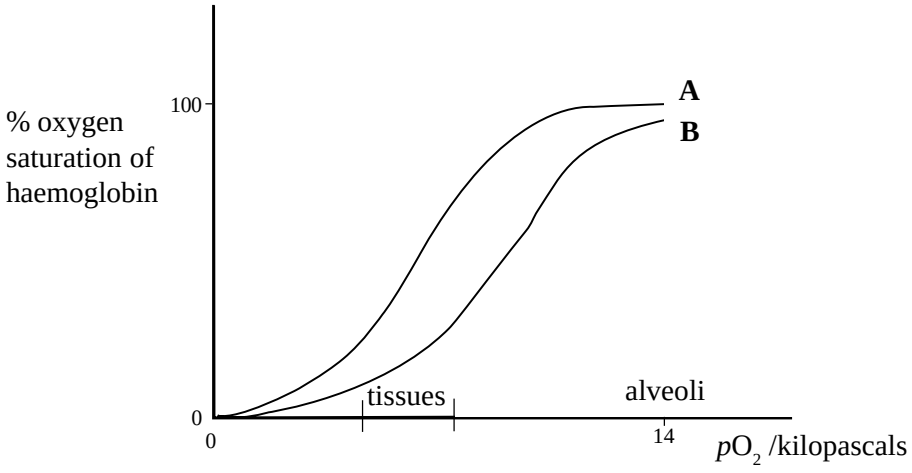
Do not write in margin

The figure shows the oxygen saturation curves for haemoglobin under different conditions. Curve A represents normal resting conditions.



(a) Suggest two factors which could be responsible for the shift of the curve from A to B.

1. .....

2. ..... [2]

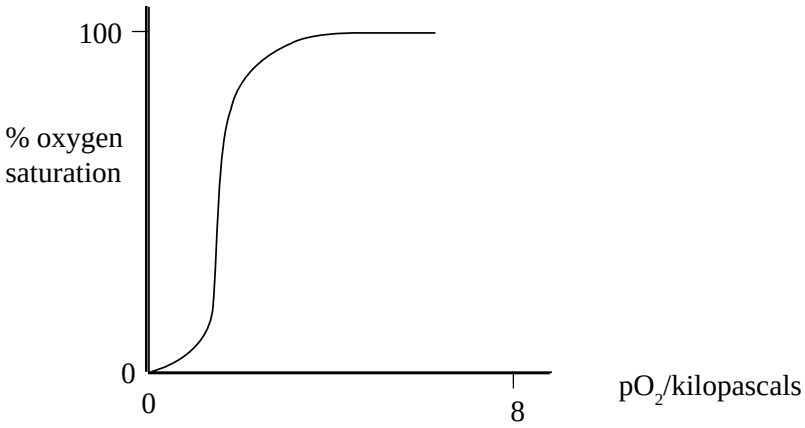
(b) Explain the physiological significance of the shift from A to B on the behaviour of haemoglobin in the tissues and alveoli.

.....

.....

..... [3]

(c) The figure below shows the oxygen dissociation curve of the haemoglobin of a mud dwelling worm. Explain the physiological advantage of this curve.



.....

.....

