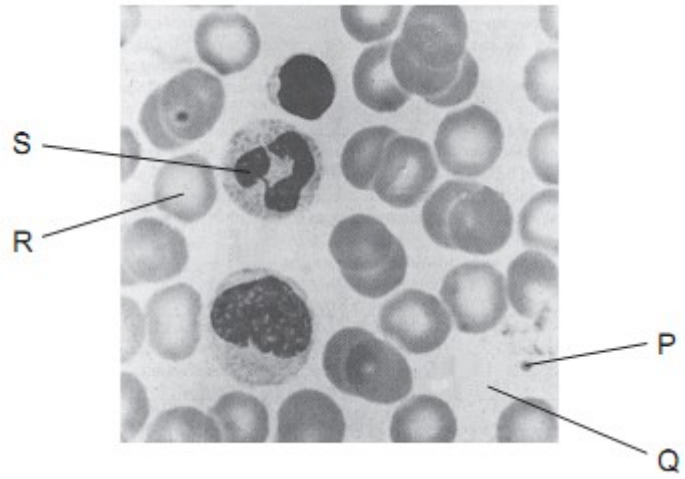
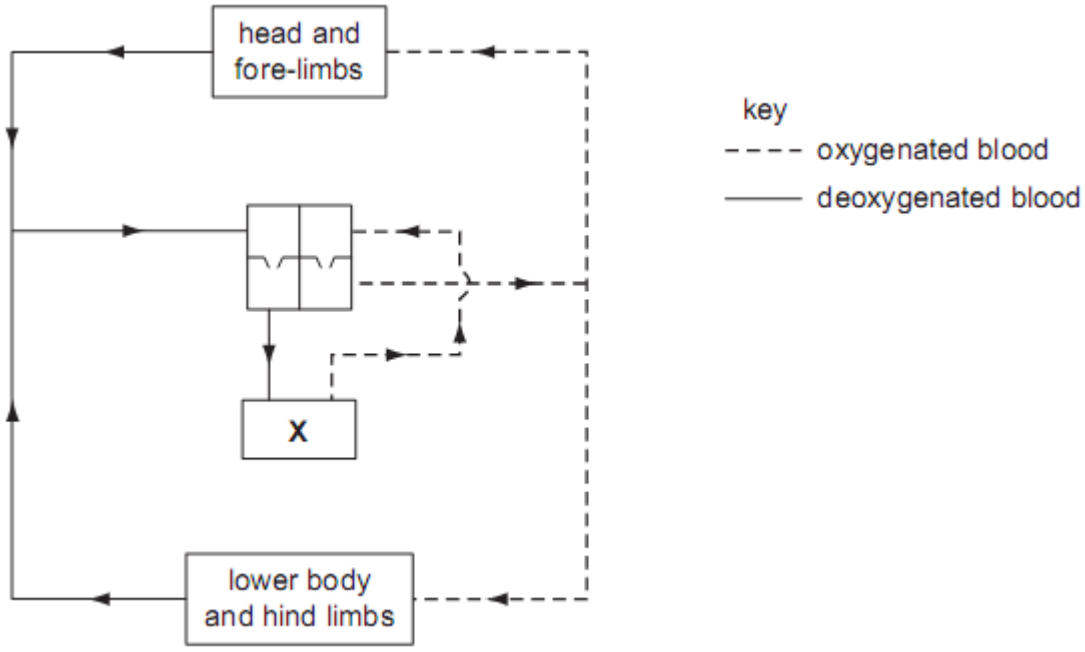
1 The diagram shows blood as seen under a microscope.



Which identifies parts P, Q, R and S of the blood?

