



INSTRUCTIONS

Use black ink.

Write your answer to each question in the space provided. If you need extra space use the lined pages at the end of this booklet. The question numbers must be clearly shown.

Answer ALL the questions.

INFORMATION

The total mark for this paper is 100.

The marks for each question are shown in brackets [].

Quality of extended response will be assessed in questions marked with an asterisk (*).

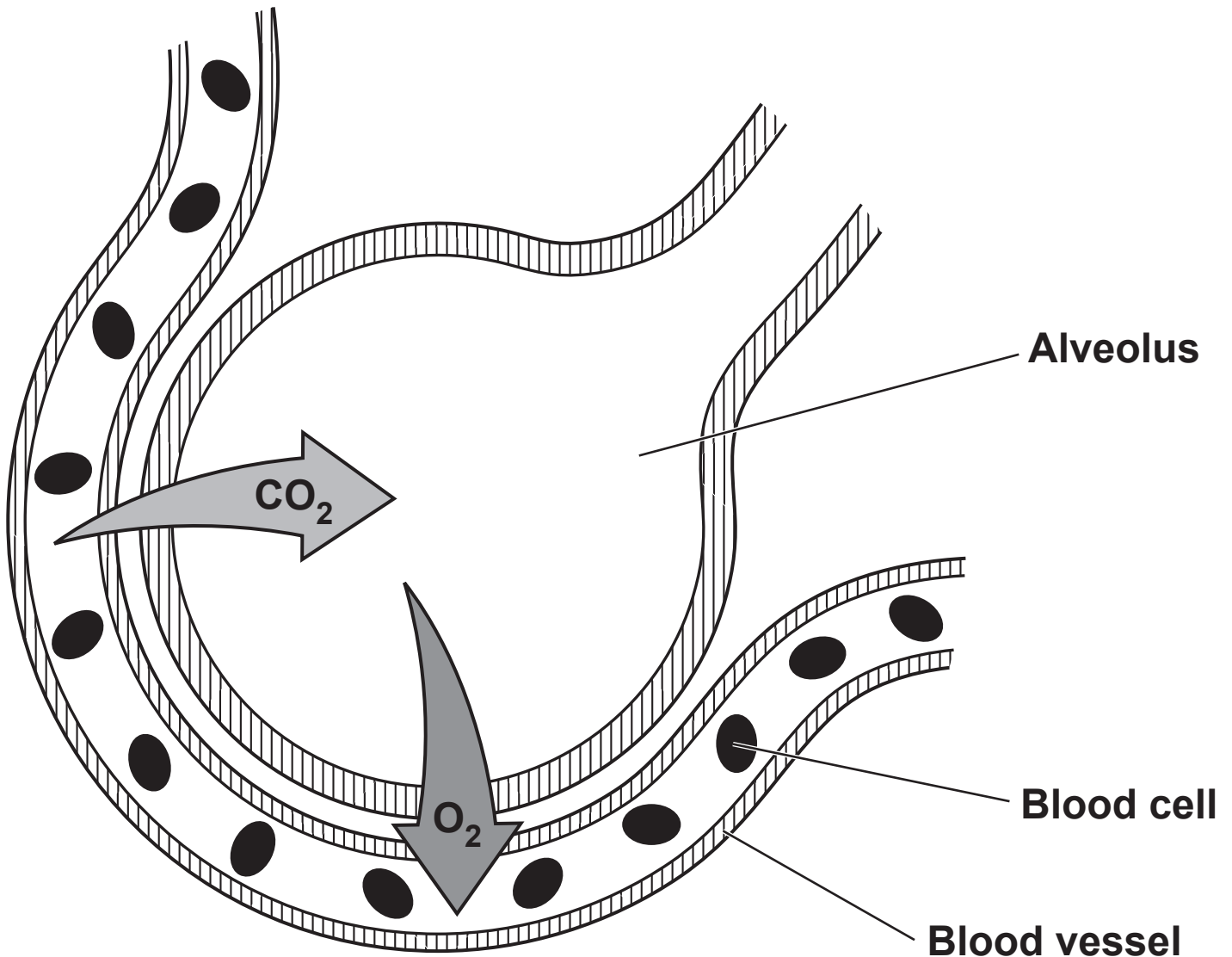
ADVICE

Read each question carefully before you start your answer.

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1

- (a) The diagram shows part of an alveolus in the respiratory system.



