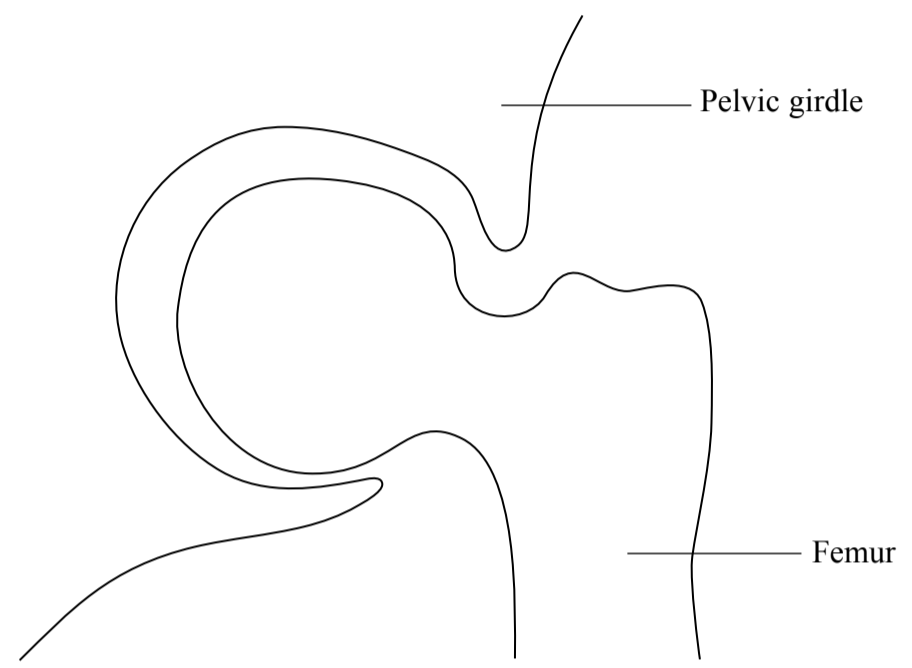


Leave blank

Answer ALL the questions.

1. The diagram below shows part of the femur and pelvic girdle at the hip joint.



(a) (i) Complete the diagram by drawing and labelling the structures between the femur and the pelvic girdle. **(4)**

(ii) Describe the amount of movement that the hip joint allows.

.....
.....
.....
.....

(2)

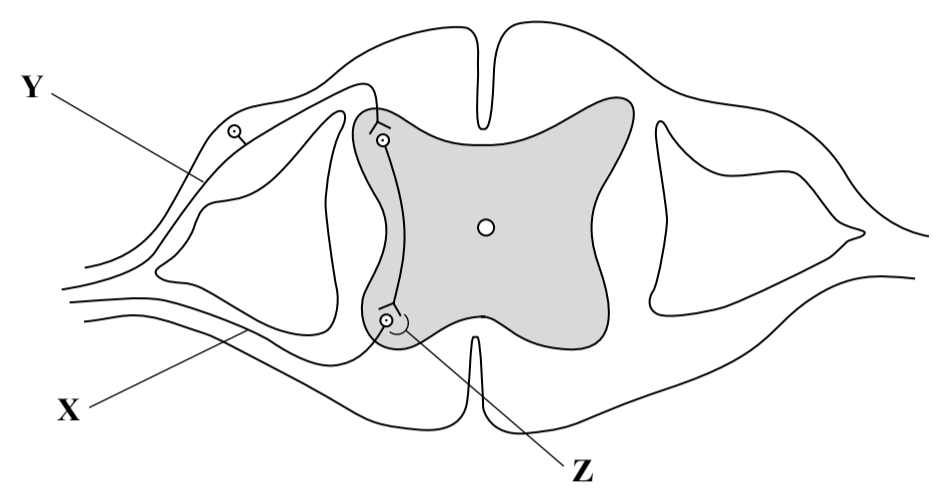


<p>(b) Sometimes, usually in older people, the hip joint needs to be replaced to allow a person to move freely.</p> <p>Suggest two properties that would have to be considered when choosing materials from which the new replacement joint should be made and give reasons for your choice.</p> <p>1</p> <p>.....</p> <p>.....</p> <p>2</p> <p>.....</p> <p>.....</p> <p style="text-align: right;">(4)</p> <p style="text-align: right;">(Total 10 marks)</p>	<p>Leave blank</p> <p>Q1</p> <table border="1"><tr><td> </td><td> </td></tr></table>		



Leave blank

2. The diagram below shows a section through the spinal cord and the neurones (nerve cells) that form a reflex arc.



(a) (i) Name the structures labelled X and Y.