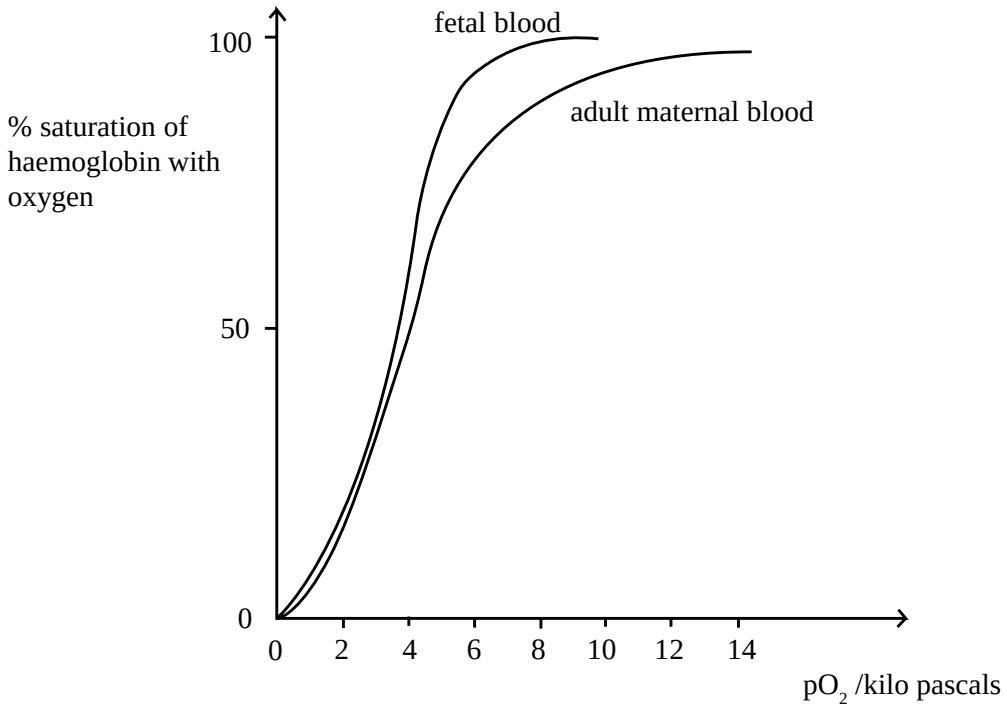
..... [2]

TOTAL / 7

TRANSPORT IN ANIMALS

QUESTIONSHEET 2

The figure below shows the oxygen dissociation curves of fetal and adult maternal human blood.



(a) Explain why the fetal oxygen dissociation curve lies to the left of the adult curve.

.....

.....

.....

.....

[3]

(b) (i) Describe two other adaptations that enable oxygen to be transported rapidly from maternal blood into the fetal tissues.

1: .....

..... [1]

2: .....

..... [1]

(ii) Shortly after birth fetal haemoglobin is broken down and replaced by adult haemoglobin. Why is fetal haemoglobin unsuitable for use after birth?

.....

.....

[2]

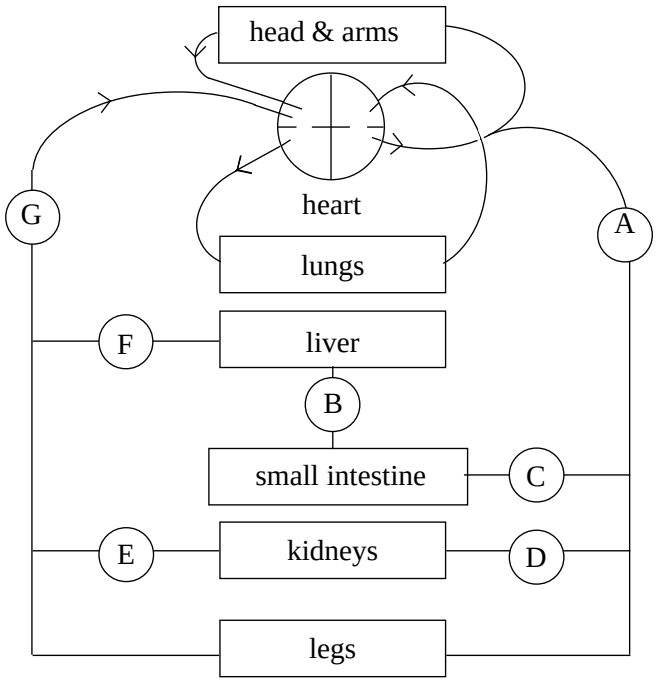
TOTAL / 7

TRANSPORT IN ANIMALS

QUESTIONSHEET 3

Do not write in margin

The diagram represents the human circulatory system.



(a) Name vessels A to G.

A: ..... B: ..... C: .....

D: ..... E: ..... F: .....

G: ..... [7]

(b) What important differences, other than oxygen or carbon dioxide content, would be present in the composition of the blood in the following pairs of vessels?

(i) B and C after a meal: .....

.....

..... [2]

(ii) B and F after a meal: .....

.....

..... [2]

(iii) D and E: .....