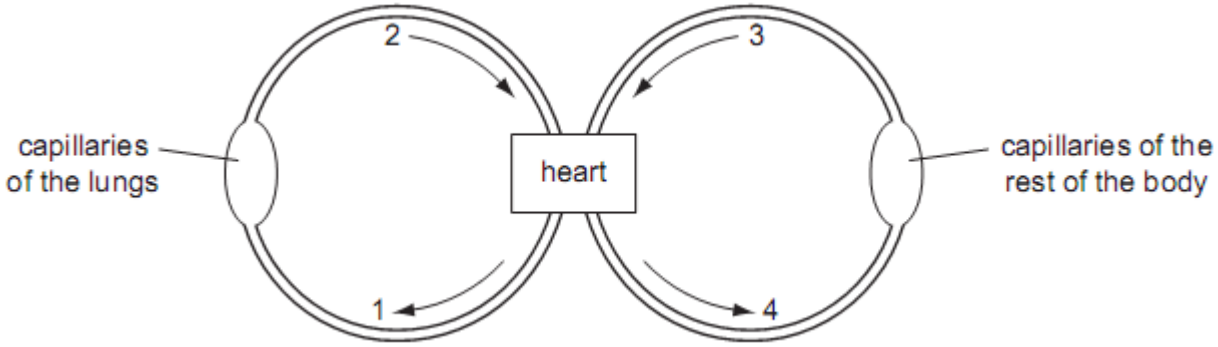
	plasma	platelet	white blood cell	red blood cell
A	P	Q	R	S
B	Q	P	S	R
C	R	S	Q	P
D	S	R	P	Q

2 The plan shows the blood system of a mammal.



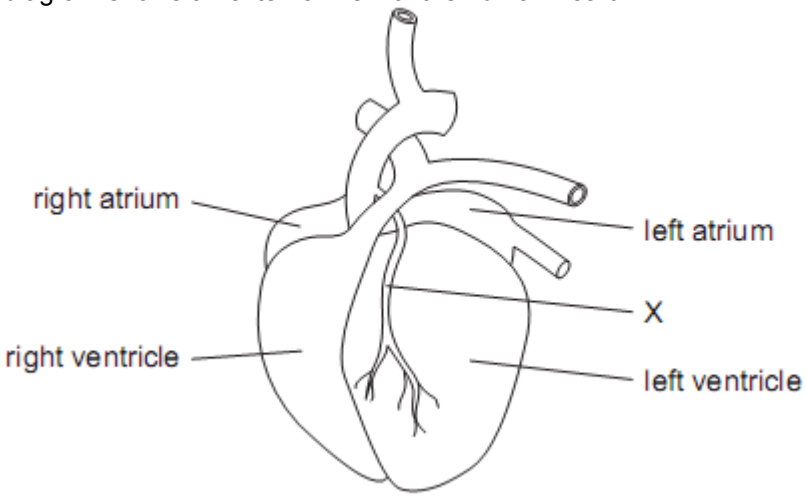
What does the part labelled X represent?
A heart
B kidneys
C liver
D lungs

3 The diagram shows a double circulatory system.



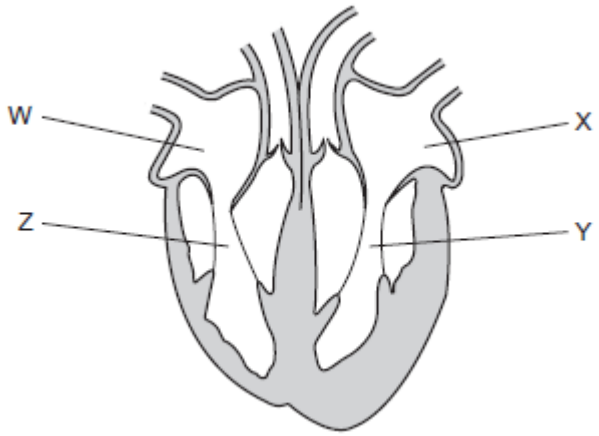
Which two vessels carry blood at the highest pressure?
A 1 and 2
B 1 and 4
C 2 and 3
D 2 and 4

4 The diagram shows an external view of the human heart.



What is the name of the blood vessel labelled X?
A coronary artery
B hepatic artery
C pulmonary artery
D renal artery