- (i) The blood vessel labelled in the diagram has thin walls to allow gases to diffuse into and out of the blood.

Name the type of blood vessel.

_____ [1]

- (ii) The type of blood cell labelled in the diagram transports oxygen.

Which ONE of the following identifies the type of blood cell in the diagram?

Put a tick (✓) in the box next to the correct blood cell. [1]

Type of blood cell	Tick (✓) ONE only
Erythrocyte	
Lymphocyte	
Neutrophil	

- (iii) Explain how diffusion gradients allow gaseous exchange between the alveolus and the blood vessel to occur.

[3]

It can be either aerobic or anaerobic.

Discuss the similarities AND differences between aerobic and anaerobic respiration.

[illegible]

(c) Emphysema is a malfunction of the respiratory system that can be caused by smoking tobacco.

(i) Apart from smoking tobacco, state ONE OTHER risk factor for emphysema.

_____ [1]

(ii) Shortness of breath is a common symptom of emphysema.

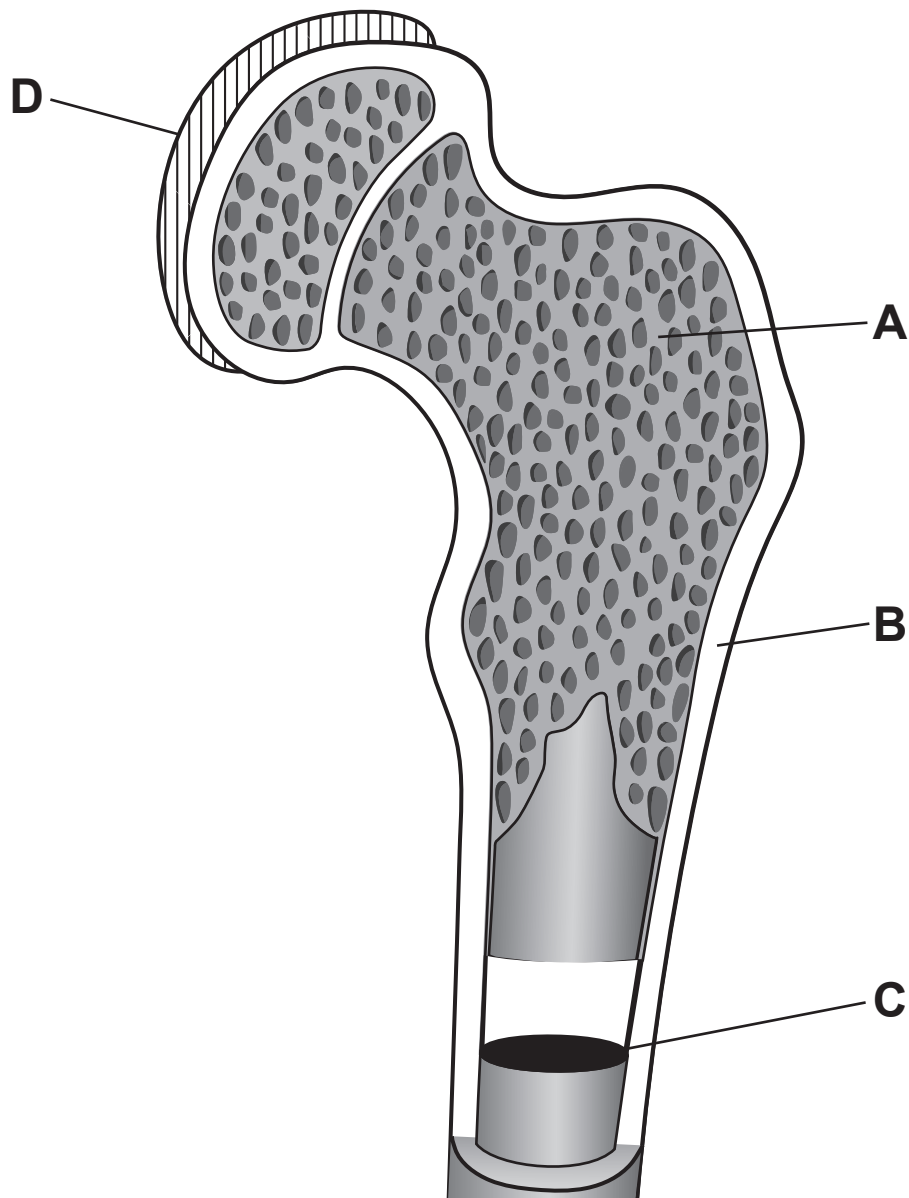
Describe ONE biological explanation for this symptom.

