that is involved in gaseous exchange in a human.



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(i) Draw and label, on the diagram, **one** arrow to show the direction of movement of oxygen between the alveolus and capillary.

(1)

(ii) Draw and label, on the diagram, **one** arrow to show the direction of movement of carbon dioxide, between the alveolus and capillary.

(1)

(iii) Give the function of the red blood cell in this process.

_____

_____

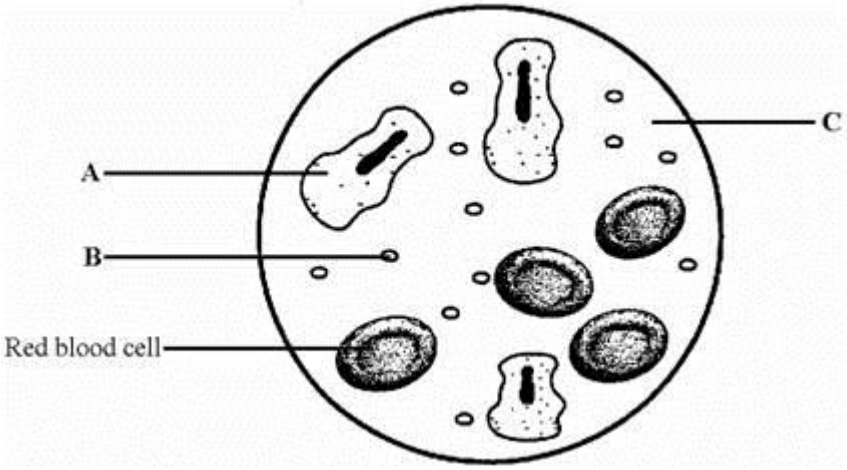
_____

(1)

(Total 3 marks)

Q8.

The diagram shows four parts of blood.



(a) Complete the table to give the name and function of the parts labelled **A**, **B** and **C**.

Letter	Name	Function
A	_____	_____ _____
B	_____	_____ _____
C	_____	_____ _____

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(6)

(b) Red blood cells contain haemoglobin. Explain how this enables red blood cells to pick up oxygen from the alveoli and release it to cells in other parts of the body.

_____

_____

_____

_____

_____

_____

_____

(4)

(Total 10 marks)

Q9.

(a) What type of blood vessels join arteries to veins?

_____

(1)

(b) How are oxygen and carbon dioxide carried in the blood?

_____

_____

_____

_____

(2)

(c) List **three** things that are carried around the body in the blood plasma.

1. _____

2. _____

3. _____

(3)

(Total 6 marks)

Q10.

The following sentences are about the blood system. Choose words from the list in the box to complete these sentences. You may use a word once or not at all.

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diffuse	lowered	narrow	one
raised	spread	two	wide

Capillaries have thin walls which are _____ .cell thick. This allows nutrients from digested food to _____ through and reach the cells of organs. Capillaries are very _____ .and so blood flow through an organ is slowed down and blood pressure is _____ .

(Total 4 marks)

Q11.

(a) Complete the table to give one site where digestive substances are made.

Digestive substance	One site of production
bile	
amylase	
lipase	
protease	

(4)

(b) Describe **two** ways that the mouth can break down starchy foods.

_____

_____

_____

_____

(2)

(c) Describe how the liver helps to digest fats.

_____

_____

_____

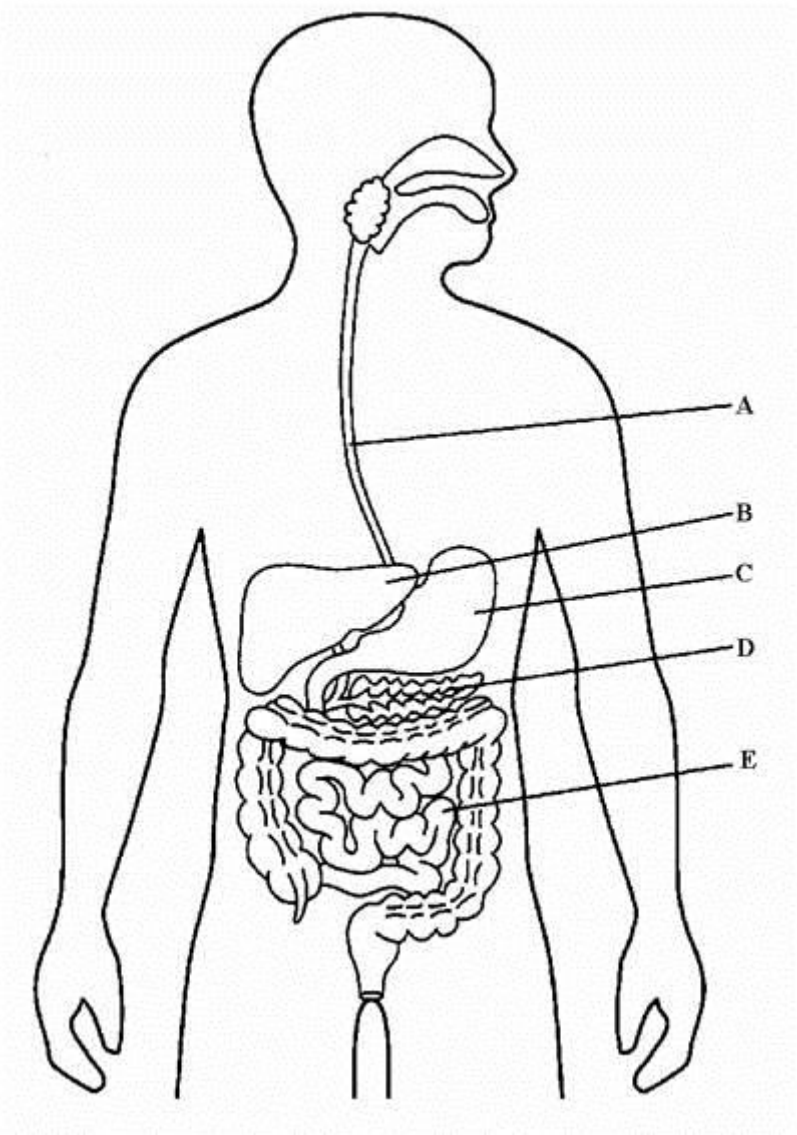
(2)

(Total 8 marks)

Q12.