X

Y

(1)

(ii) Use a series of arrows to show the direction in which a nerve impulse passes along the reflex arc.

(1)

(iii) Describe how the impulse passes from one neurone to another at Z.

.....
.....
.....
.....
.....
.....
.....
.....
.....

(4)





<p>(b) Suggest what the effect on a person might be if some damage occurred to the spinal cord in the neck region in each of the following cases.</p> <p>(i) If the spinal cord was cut through.</p> <p>.....</p> <p>(2)</p> <p>(ii) If all the nerve fibres at X were destroyed in the nerve to the arm but the rest of the spinal cord was undamaged.</p> <p>.....</p> <p>(2)</p> <p>(Total 10 marks)</p>	<p>Leave blank</p> <p>Q2</p> <table border="1"><tr><td></td><td></td></tr></table>		



Leave blank

3. The table below shows the redistribution of blood flow to various parts of the body in response to exercise.

Organ	Blood flow at rest		Blood flow during exercise	
	Volume of blood in cm ³ per min	Percentage of total blood flow (%)	Volume of blood in cm ³ per min	Percentage of total blood flow (%)
Heart muscle	190	3.3	740	3.9
Liver	1380	24.3	590	3.1
Brain	690	12.1	740	3.9
Kidneys	1050	18.4	590	3.1
Skeletal muscle	740	13.0	12 450	65.9
Skin	310	5.4	1850	9.8
Other organs	1340	23.5	1940	10.3
Total blood flow	5700	100.0	18 900	100.0

- (a) Use data from the table to answer the following questions.
- (i) Which organ of the body has the greatest volume of blood flowing through its tissues while the body is at rest?
.....
(1)
- (ii) Name **one** organ of the body in which the flow of blood through its tissues is reduced during exercise.
.....
(1)



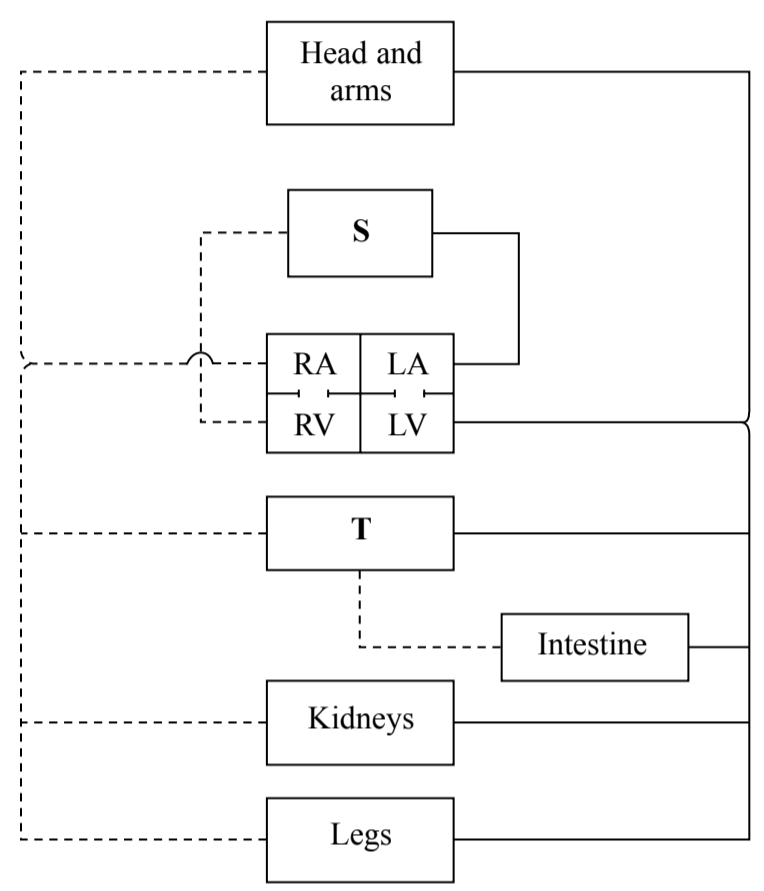
<p>(b) The table shows that the volume of blood that flows through the brain tissue rises during exercise. It also shows that the percentage of the total blood flow that passes through the brain tissue falls during exercise.</p> <p>Explain the apparent contradiction between these two observations.</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p style="text-align: right;">(2)</p> <p>(c) Suggest how the increase in the volume of blood flowing through the tissues of the skin during exercise is of value to the body.</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p style="text-align: right;">(2)</p> <p style="text-align: right;">(Total 6 marks)</p>	<p>Leave blank</p> <p>Q3</p> <input data-bbox="1612 1498 1654 1567" type="text"/>