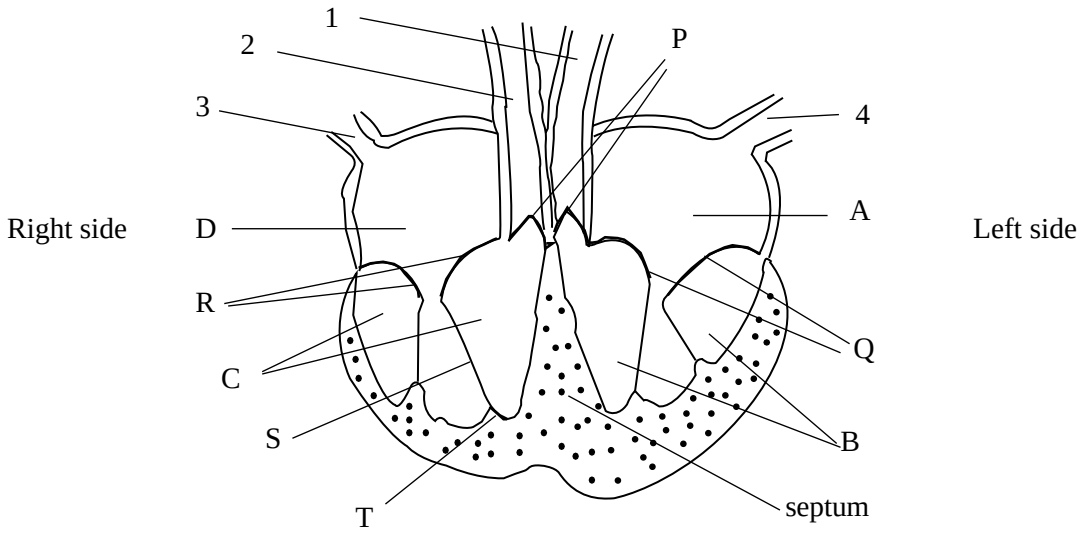
.....

..... [2]

TOTAL / 13

Do not write in margin

The diagram below shows a human heart in ventral view, in a simplified form.



(a) Name chambers A, B, C and D.

A: ..... B: .....

C: ..... D: .....

[4]

(b) Name vessels 1 to 4 and state whether each one is carrying blood to or from the heart.

1: ..... 2: .....

3: ..... 4: .....

[4]

(c) (i) State the functions of valves R and Q.

.....

.....

[2]

(ii) State the functions of valves P.

.....

.....

[2]

(iii) What do S and T do?

.....

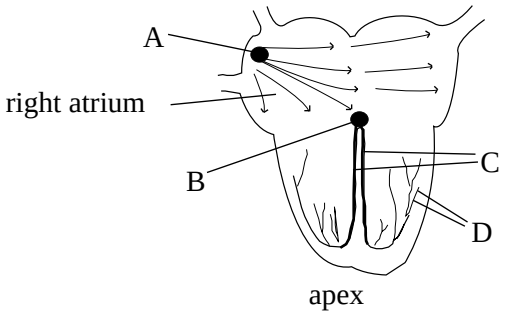
.....

[2]

TOTAL / 14

QUESTIONSHEET 5

The diagram below shows the conducting system of the heart in a simplified form.



(a) (i) The heart muscle is said to be 'myogenic'. What does this mean?

..... [1]

(ii) Name components A to D of the conducting system.

A: ..... B: .....

C: ..... D: ..... [4]

(b) With reference to the parts of the conducting system of the heart, explain why:

(i) the right atrium contracts before the left atrium.

.....

..... [2]

(ii) the ventricles contract after the atria.

.....

..... [2]

(iii) the ventricles contract from the apex upwards.

..... [1]

(c) How is the frequency and force of the heartbeat modified to meet the body's needs?

.....

.....

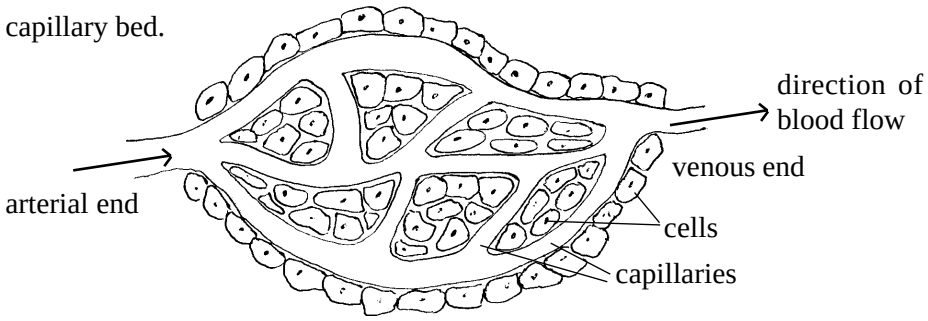
.....