The diagram shows part of the human digestive system.

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(i) Name part **B**.

_____

(1)

(ii) Describe the role of **B** and **D** in reducing blood sugar levels.

_____

_____

_____

_____

_____

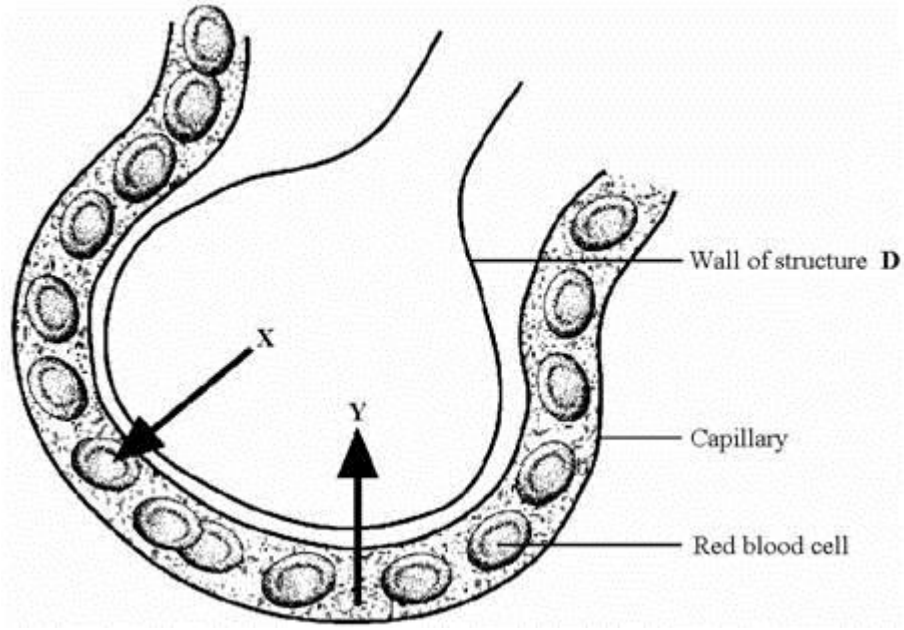
(2)

(Total 3 marks)

Q13.

The diagram shows an enlargement of structure **D**.

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The arrows show the direction of the gases exchanged in this structure. Name gas **X** and gas **Y**.

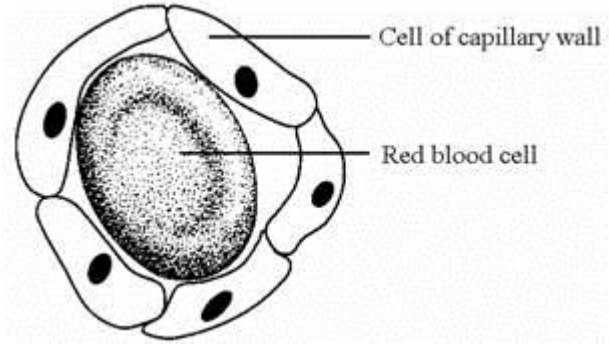
X _____

Y _____

(Total 2 marks)

Q14.

Capillaries are blood vessels in the body which join the arteries to the veins. They have walls which are one cell thick and so are able to exchange substances with the body cells.



(i) Name **two** substances that travel from the muscle cells to the blood in the capillaries.

1. _____

2. _____

(2)

(ii) Glucose is one substance that travels from the blood in the capillaries to the body cells. Explain how this happens.

_____

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_____

_____

(2)

(Total 4 marks)

Q15.

(a) Describe, as fully as you can, the job of

(i) the circulatory system.

_____

_____

(2)

(ii) the digestive system.

_____

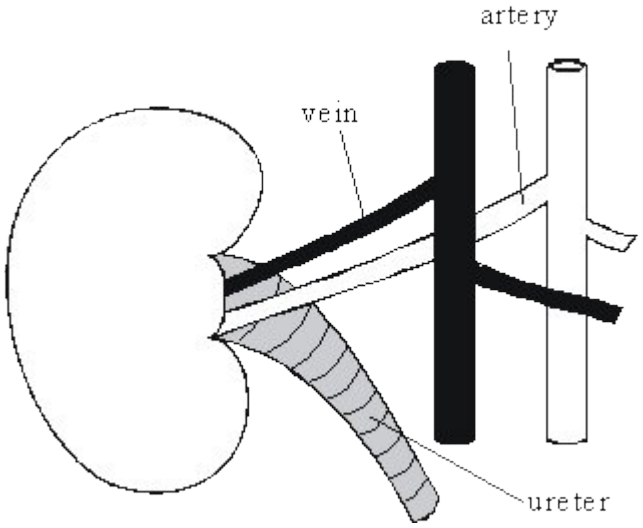
_____

_____

_____

(3)

(b)



The drawing shows a kidney, its blood supply and the ureter (a tube which carries urine from the kidney to the bladder). The amount and composition of the urine flowing down the ureter change if the blood in the artery contains too much water. Describe these changes and explain how they take place.

