Resources available from kickstart tutors

Student number

Name

Date

Attempt/Time taken

GCSE
BIOLOGY

Topic Paper: 2.2 - 2.3 Plant and animal tissues, organs and systems
Part 1

Time allowed: 35 minutes

Materials
For this paper you must have:
- the Periodic Table/Data Sheet, provided as an insert (enclosed)
- a ruler with millimetre measurements
- a calculator, which you are expected to use where appropriate.

Instructions
- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- All working must be shown.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information
- The Periodic Table/Data Sheet is provided as in insert.
- You are reminded of the need for good English and clear presentation in your answers.
- When answering questions you need to make sure that your answer:
  - is clear, logical, sensibly structured
  - fully meets the requirements of the question
  - shows that each separate point or step supports the overall answer.

29 Marks

Q1. Blood is part of the circulatory system.

(a) (i) Give **one** function of white blood cells.

.....

.....

(1)

(ii) Which of the following is a feature of platelets?

Tick (✓) **one** box.

They have a nucleus. ☐

They contain haemoglobin. ☐

They are small fragments of cells. ☐

(1)

(b) Urea is transported by the blood plasma from where it is made to where the urea is excreted.

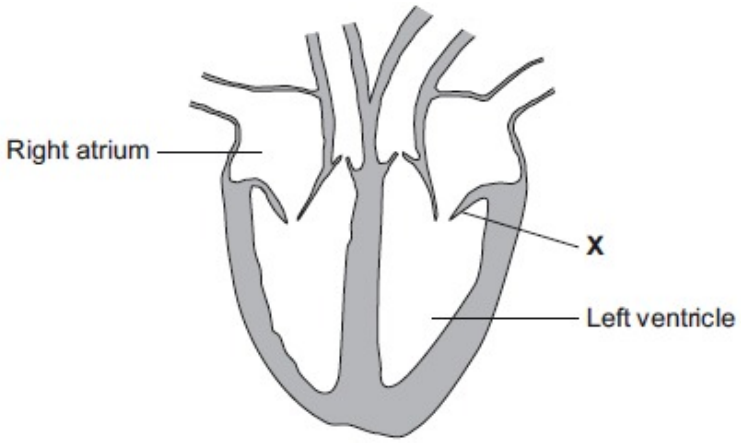
Complete the following sentence.

Blood plasma carries urea from where it is made in the .....

to the ..... where the urea is removed from the blood.

(2)

(c) The illustration shows a section through the human heart.



Structure **X** is a valve. If valve **X** stops working, it may need to be replaced.

A scientist is designing a new heart valve. The scientist knows that the valve must be the correct size to fit in the heart.

Suggest **two** other factors the scientist needs to consider so that the newly designed valve works effectively in the heart.

.....

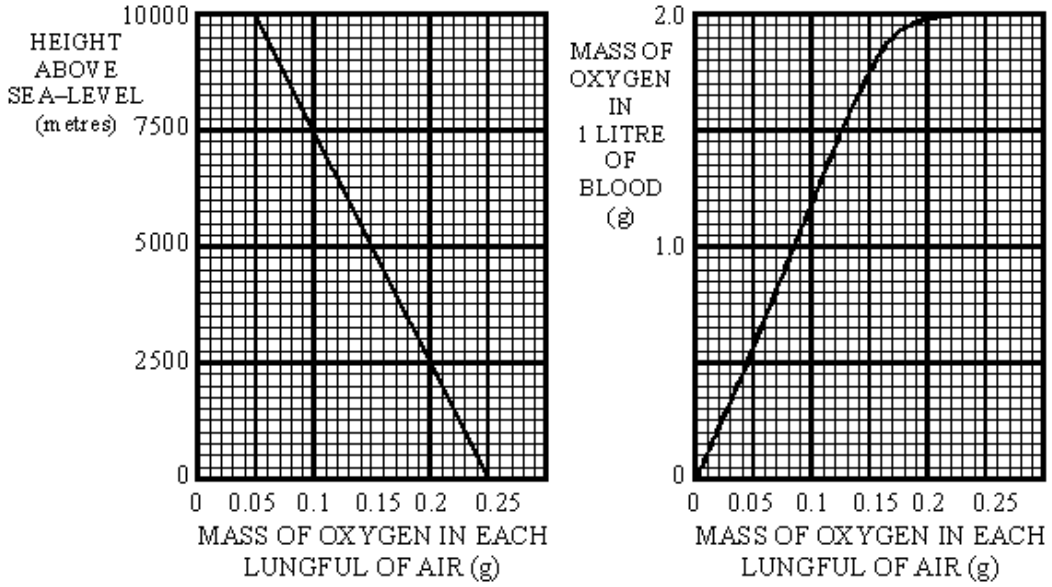
.....