Leave blank

4. The diagram below shows a simple plan of the circulatory system.

Key
 RA – Right atrium (auricle)
 RV – Right ventricle
 LA – Left atrium (auricle)
 LV – Left ventricle



Deoxygenated blood ----- Oxygenated blood

- (a) (i) Name the structures labelled **S** and **T**.
- S**
- T** (2)
- (ii) Use a series of arrows to show, on the diagram, the route taken by blood passing from the head and arms to the kidneys. (3)



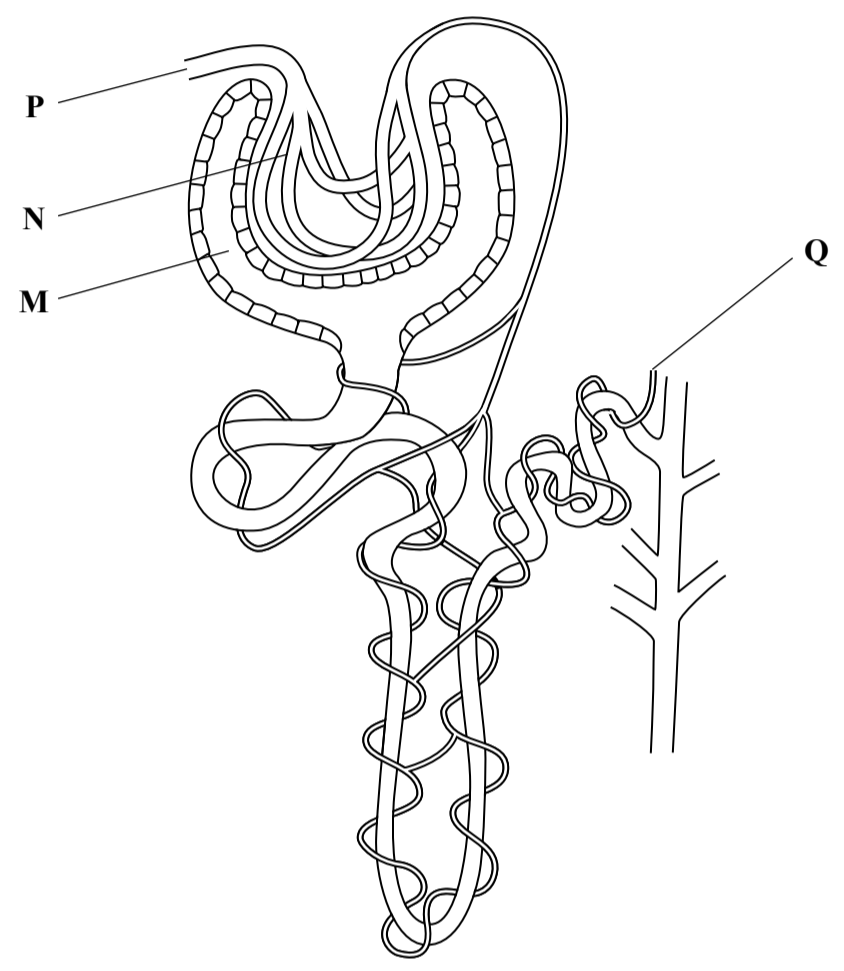


<p>(b) (i) Describe two ways in which the structure of an artery differs from the structure of a vein.</p> <p>1</p> <p>.....</p> <p>2</p> <p>.....</p> <p style="text-align: right;">(2)</p> <p>(ii) Each of the organs shown on the diagram contains a capillary network.</p> <p>Give two features of capillaries and in each case explain how the feature helps the capillary network to carry out its functions.</p> <p>1</p> <p>.....</p> <p>.....</p> <p>2</p> <p>.....</p> <p>.....</p> <p style="text-align: right;">(4)</p> <p style="text-align: right;">(Total 11 marks)</p>	<p>Leave blank</p> <p style="text-align: center;">Q4</p>



Leave blank

5. The diagram below shows a kidney tubule and its blood supply.