_____

_____

_____

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_____

_____

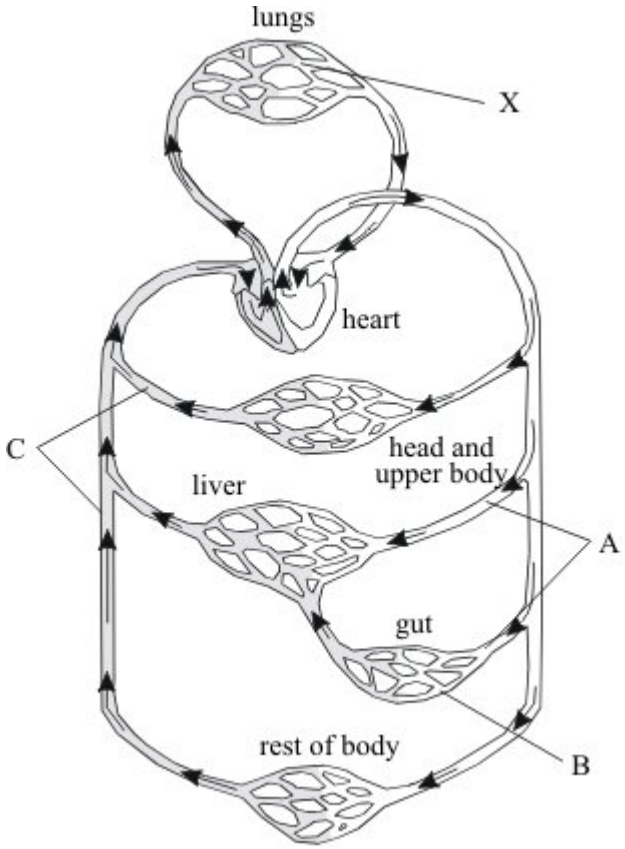
_____

(4)

(Total 9 marks)

Q16.

The diagram shows part of the circulatory system.



(a) Name the types of blood vessel labelled A, B and C on the diagram.

A _____

B _____

C _____

(3)

(b) What is the job of the circulatory system?

_____

_____

(1)

(c) Give **two** ways in which the composition of blood changes as it flows through the vessels labelled X on the diagram.

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1. _____

_____

2. _____

_____

(2)

(Total 6 marks)

Q17.

A dog runs across the road in front of a car. The driver slams her foot on the brakes.

(i) Explain how the nervous system brings about this response.

_____

_____

_____

_____

_____

_____

_____

(4)

(ii) Explain why alcohol consumption would affect the driver's response.

_____

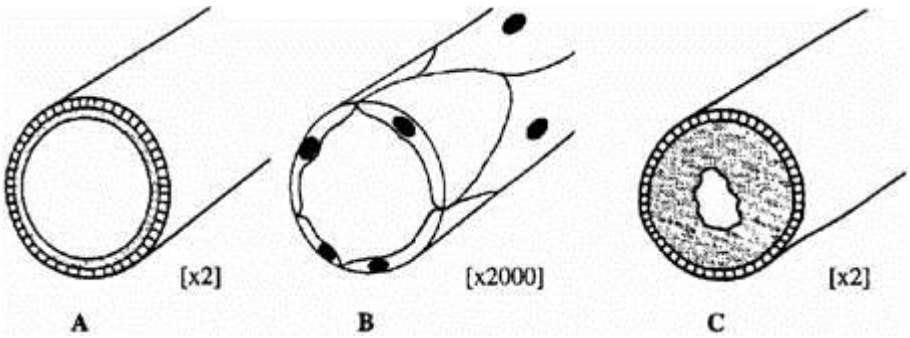
_____

(1)

(Total 5 marks)

Q18.

The drawings show the structure of three types of blood vessel, **A**, **B** and **C**. They are drawn to the scales indicated.



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(a) Name the **three** types of blood vessel.

A _____

B _____

C _____

(3)

(b) Describe the job of blood vessel **B**.

_____

_____

_____

_____

(2)

(Total 5 marks)

Q19.

The table shows the amounts of carbohydrate, fat and protein in 100 g portions of five foods, A - E.

	MASS IN 100 g PORTION (g)		
FOOD	CARBOHYDRATE	FAT	PROTEIN
A	0	1	20
B	50	2	8
C	0	82	0
D	12	0	1
E	20	0	2

(a) A person eats 50 g of food E.

How much carbohydrate would the person eat?

_____ g

(1)

(b) Describe, in as much detail as you can, what happens to the protein after food A is swallowed.

_____

_____

_____

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_____

_____

_____

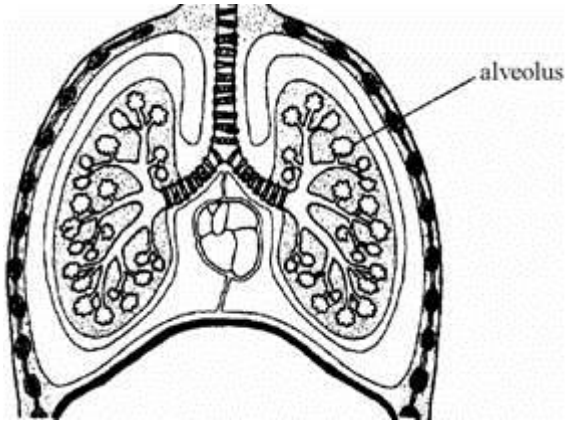
_____

(4)

(Total 5 marks)

Q20.

(a) The drawing shows some of the organs in the human thorax.



On the drawing, use guidelines to label:

(i) the heart;

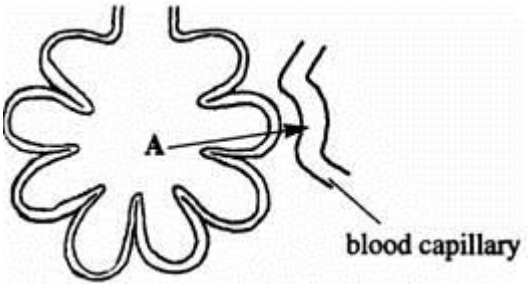
(ii) a rib;

(iii) the diaphragm;

(iv) the trachea.

(4)

(b) The drawing shows a section through an alveolus.



At **A**, oxygen moves from the air in the alveolus into the blood capillary. Explain, as fully as you can, how oxygen moves into the blood.