_____ [2]

(iii) Identify ONE possible treatment for emphysema.

_____ [1]

2 The diagram shows a vertical section of bone.



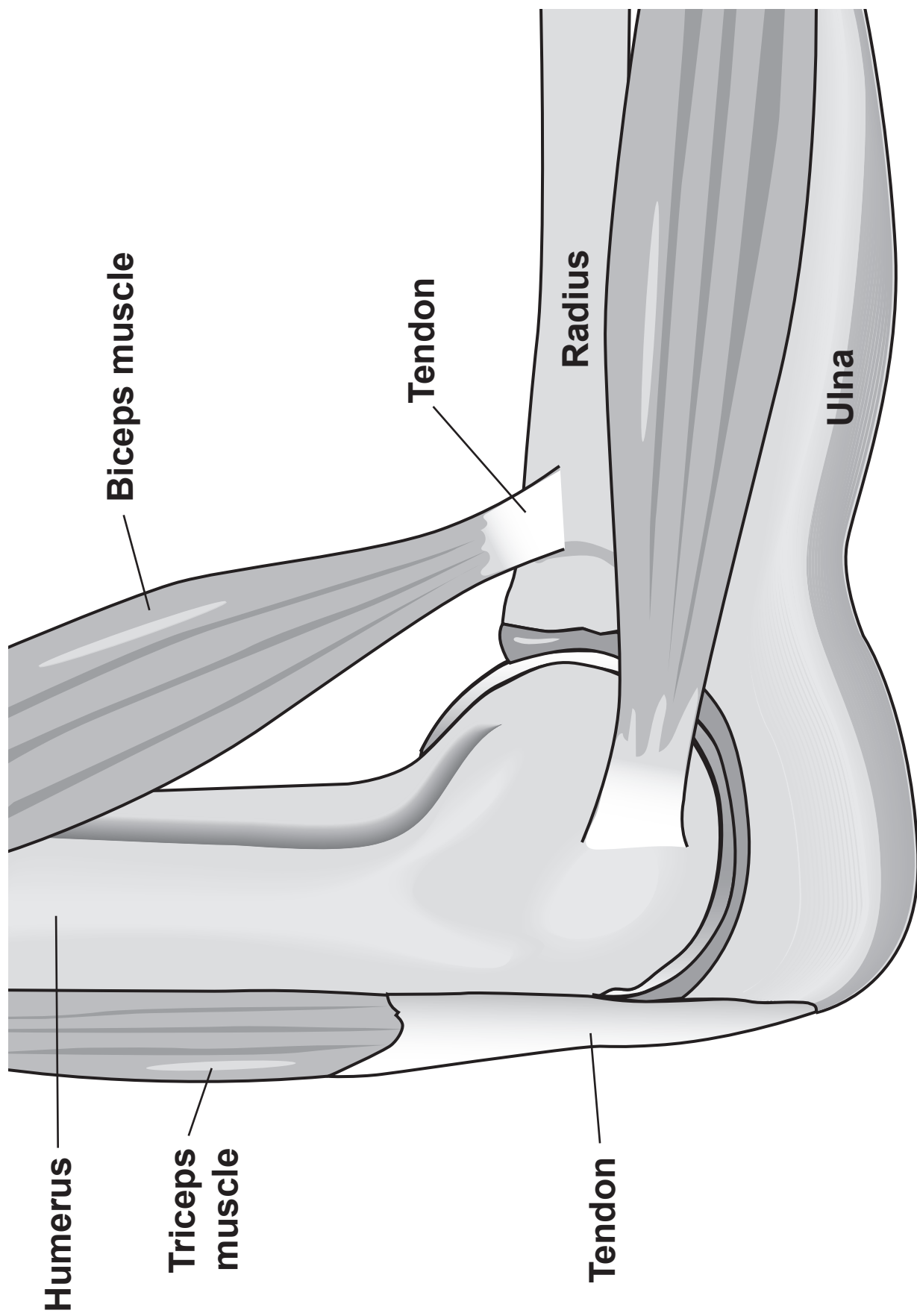
- (a) Complete the table below by selecting the correct letter that identifies the components of bone.