(a) (i) Name the parts labelled **M** and **N**.

M

N

(1)

(ii) State **two** ways in which the composition of the blood in vessel **P** differs from that in vessel **Q**.

1

.....

2

.....

(2)



Leave blank

(b) The main functions of the kidney tubule are ultrafiltration and selective reabsorption. Explain how each of these processes helps in the formation of urine.

Ultrafiltration

.....

.....

.....

.....

Selective reabsorption

.....

.....

.....

.....

(6)

(c) The volume of urine produced by a person was considerably lower on a hot day than on a cold day. The person was given exactly the same diet and carried out the same activities on both days.

Explain how this difference is brought about.

.....

.....

.....

.....

.....

.....

.....

.....

.....

(4)

(Total 13 marks)

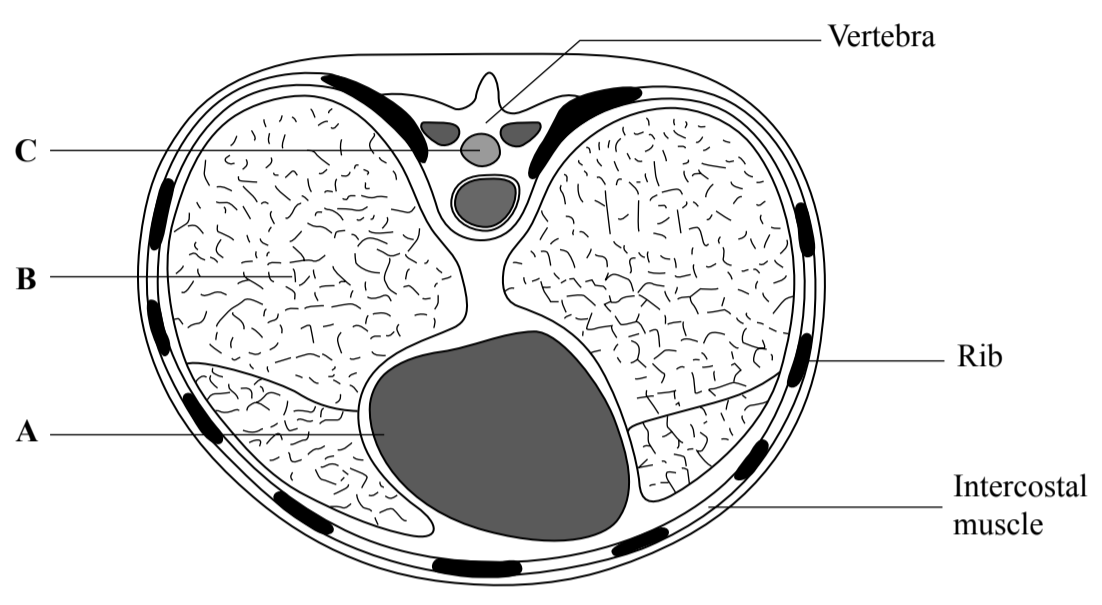
Q5

--	--



Leave blank

6. The diagram below shows a section across the thoracic (chest) cavity.



(a) Name the structures labelled A, B and C.

A

B

C (3)

(b) Describe and explain how the ribs, intercostal muscles and vertebrae bring about the movement of air into the lungs.

.....

.....

.....

.....

.....

.....

.....

.....

.....