_____

_____

_____

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_____

_____

_____

(2)

(Total 6 marks)

Q21.

(a) A food contains protein. Describe, in as much detail as you can, what happens to this protein after the food is swallowed.

_____

_____

_____

_____

_____

_____

_____

_____

(4)

(b) The table shows the activity of lipase on fat in three different conditions.

CONDITION	UNITS OF LIPASE ACTIVITY PER MINUTE
Lipase + acid solution	3.3
Lipase + weak alkaline solution	15.3
Lipase + bile	14.5

Explain, as fully as you can, the results shown in the table.

_____

_____

_____

_____

_____

_____

(3)

(Total 7 marks)

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Q22.

The black pigment in human skin and eyes is called melanin. Production of melanin is controlled by a single pair of genes. A person who is homozygous for a recessive allele of the gene has no melanin and is said to be albino.

(a) A man is albino. His wife is heterozygous for the melanin-producing allele.

(i) The fertilised egg cell produced by the couple divides to form two cells.

Name the process of cell division involved.

_____

(1)

(ii) How many albino genes would there be in each of these two cells?

_____

Explain you answer.

_____

_____

_____

(3)

(b) (i) Albino people are more likely than people with melanin to suffer mutations that cause cancer in their skin. Suggest why albino people have an increased chance of mutation in their skin cells.

_____

_____

(1)

(ii) Sometimes, mutation in skin cells leads to cancers in other organs, such as the liver.

Explain how.

_____

_____

_____

_____

(2)

(Total 7 marks)

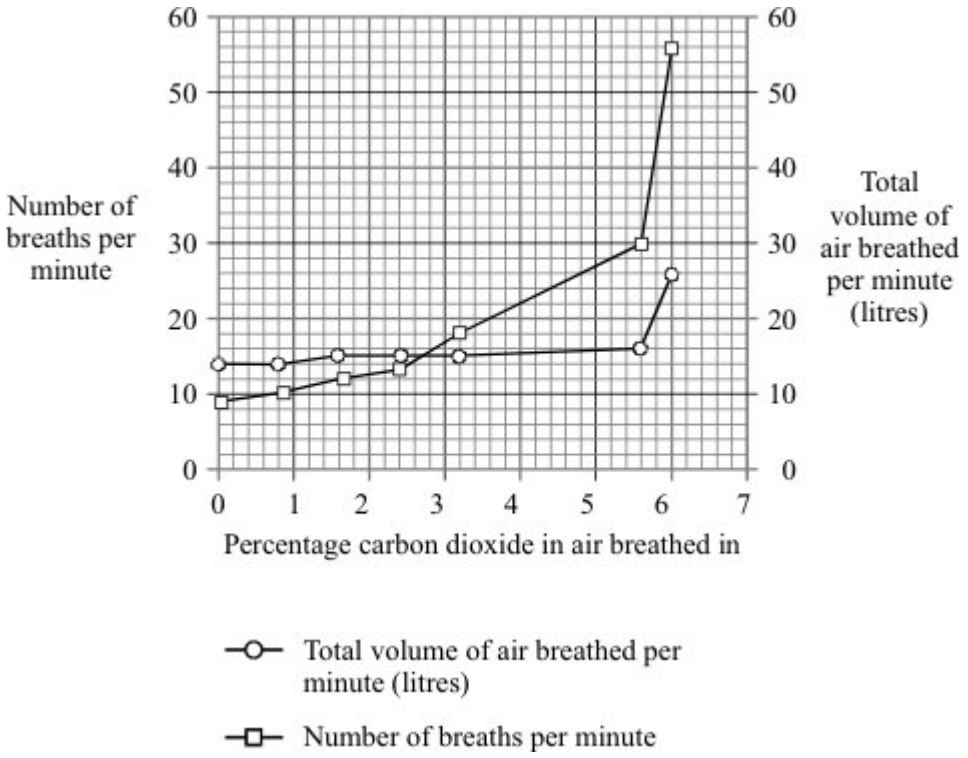
Q23.

The graph shows the effect of increasing the carbon dioxide content of the inhaled air on:

- the number of breaths per minute;

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- the total volume of air breathed per minute.



(i) Describe the effect of increasing the percentage of carbon dioxide in the inhaled air on the total volume of air breathed.

_____

_____

_____

_____

(2)

(ii) Suggest why the total volume of inhaled air is **not** directly proportional to the number of breaths per minute.

_____

_____

_____

_____

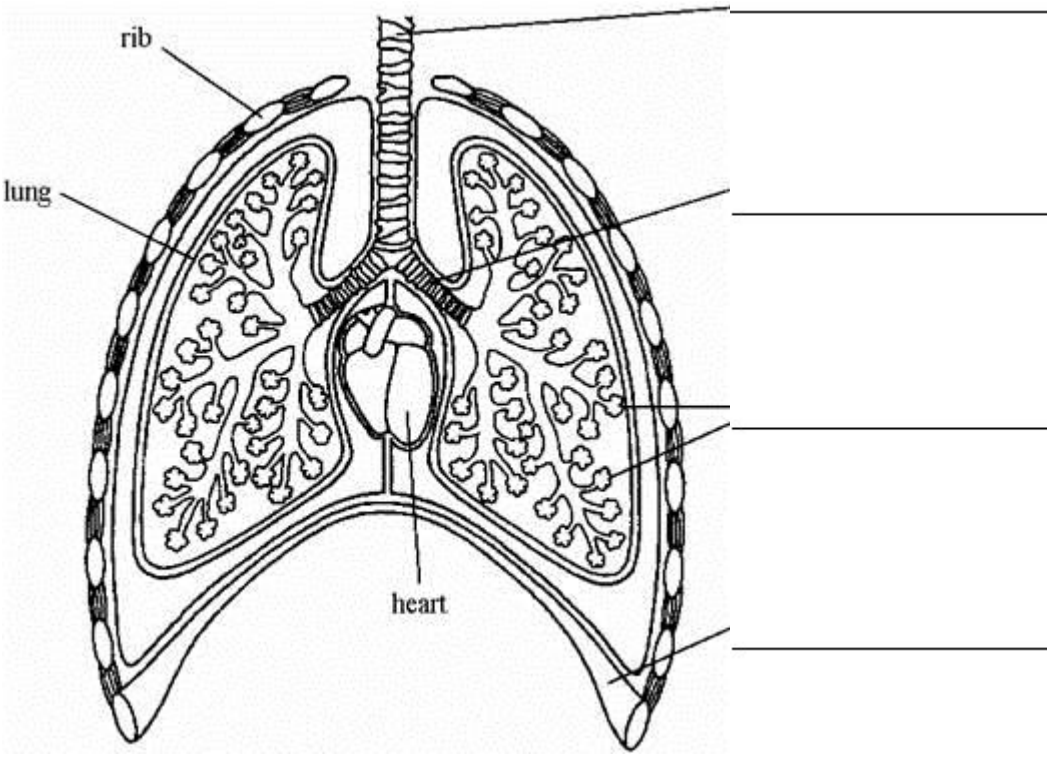
(2)