.....

.....

(2)
(Total 6 marks)

Q2. Two balloonists decide to go up to 5000 metres. At this level the air is less dense, so the mass of oxygen in each lungful of air they breathe is less than at sea-level.



Describe, in as much detail as you can, how the mass of oxygen in the balloonists' blood changes as they go up from sea-level to 5000 metres.

.....

.....

.....

.....

.....

.....

(Total 4 marks)

Q3.

As they go higher up a mountain, mountaineers take less oxygen into their bodies with each breath, as shown in the table below.

		MILLIGRAMS OF OXYGEN INTO **BLOOD** WITH EACH NORMAL BREATH	
HEIGHT	MILLIGRAMS OF OXYGEN TAKEN INTO **LUNGS** WITH EACH NORMAL BREATH	AT FIRST	AFTER STAYING AT 4500 METRES FOR TWO WEEKS
sea-level	300	60	90
1500 metres	250	50	
3000 metres	200	40	
4500 metres	150	30	45

(a) (i) How does the amount of oxygen taken into the blood with each breath vary with the amount of oxygen breathed into the lungs with each breath?

.....

(2)

(ii) Use the idea of diffusion to explain why the amount of oxygen taken into the blood varies in this way.

.....

.....

(1)

(b) (i) How does staying at an altitude of 4500 metres for two weeks affect the mountaineers?

.....

(2)

(ii) Suggest an explanation for this.

.....

.....

(1)

(iii) Add the two missing figures to the right-hand column of the table.

(2)

(Total 8 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.

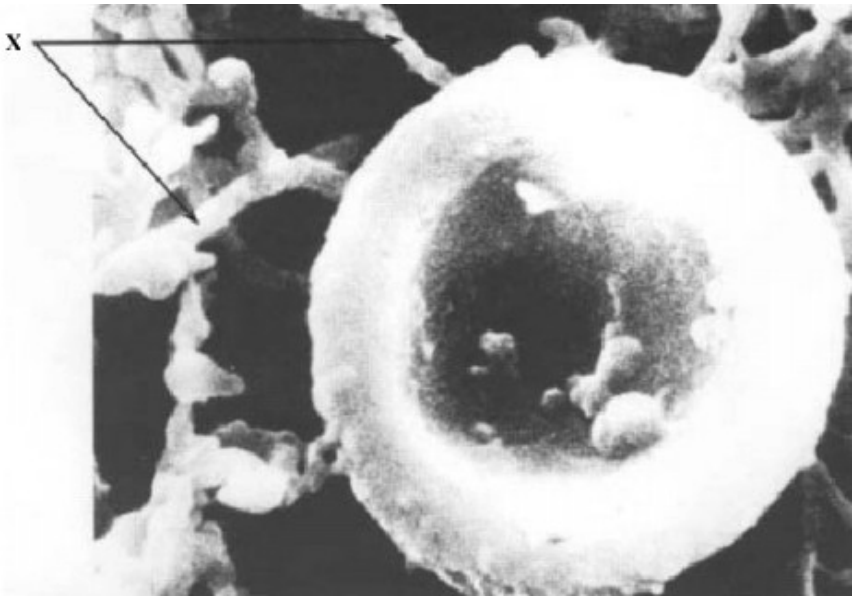
.....

.....

(1)

(Total 4 marks)

Q5. 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.

.....

.....

.....

.....

.....

.....

(3)

(Total 7 marks)