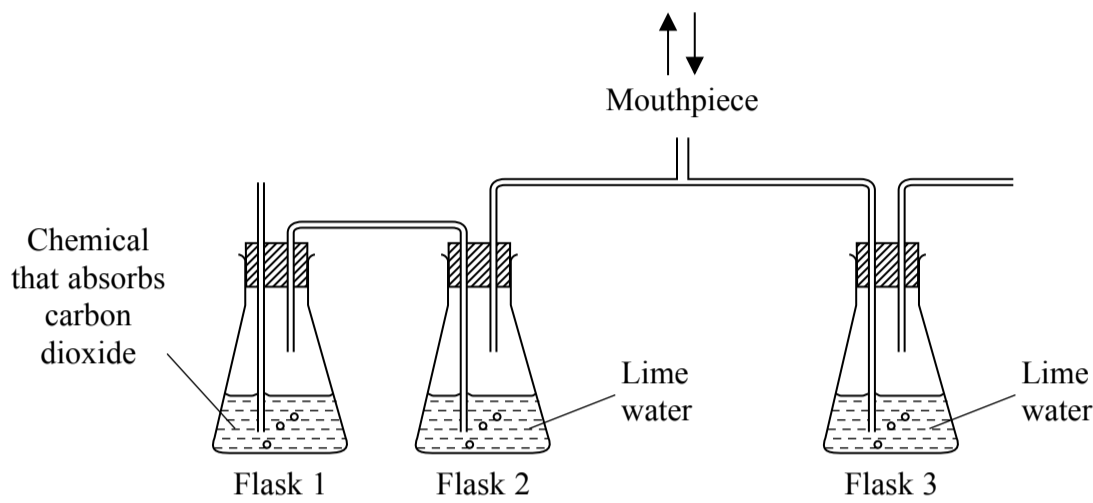
..... (4)

(Total 7 marks)

Q6



7. The diagram below shows an apparatus that could be used to compare the carbon dioxide content of inspired and expired air.



Leave blank

(a) (i) On the diagram, by means of a series of arrows, show the direction of air flow through the apparatus when a person breathes in and out through the mouthpiece. (1)

(ii) Suggest why a chemical that absorbs carbon dioxide has been put into flask 1.

.....
 (1)

(iii) Suggest what changes you would expect to see in flasks 2 and 3, after a student had breathed in and out through the mouthpiece several times.

Flask 2

.....

Flask 3

..... (2)

(iv) Explain the changes you have suggested that you would see in flasks 2 and 3.

.....

.....

.....

..... (2)



Leave blank

(b) Table 1 below gives details about the rate and depth of breathing of a student immediately before and immediately after exercise.

Table 1

Feature	Before exercise	After exercise
Number of breaths per minute	16	30
Volume of air expired each breath in dm ³	0.5	4.0

Table 2 below gives some details about the composition of air inspired and expired before exercise.

Table 2

Percentage of gas	Inspired air	Expired air
Carbon dioxide in air (%)	0.04	4.0
Oxygen in air (%)	21.0	16.0

(i) Using data from Tables 1 and 2, calculate the volume of oxygen absorbed from the alveoli, during one minute before exercise.

Answer =
(3)





<p>(ii) The rate and depth of breathing increases considerably when the student carries out exercise. State what triggers this change in the rate and depth of breathing.</p> <p>.....</p> <p>.....</p> <p style="text-align: right;">(1)</p> <p>(c) When carrying out exercise the student's pulse rate rises. After the exercise finishes, it takes some time for the pulse to return to the normal resting rate. Suggest why this happens.</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p style="text-align: right;">(4)</p> <p style="text-align: right;">(Total 14 marks)</p>	<p>Leave blank</p> <p>Q7</p> <table border="1"><tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr></table>		



8. Complete the passage below by writing the most suitable word or words in each space.

In males at puberty the become active and produce the hormone that causes changes in the body of the male.

The becomes deeper in tone. In the limbs the increase in length and are moved by much more powerful

The male hormone also causes the growth of on various areas of the body.