(Total 4 marks)

Q24.

The diagram shows part of the breathing system in a human.

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(a) Use words from the list to label the parts on the drawing.

alveoli bronchiole bronchus diaphragm trachea (windpipe)

(4)

(b) Where in the lungs does oxygen enter the blood?

_____

(1)

(c) Which process in cells produces carbon dioxide?

_____

(1)

(Total 6 marks)

Q25.

Describe the roles of the liver and the pancreas in the digestion of fats.

_____

_____

_____

_____

_____

_____

_____

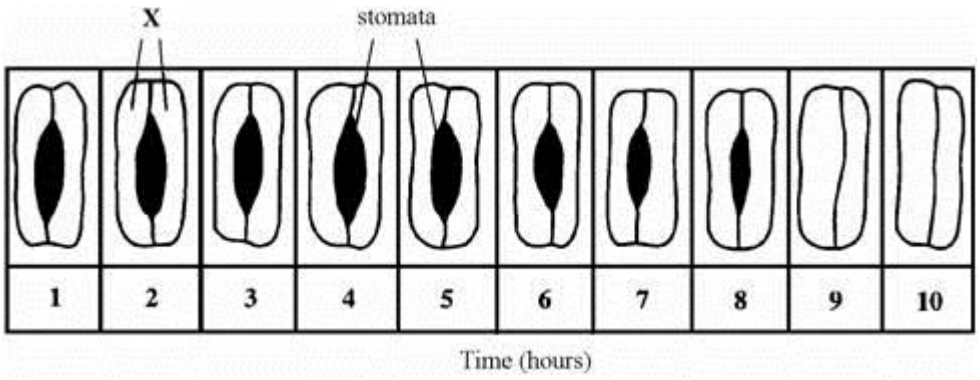
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_____

(Total 5 marks)

Q26.

A potted plant was left in a hot, brightly lit room for ten hours. The plant was not watered during this period. The drawings show how the mean width of stomata changed over the ten hour period.



(a) Why do plants need stomata?

_____

(1)

(b) Name the cells labelled **X** on the drawing.

_____

(1)

(c) The width of the stomata changed over the ten hour period.
Explain the advantage to the plant of this change.

_____

_____

_____

_____

(2)

(Total 4 marks)

Q27.

The table shows the composition of blood entering and leaving the lungs.

Gas	Concentration in arbitrary units	
	Blood entering lungs	**Blood leaving lungs**
Oxygen	40	100
Carbon dioxide	46	40

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(a) Describe, in as much detail as you can, the changes that take place in the composition of blood as it passes through the lungs.

_____

_____

_____

_____

_____

_____

(3)

(b) Which part of the blood:

(i) transports most carbon dioxide; _____

(ii) transports most oxygen? _____

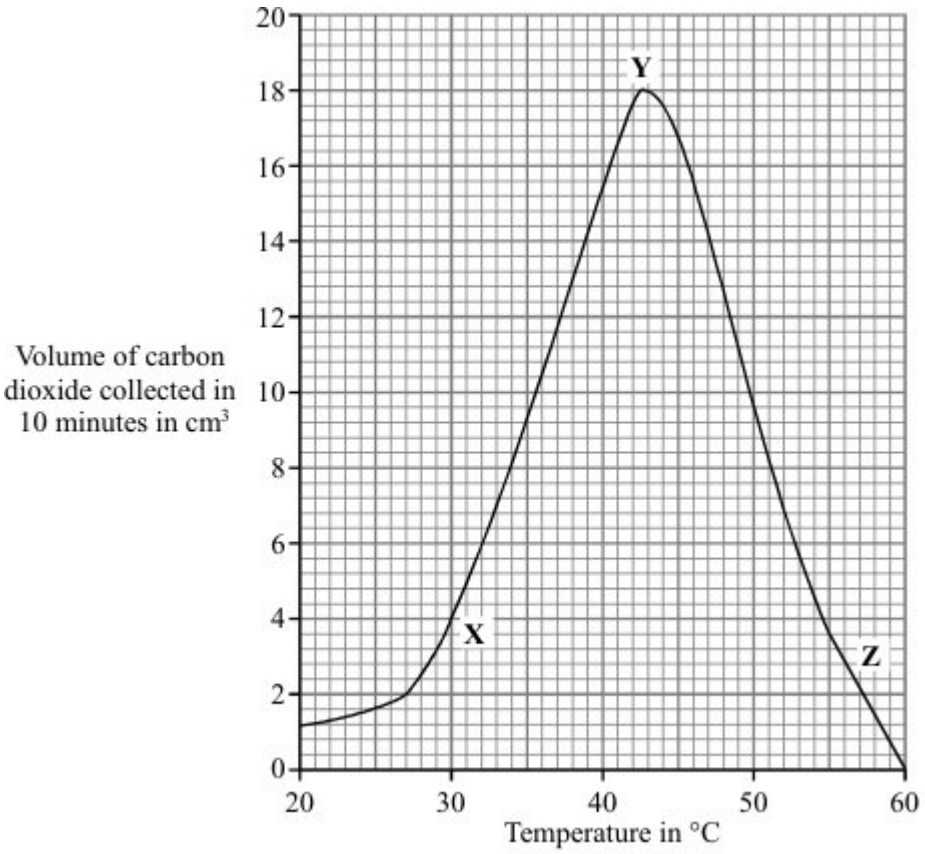
(2)

(Total 5 marks)

Q28.