5 The diagram shows the human heart.

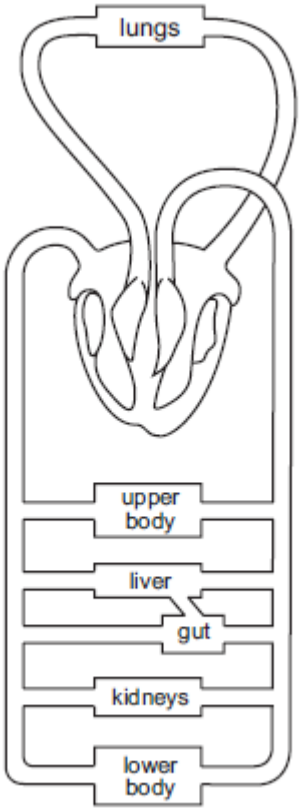


Which two chambers contract at the same time?
A W and X
B W and Z
C X and Z
D X and Y

6 What describes the aortic (semi-lunar) and bicuspid (mitral) heart valves when the left ventricle is relaxing?

	aortic valve	bicuspid valve
A	closed	closed
B	closed	open
C	open	closed
D	open	open

7 The diagram shows the blood circulatory system of a human.

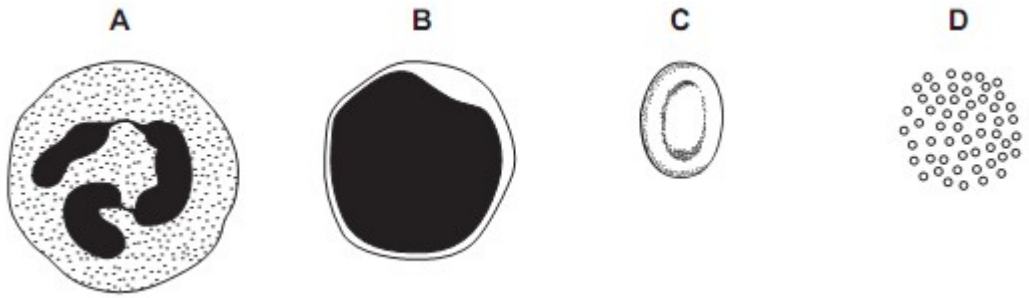


How many times does the blood pass through the heart on its way from the kidneys to the aorta?
A one
B two
C four
D more than four

8 Dietary fibre passes through several structures after leaving the stomach.
In which order does the dietary fibre pass through these structures?
A duodenum → ileum → colon → rectum
B duodenum → ileum → rectum → colon
C ileum → duodenum → colon → rectum
D ileum → duodenum → rectum → colon

25 Which group contains substances that are all carried in the blood?
A amino acids, carbon dioxide and cellulose
B glucose, glycogen and lactic acid
C oestrogen, oxygen and starch
D salts, testosterone and urea

9 The diagram shows some parts from the blood of a mammal.
Which part would contain the breakdown products of bacterial cells?



10 Which describes the structure and function of a red blood cell?

	structure	function
A	cell contents are dead	transport of water
B	has a nucleus	produces antibodies
C	has cilia	moves particles in the respiratory tract
D	has no nucleus	transport of substances