Leave blank

Q8

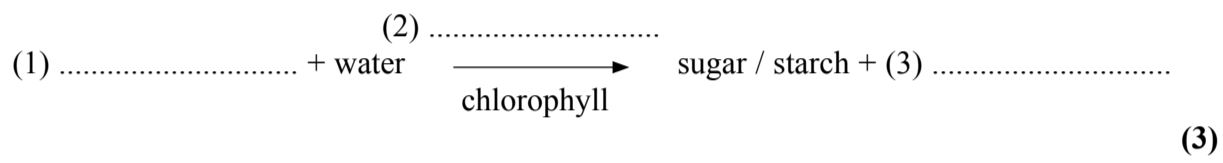
(Total 6 marks)



9. The diagram below shows a food chain. Energy passes along the food chain as one organism feeds on another.



(a) (i) The grass obtains its energy by photosynthesis. Complete the word equation below for photosynthesis by writing suitable words on the three dotted lines, (1), (2) and (3).



(ii) How does energy pass from the grass to the sheep?

..... (1)

(iii) State **one** reason why some of the energy stored in the grass does not pass to the sheep.

.....
 (1)

(iv) Describe **two** ways in which the sheep uses the energy it obtains from the grass.

1

 2
 (2)

(b) Suggest why food chains rarely consist of more than 4 or 5 levels.

.....
 (1)

(Total 8 marks)

Leave blank

Q9



Leave blank

10. (a) State what is meant by the term **incubation** for a disease.

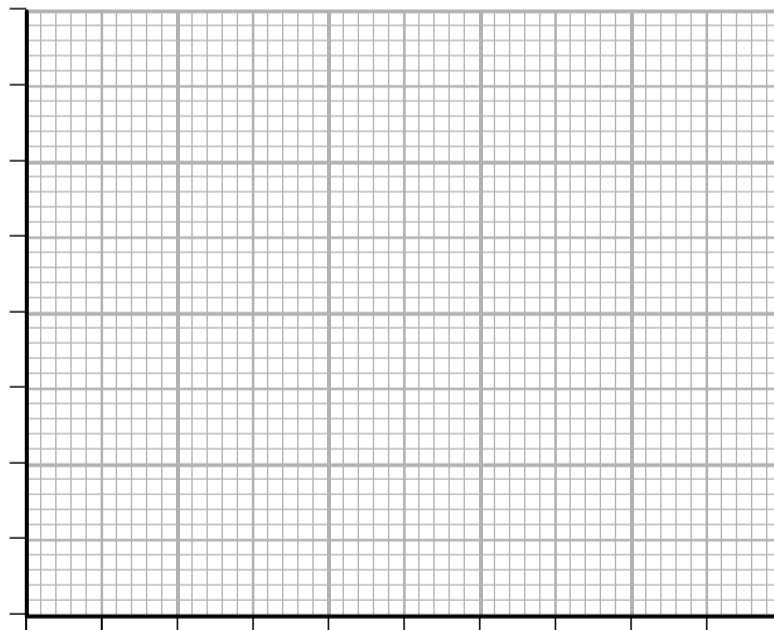
.....
.....

(1)

(b) The data below show the body temperature of a woman over a period of 10 days. On day 1 the woman visited her brother who was suffering from influenza.

Day	Temperature in °C
1	37.0
2	37.0
3	39.8
4	39.6
5	37.4
6	37.3
7	37.2
8	37.0
9	37.1
10	37.0

(i) Plot the data on the grid below.



(4)



<p>(ii) On which day did the woman first show symptoms of influenza?</p> <p>.....</p> <p>(1)</p> <p>(iii) How long was the incubation period?</p> <p>.....</p> <p>(1)</p> <p>(Total 7 marks)</p>	<p>Leave blank</p> <p>Q10</p> <input data-bbox="1612 899 1654 973" type="text"/>
--	---



11. Some human disorders and diseases are **not** caused by pathogens. Complete the table below about some of these human disorders by filling in the spaces.

Name of disorder	Symptom / effect on the body	Reason for disorder
Anaemia		lack of iron in diet
	paralysis / destruction of cilia in trachea	
Heart attack		diet rich in animal fats
	peristalsis inefficient	
Diabetes		not producing enough insulin
	bent / deformed leg bones	lack of calcium salts and vitamin D in diet of child

Leave blank

Q11

(Total 8 marks)

TOTAL FOR PAPER: 100 MARKS

END