Fermentation of sugar by yeast produces carbon dioxide.

The graph shows the effect of temperature on the production of carbon dioxide by fermentation.



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(a) By how much did the volume of carbon dioxide collected change when the temperature was raised from 30°C to 40°C?

_____ cm^3

(1)

(b) Complete the sentences to explain the shape of the curve between **X** and **Y**.

Raising the temperature _____ the speed of the reacting particles.

These particles collide more _____ and more _____ .

(3)

(Total 4 marks)

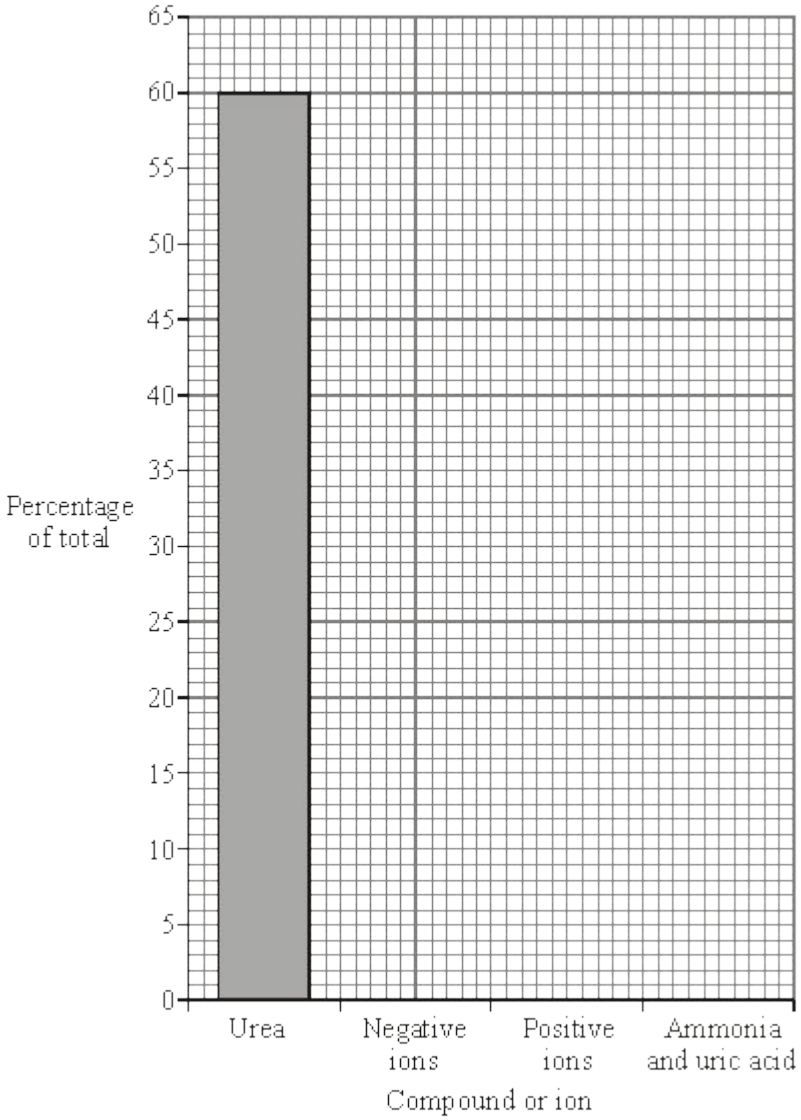
Q29.

(a) The table shows the compounds and ions dissolved in a student's urine.

Compound or ion	Percentage of total
urea	60
negative ions	25
positive ions	10
ammonia and uric acid	5

(i) Complete the bar chart. One bar has been drawn for you.

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(2)

(ii) There is a total of 10 g of compounds and ions dissolved in a sample of this student's urine. Calculate the mass of urea in the sample. Show clearly how you work out your answer.

_____

_____

_____

Mass of urea _____ g

(2)

(b) Use words from the box to complete the sentences.

anus	bladder	kidneys	liver	lungs

Plasma transports carbon dioxide from the body to the _____ .

Plasma transports urea from the _____ to the _____ .