11 Fig. 5.1 shows a section through the heart.

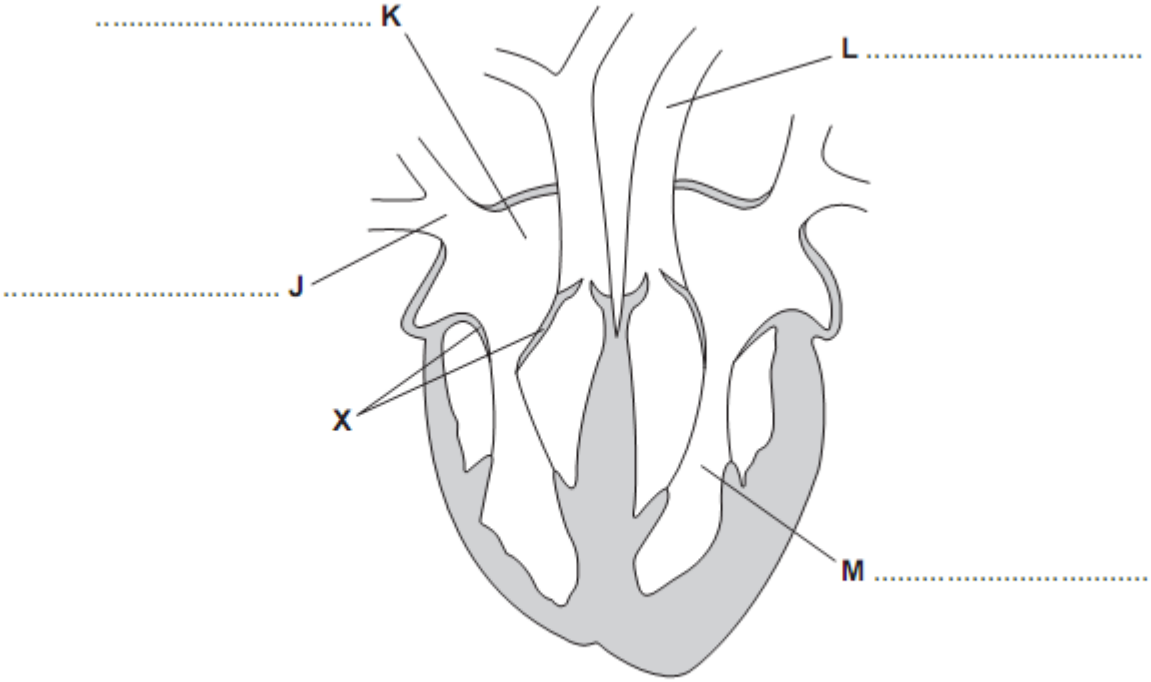


Fig. 5.1

(a) On Fig. 5.1,
(i) label parts J, K, L and M, [4]
(ii) shade in the blood vessels that carry deoxygenated blood, [1]
(iii) draw a series of arrows to show the direction of blood flow through the heart from the lungs to the rest of the body. [1]
(b) Describe the role of valve X.
…….. [2]
[Total: 8]

12 (a) Mammals have a double circulatory system.
Explain what is meant by a double circulatory system.[1]
Fig. 4.1 shows sections of three blood vessels: an artery, a capillary and a vein.

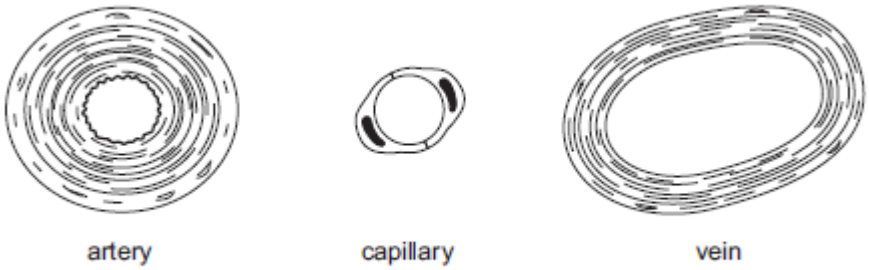


Fig. 4.1

(b) State one function for each of the blood vessels shown in Fig. 4.1.
artery:
capillary:
vein: [3]
(c) Explain how the structure of the artery shown in Fig. 4.1 is adapted to its function.[4]
(d) Explain how valves help the transport of blood in veins.[2]
[Total: 10]

13 Heart surgeons may stop the heart beating during operations. While this happens blood is pumped through a heart-lung machine that oxygenates the blood.
Fig. 1.1 is a diagram showing a heart-lung machine in use.