[2]

TOTAL / 12

Do not write in margin

The diagram shows a capillary bed.



(a) Some components of the blood flowing through the capillaries move out into the spaces between the cells.

(i) Name two blood components that move out of the capillaries.

1: ..... 2: ..... [2]

(ii) Name two components of the blood that do not move out through the capillary walls.

1: ..... 2: ..... [2]

(iii) Name four transported substances that would move out of the blood into the tissues.

1: ..... 2: .....

1: ..... 2: .....

[4]

(b) (i) Distinguish lymph from tissue fluid.

.....

.....

[2]

(ii) Outline the process by which lymph is formed.

.....

.....

.....

.....

[3]

(iii) Outline the processes by which lymph is returned to the blood.

.....

.....

.....

.....

[3]

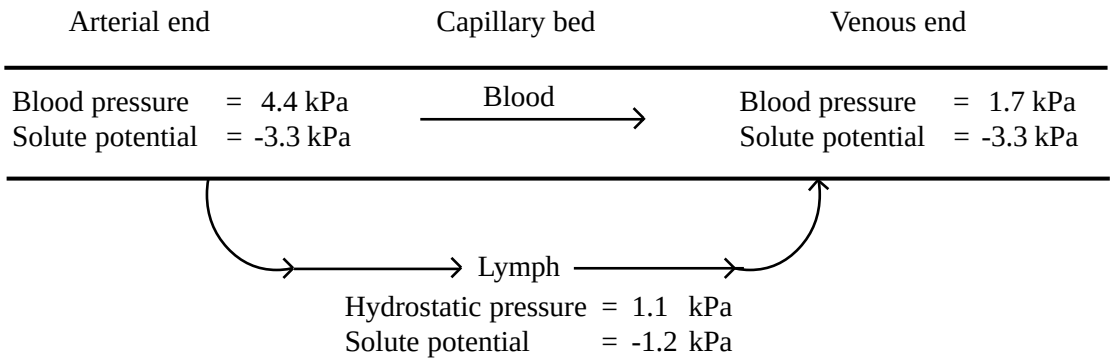
TOTAL / 16

TRANSPORT IN ANIMALS

QUESTIONSHEET 7

Do not write in margin

The diagram below shows some of the pressures which are important in the formation and uptake of lymph in a capillary bed.



(a) (i) Explain how fluid leaves the capillary at the arterial end.

.....

.....

.....

.....

[3]

(ii) Explain how fluid is returned to the capillary at the venous end.

.....

.....

.....

.....

[3]

(iii) Why is the solute potential of the blood more negative than the solute potential of the lymph?

.....

.....

[1]

(b) In kidney disease (nephritis) plasma proteins are lost into the urine. How might this affect the circulation of lymph?

.....

.....

.....

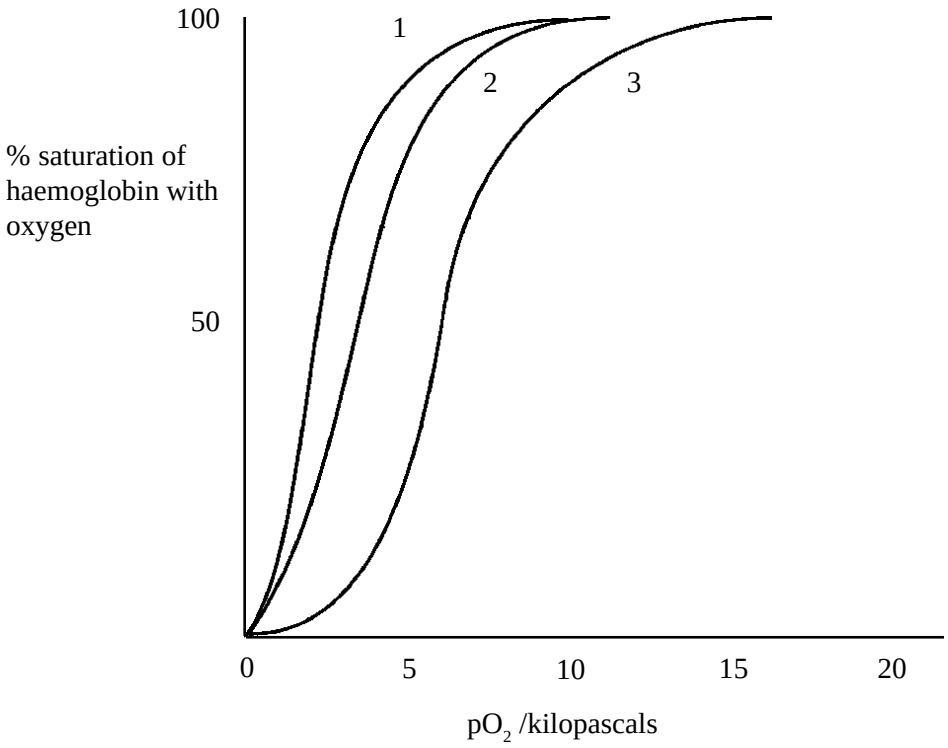
[3]