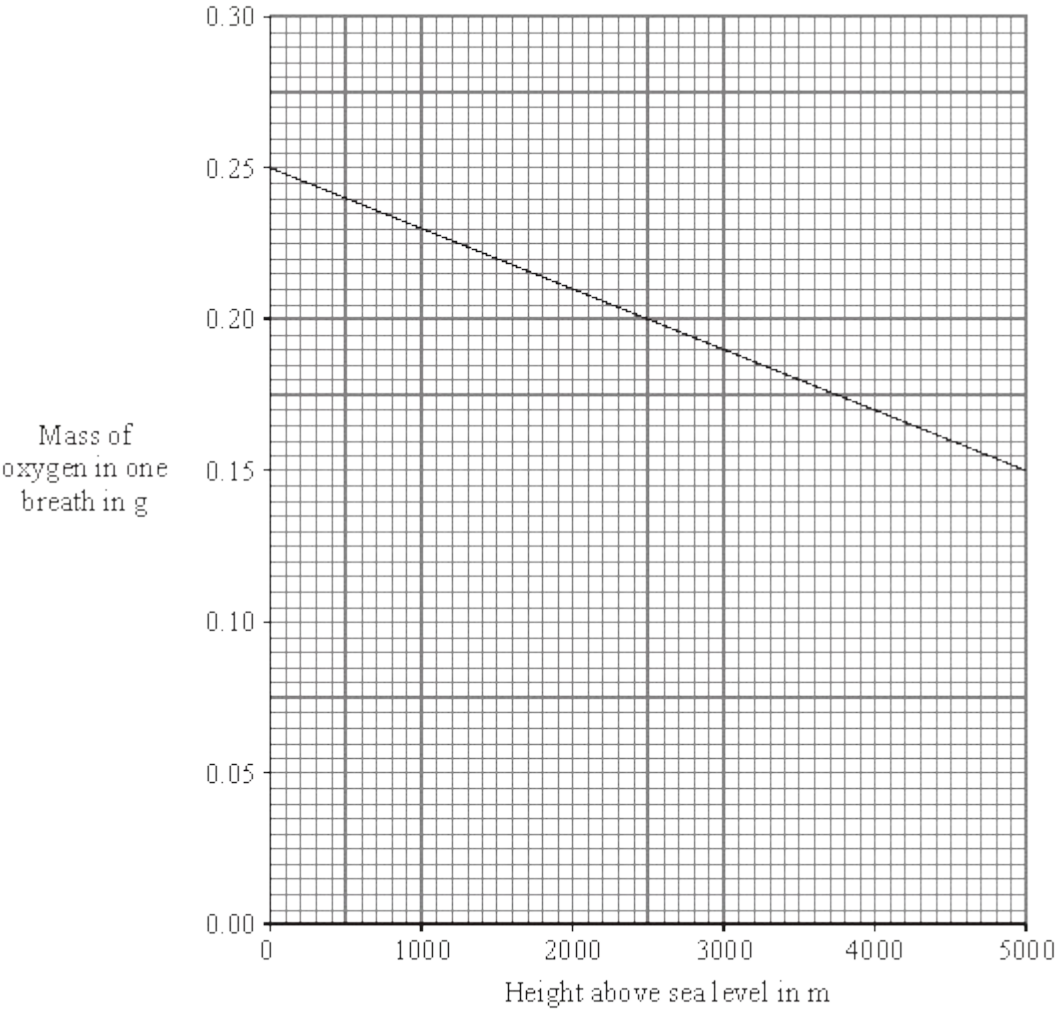
(3)

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(Total 7 marks)

Q30.

(a) The graph shows how the mass of oxygen you breathe in changes as you climb up a mountain.



Describe, in as much detail as you can, how the mass of oxygen in one breath changes as you climb from sea level to 3000 m.

_____

_____

_____

_____

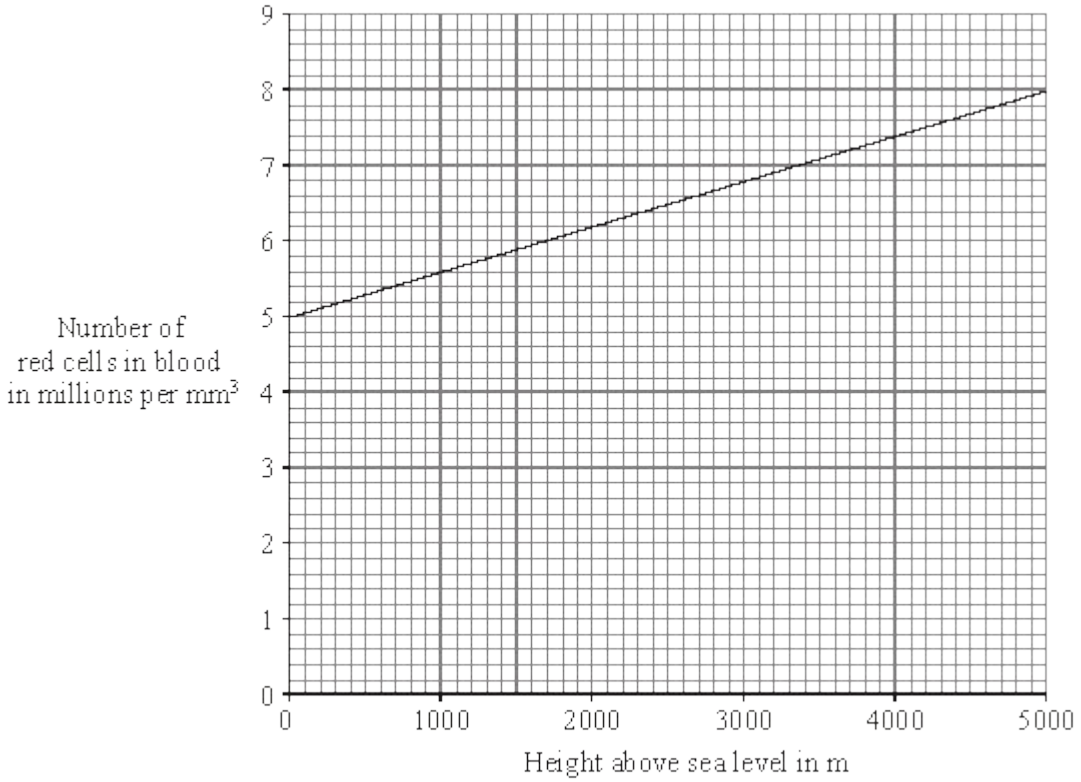
_____

_____

(3)

(b) People who live high up in mountainous areas have more red blood cells than people who live at sea level. The graph below shows how the number of red blood cells changes with height above sea level.

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(i) How many more red blood cells does a person living at 3000 m above sea level have than someone living at sea level? Show clearly how you work out your answer.

_____

_____

Increase in number of red blood cells = _____ millions per m^3

(2)

(ii) What is the advantage of having more red blood cells?