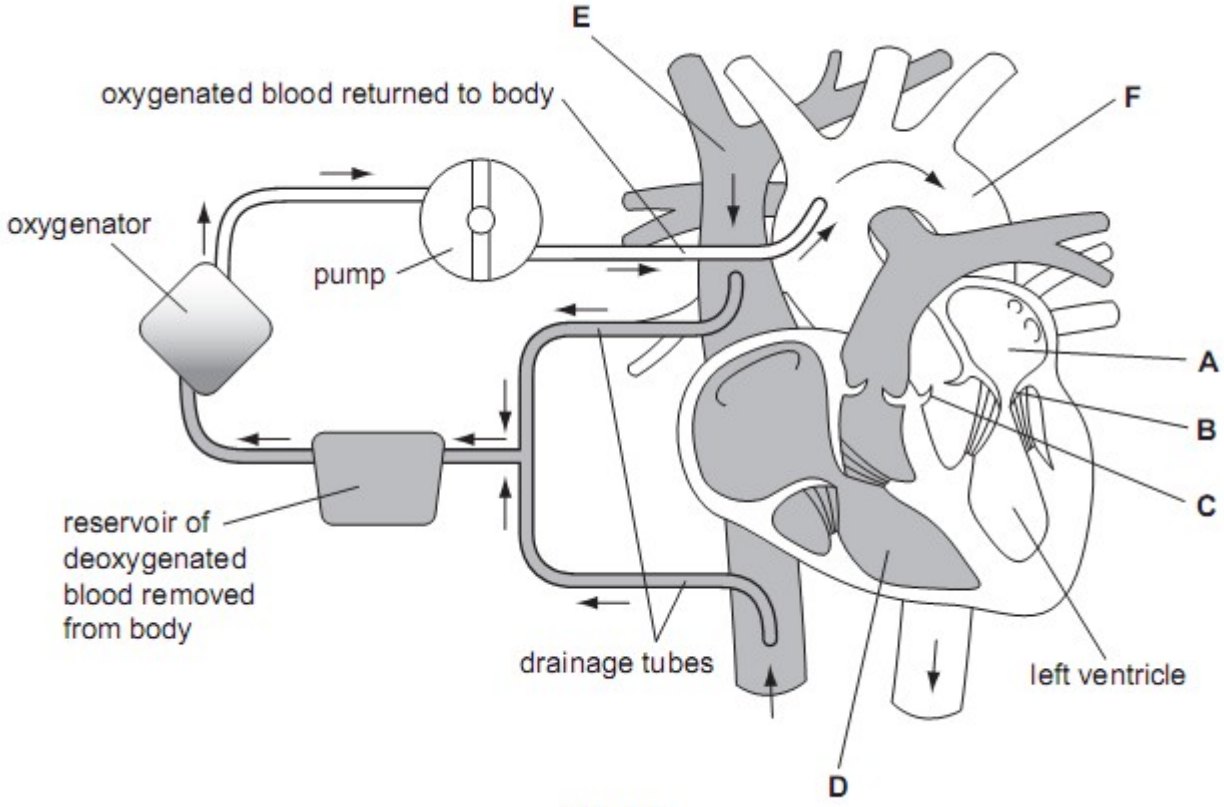


Fig. 1.1

(a) Name the structures labelled A to D.
A
B
C
D [4]
(b) Name the blood vessels E and F.
E
F [2]
(c) The heart-lung machine is used so that surgeons can operate on the arteries supplying heart muscle. These arteries may be diseased.
Name these arteries and explain how they may become diseased.
name of arteries

explanation [3]

(d) Suggest why a patient is put on a heart-lung machine during such an operation. [2]

Humans have a double circulation system. There is a low pressure circulation and a high pressure circulation.

(e) Explain how the structure of the heart enables it to pump blood into two circulations at different pressures. [4]

[Total: 15]

14 Proteins in the blood are involved in protection of the body.

Three proteins found in the blood are

- antibodies
- thrombin
- fibrinogen

(a) (i) Name the type of white blood cell that produces antibodies. [1]

(ii) Outline how antibodies protect the body. [2]

(b) Thrombin is an enzyme that catalyses the reaction:

fibrinogen ⟶ fibrin

(i) State when this reaction occurs. [1]

(ii) Explain how fibrin protects the body. [3]

An investigation was carried out to determine the effect of different temperatures on the activity of thrombin. The results are shown in Fig. 4.1.

(c) (i) Explain why thrombin functions slowly at 5°C and does not function at all at 70 °C.