TOTAL / 10

TRANSPORT IN ANIMALS

QUESTIONSHEET 8

The graph below shows the oxygen dissociation curves for normal haemoglobin, fetal haemoglobin and myoglobin.



(a) Identify each of the three curves:

Curve 1. .....

Curve 2. .....

Curve 3. .....

[3]

(b) Outline the significance of the position of:

(i) the fetal curve.

.....

.....

.....

[2]

(ii) the curve for myoglobin.

.....

.....

.....

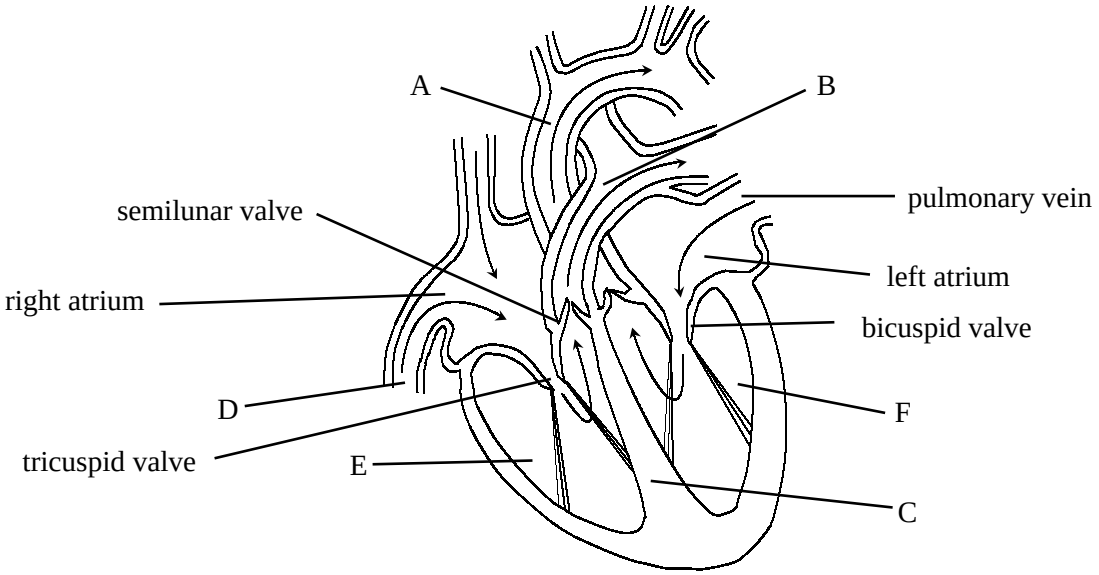
[2]

TOTAL / 7

TRANSPORT IN ANIMALS

QUESTIONSHEET 9

The diagram shows a vertical section through a human heart.



(a) Identify features A - F.

A: .....

B: .....

C: .....

D: .....

E: .....

F: .....

[6]

(b) Starting with the heart full of blood outline the stages of the cardiac cycle.