_____

_____

(1)

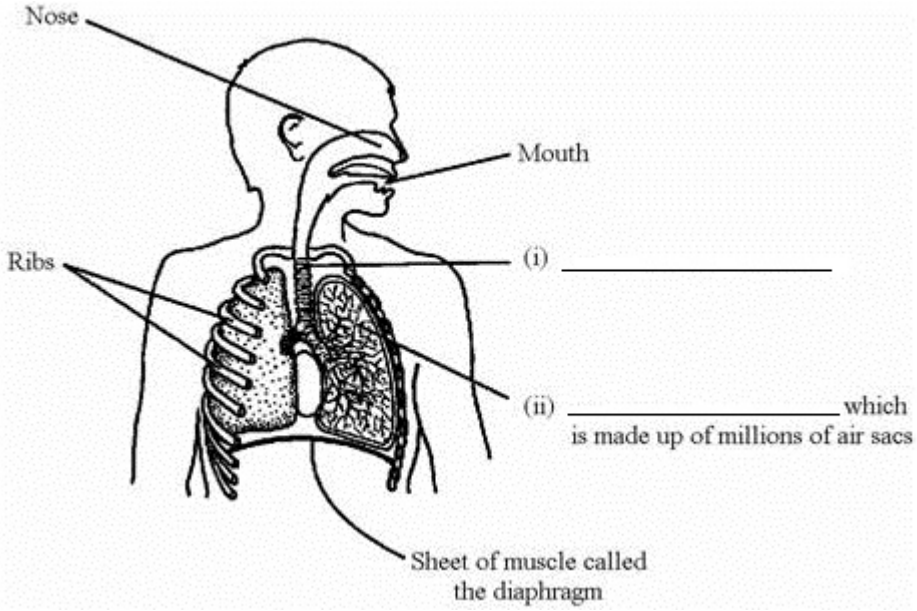
(Total 6 marks)

Q31.

The diagram shows the human breathing system.

(a) Complete the labels (i) and (ii).

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(2)

(b) Complete the following sentence.

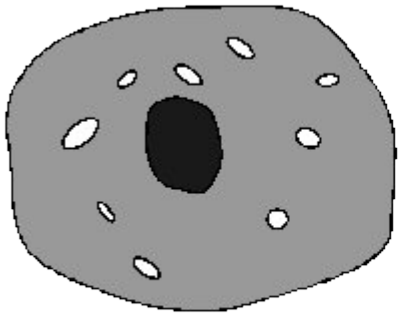
When we breathe out, the mixture of gases which leaves the air sacs contains **more** _____ and **less** _____ than the mixture of gases which enters the air sacs.

(2)

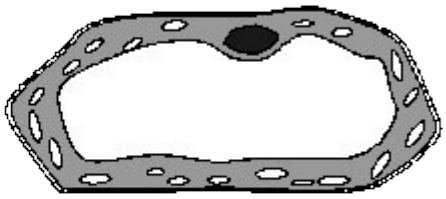
(Total 4 marks)

Q32.

The diagrams show a cheek cell from a human and a leaf cell from a plant.



Cheek cell



Leaf cell

(a) The two cells have a number of parts in common.

(i) On the cheek cell, label **three** of these parts which both cells have.

(3)

(ii) In the table, write the names of the **three** parts you have labelled above and describe the main function of each part.

Part	Function

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_____	
_____	
_____	

(3)

(b) Blood contains white cells and red cells. State the function of each type of cell in the blood.

White cells _____

_____

Red cells _____

_____

(2)

(Total 8 marks)

Q33.

(a) (i) Complete the word equation for the process of aerobic respiration.

Glucose + _____ → carbon dioxide + water

(1)

(ii) Which organ removes carbon dioxide from your body?

_____

(1)

(b) Use names from the box to complete the **two** spaces in the passage.

carbon dioxide	lactic acid	nitrogen	oxygen	water

Anaerobic respiration can occur when an athlete does vigorous exercise.

This is because there is not enough _____ in the body.

The product of anaerobic respiration is _____ .

(2)

(Total 4 marks)

Q34.

Blood contains plasma, platelets, red cells and white cells. Each has one or more important functions.

In the table below draw a line from each part to its function.

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One part has two functions. Draw lines from this part to both functions.

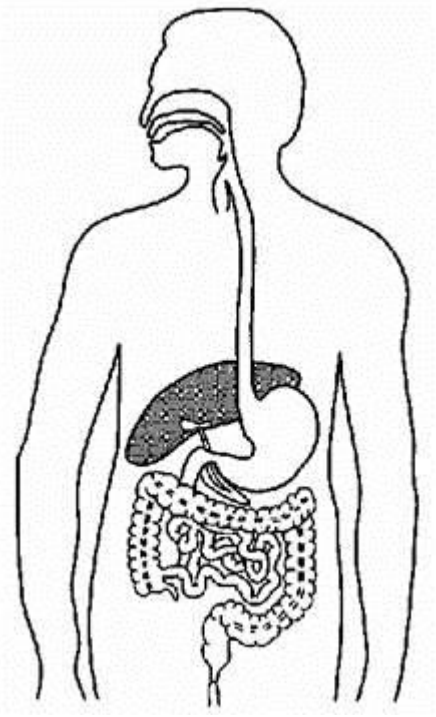
Name of part of blood	Function of part of blood
red cell	fights bacteria
platelet	carries dissolved hormones
plasma	carries dissolved urea
white cell	transports oxygen around the body
	helps blood to clot

(Total 5 marks)

Q35.

The diagram shows the digestive system.

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(a) Complete the following sentences about digestive enzymes.

(i) Amylase works in the _____ where it is involved in the digestion of _____ to _____ .

(3)

(ii) Lipase works in the _____ where it is involved in the digestion of _____ to _____ .

(3)

(b) Which gland produces:

(i) amylase;

_____

(1)

(ii) lipase?

_____

(1)

(Total 8 marks)

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