5°C

70°C [3]

(ii) Suggest how the activity of thrombin was determined. [1]

(iii) State two conditions that would have been kept constant during the investigation.

1

2 [2]

[Total: 13]

15 As the heart pumps blood around the human body, a pulse may be felt at certain sites, such as the one shown in Fig. 2.1.

(a) (i) Label on Fig. 2.1, one other site where a pulse may be felt.

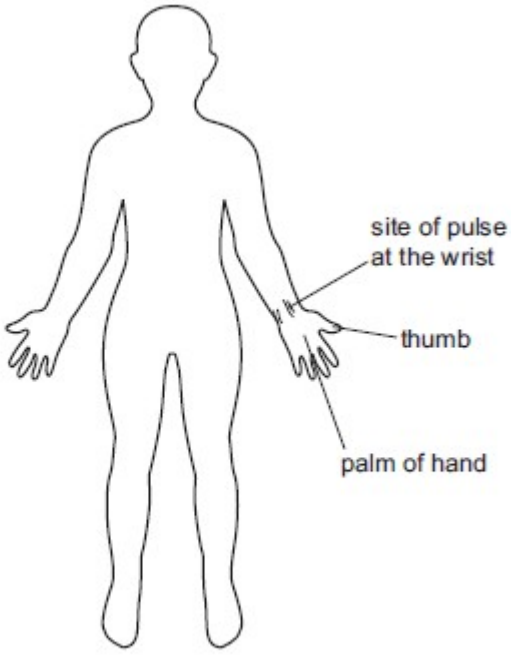


Fig. 2.1

(ii) Suggest why it is possible to feel the pulse at these sites.[2]

(b) A student counted the number of pulses felt in 15 seconds at the site shown on their wrist. The student did this three times.

The results are recorded in Table 2.1.

Table 2.1

	pulses per 15 seconds	pulses per minute
1st count	18	
2nd count	19	
3rd count	17	
mean		

(i) Complete the righthand column in Table 2.1 to show the number of pulses per minute for each count and the mean pulses per minute. [2]
(ii) Explain why it is advisable to repeat readings at least three times.[1]
(iii) State two factors that may affect heart rate. For each factor explain its effect on heart rate.

factor	explanation
1	…… …… ……
2	…… …… ……

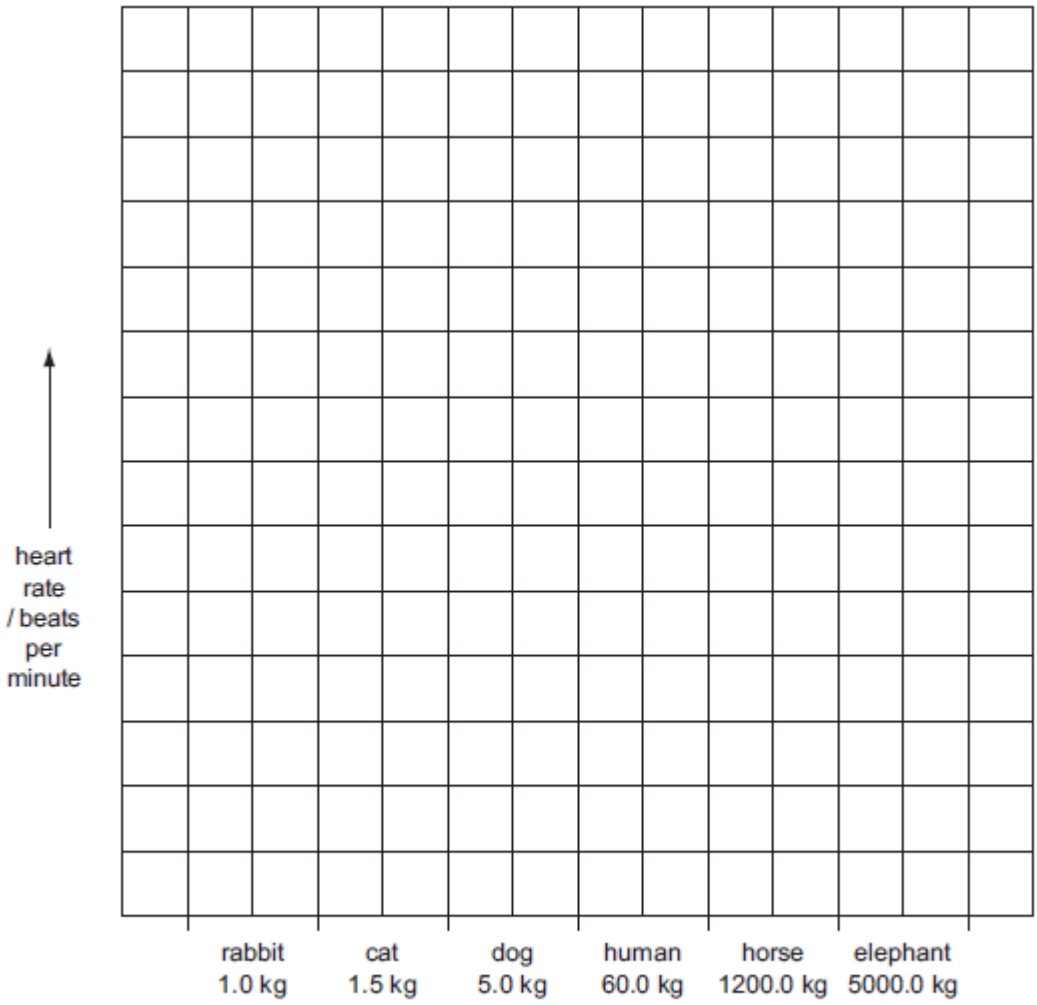
[4]