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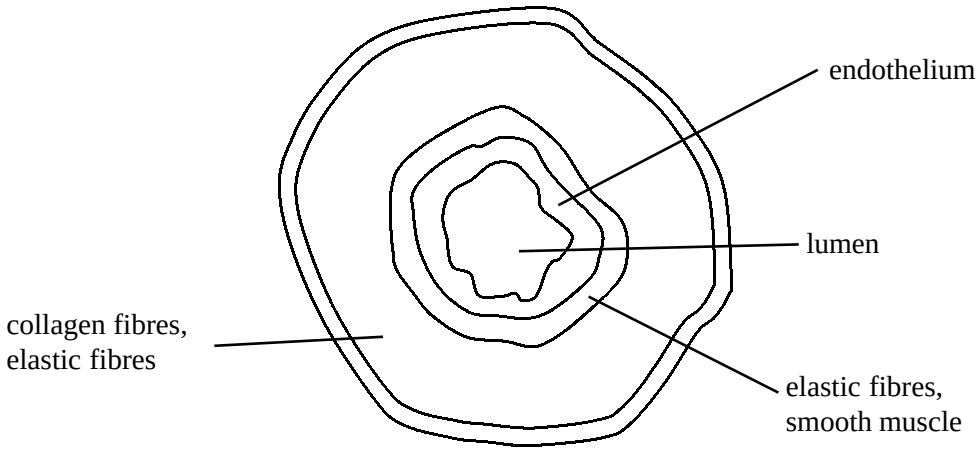
[5]

TOTAL / 11

Do not write in margin

The diagram shows a transverse section through an artery.



(a) Using the information in the diagram explain how arteries are adapted for their function.

.....

.....

.....

[2]

(b) Distinguish between each of the following:

(i) blood and tissue fluid.

.....

.....

[2]

(ii) maternal and fetal haemoglobin.

.....

.....

[2]

TOTAL / 6

TRANSPORT IN ANIMALS

QUESTIONSHEET 11

Do not write in margin

(a) How is transport of metabolites achieved in a protoctistan, such as Amoeba?

.....

.....

..... [3]

(b) The table below shows certain chemicals that are transported by the blood. Complete the table by writing appropriate origins and destinations selected from list A in the empty boxes. Some chemicals may have more than one item from the list.

Chemical	Origin to destination
Urea	
Insulin	
Alcohol	
ADH	
glucose	
FSH	

List A:
kidney to liver
anterior pituitary to kidney
stomach to liver
liver to kidney
small intestine to liver
posterior pituitary to kidney
pancreas to liver
liver to all other organs
anterior pituitary to ovaries

[9]

(c) How do neutrophils(phagocytes) pass from their place of formation to a site of infection?

.....

.....

.....

.....

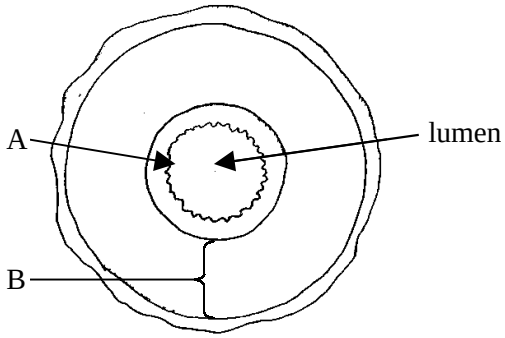
[3]

TOTAL / 15

TRANSPORT IN ANIMALS

QUESTIONSHEET 12

The drawing below shows the structure of an artery as seen in transverse section.



(a) (i) Identify <u>tissues</u> present in layers A and B.

A: .....

B: ..... [3]

(ii) Describe how the structure of an artery is suited to its functions.

.....

.....

.....

..... [3]

(b) (i) How does the structure of a vein differ from that of an artery?

.....

.....

.....

..... [4]

(ii) Suggest why veins differ in structure to arteries.

.....

.....

.....

..... [3]

(c) Describe the structure of a capillary.

.....

.....

.....