(c) Body mass and heart rates for a number of different mammals are shown in Table 2.2.

Table 2.2

mammal	body mass / kg	heart rate / beats per minute
rabbit	1.0	200
cat	1.5	150
dog	5.0	90
human	60.0	
horse	1200.0	44
elephant	5000.0	30

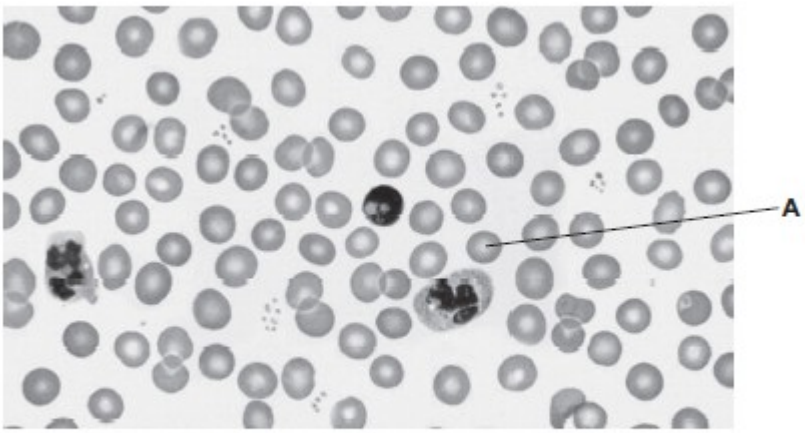
Copy the mean pulses per minute from Table 2.1 into Table 2.2.
(i) Plot the data in a bar chart to show heart rate for all six mammals.



[5]

(ii) Describe the general trend shown by this data plotted on the bar chart.[1]
(d) An elephant can live for 70 years, a cat for 15 years and a rabbit for 9 years.
Suggest how heart rate and body mass might affect life expectancy of mammals.[1]
[Total: 17]

16 Fig. 3.1 shows a photomicrograph of a human blood smear.



Magnification ×800

Fig. 3.1

(a) (i) On Fig. 3.1, draw label lines and name three different types of blood cell.[3]
(ii) Name two parts of the blood that can pass through the capillary walls.[2]
(b) (i) Measure the diameter of the blood cell labelled A. mm [1]

(ii) The photomicrograph has been enlarged by x 800, calculate the actual size of cell A.
show your working
actual size of cell A [2]
(iii) State the function of cell A.[1]
[Total: 9]