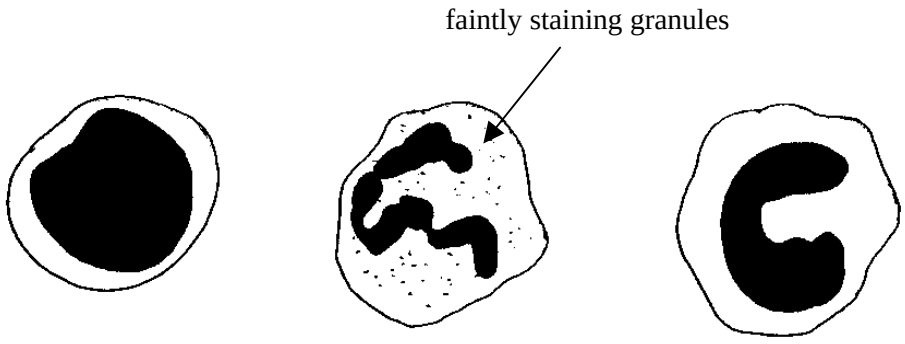
..... [3]

TOTAL / 16

TRANSPORT IN ANIMALS

QUESTIONSHEET 13

The drawings below show the structure of three different types of white blood cell.



Cell A Cell B Cell C

(a) (i) Identify cells A, B and C.

A: ..... B: ..... C: ..... [3]

(ii) The table below indicates some of the functions of white cells. Complete the table by writing the names of the relevant white cell, or cells in the appropriate boxes.

Function	White cells
production of antibodies	
phagocytosis of bacteria	
secretion of histamine, serotonin, heparin	
phagocytosis of antigen-antibody debris	

[5]

(b) Lymphocytes are produced in lymph nodes but many operate in the tissues at the sites of infection. Suggest how the lymphocytes get to the sites of infection from the lymph nodes.

.....

.....

.....

..... [3]

TOTAL / 11

Do not write in margin

The table below shows the results of a survey of red cell counts in similar human populations living at different altitudes above sea level. 100 individuals were included in each sample.

Altitude above sea level/meters	Mean red cell count/cells dm^{-3} blood
0	5.0×10^{12}
1000	5.3×10^{12}
2000	5.5×10^{12}
3000	5.7×10^{12}

(a) (i) Suggest why higher red cell counts occurred as altitude increased.

.....

.....

.....

..... [3]

(ii) State and explain three precautions which would be necessary when choosing the samples of 100 people

1: .....

.....

2: .....

.....

3: .....

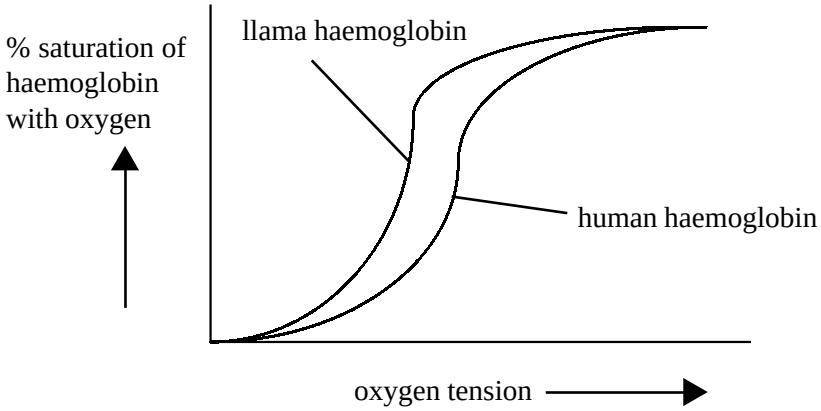
..... [6]

TOTAL / 9

TRANSPORT IN ANIMALS

QUESTIONSHEET 15

The graph below shows the haemoglobin oxygen dissociation curves of a human and a llama (a relative of the camel native to mountainous regions of South America).



(a) Suggest why the llama haemoglobin oxygen dissociation curve lies to the left of the human curve.

.....

.....

.....

..... [3]

(b) Red cell production is regulated by an enzyme, renal erythropoietic factor, which is secreted by the kidneys especially when they are deficient in oxygen. The enzyme acts on a plasma protein to convert it to the hormone erythropoietin. This hormone increases the rate of mitosis of the erythrocyte stem cells in the red bone marrow.

Use this information, and your own knowledge to explain why:

(i) athletes who are going to race in a high altitude region go and stay there a few weeks before the event.

.....

.....

.....

..... [3]

(ii) renal dialysis patients are often severely anaemic.

.....

.....

..... [2]

(iii) patients with liver disease may also be anaemic.

.....

.....

..... [2]

TOTAL / 10