One row has been done for you. [3]

STRUCTURE	LETTER ON DIAGRAM
Bone marrow	
Cartilage	D
Compact bone	
Spongy bone	

[6]

10



- (c) Arthritis and osteoporosis are both malfunctions of the musculoskeletal system.

The table below contains statements about arthritis and osteoporosis.

Complete the table below by deciding whether each statement is correct for either **ARTHRITIS ONLY**, **OSTEOPOROSIS ONLY** or **BOTH** types of malfunction.

Put a tick (✓) in each box that applies to a correct statement.

The first row has been done for you. [3]

STATEMENT	ARTHRITIS ONLY	OSTEOPOROSIS ONLY	BOTH
Risk of developing the malfunction increases with age			✓
Characterised by loss of bone density			
Inflammation or injury results in loss of cartilage			
Steroid injections can be used to treat swollen joints			

- (d) Muscle movements are coordinated and controlled by the brain and nervous system.

The list shows some components of the brain.

cerebellum	cerebral cortex	corpus callosum
frontal lobe	medulla	meninges

Choose from the list above to identify the component for each of the statements below.

You can use each component once, more than once or not at all.

Coordinates muscle activity and fine motor skills.

Controls muscles to help maintain balance.

A bridge of tissue that enables communication between the two halves of the brain.

A set of membranes around the brain and spinal cord to provide protection against infection.

[4]

Describe TWO OTHER possible symptoms of stroke AND explain the possible biological causes of these symptoms. [8]

[illegible]

3 The ear is part of the sensory system.

(a) Complete the sentences about the ear by choosing the most appropriate word(s) from the list below.

ampullae auditory nerve cochlea ear drum
eustachian tube organ of Corti round window

The _____ receives sound waves directly from the external environment and transmits them to the middle ear. The sound waves are then amplified by three small bones and the vibrations passed onto the _____ , a membrane between the middle and inner ear. The vibrations pass through the jelly-like fluid of the _____ in the inner ear and are then converted into impulses that are sent to the brain via the _____ .

Tiny fluid-filled tubes called _____ are also found in the inner ear. These do not have a role in hearing but help maintain balance. [5]

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4 The digestive system produces fluids that have a role in digesting food.

(a) Bile is a digestive fluid.

(i) Name the organ that stores bile until it is needed.

_____ **[1]**

(ii) Name the structure that enables bile to enter the small intestine.

_____ **[1]**

(b) Complete the table below by deciding whether each statement about the digestive role of bile is True (T) or False (F). [3]

STATEMENT	True (T) OR False (F)
Bile is an enzyme that chemically digests fats.	
Bile helps in digestion by emulsifying proteins.	
Bile helps in digestion by neutralising stomach acid.	

(c)* Chemical imbalances in bile can result in the formation of gallstones, a malfunction of the digestive system.

Amos has been diagnosed with gallstones.

Discuss the impact of gallstones on Amos' diet and lifestyle.

[illegible]

(d) The pancreas is part of the digestive system.

Outline the role of the pancreas in chemical digestion.

[3]

(e) The liver is part of the digestive system that also has breakdown functions.

Deamination and detoxification are breakdown functions carried out by the liver.

(i) Describe the process of deamination.

[2]

(ii) State ONE example of detoxification.

[1]

(f) Gabi's liver is malfunctioning.

(i) Name a malfunction of the liver.

_____ **[1]**

(ii) State TWO possible symptoms caused by Gabi's liver malfunction.

1 _____

2 _____ **[2]**

(iii) Which TWO of the following are risk factors that may have caused Gabi's liver to malfunction?

Put a tick (✓) in the box next to TWO correct risk factors. [2]

RISK FACTORS	Tick (✓) TWO only
Eating disorder such as anorexia	
Excess alcohol intake	
Exposure to UV light	
Food allergy	
Hepatitis C infection	

5 The heart pumps blood through the cardiovascular system.

(a) Choose from the list below to answer the following questions about the structure and functions of components of the heart.

aorta atrium bicuspid pulmonary artery
pulmonary vein semi-lunar vena cava ventricle

You can use each component once, more than once or not at all.

(i) Identify a VALVE that closes to prevent blood flowing back into ventricles as it is pumped out of the heart.

_____ **[1]**

(ii) Identify TWO blood vessels that carry oxygenated blood.

1 _____

2 _____ **[2]**

(iii) Identify a CHAMBER where blood enters the heart.

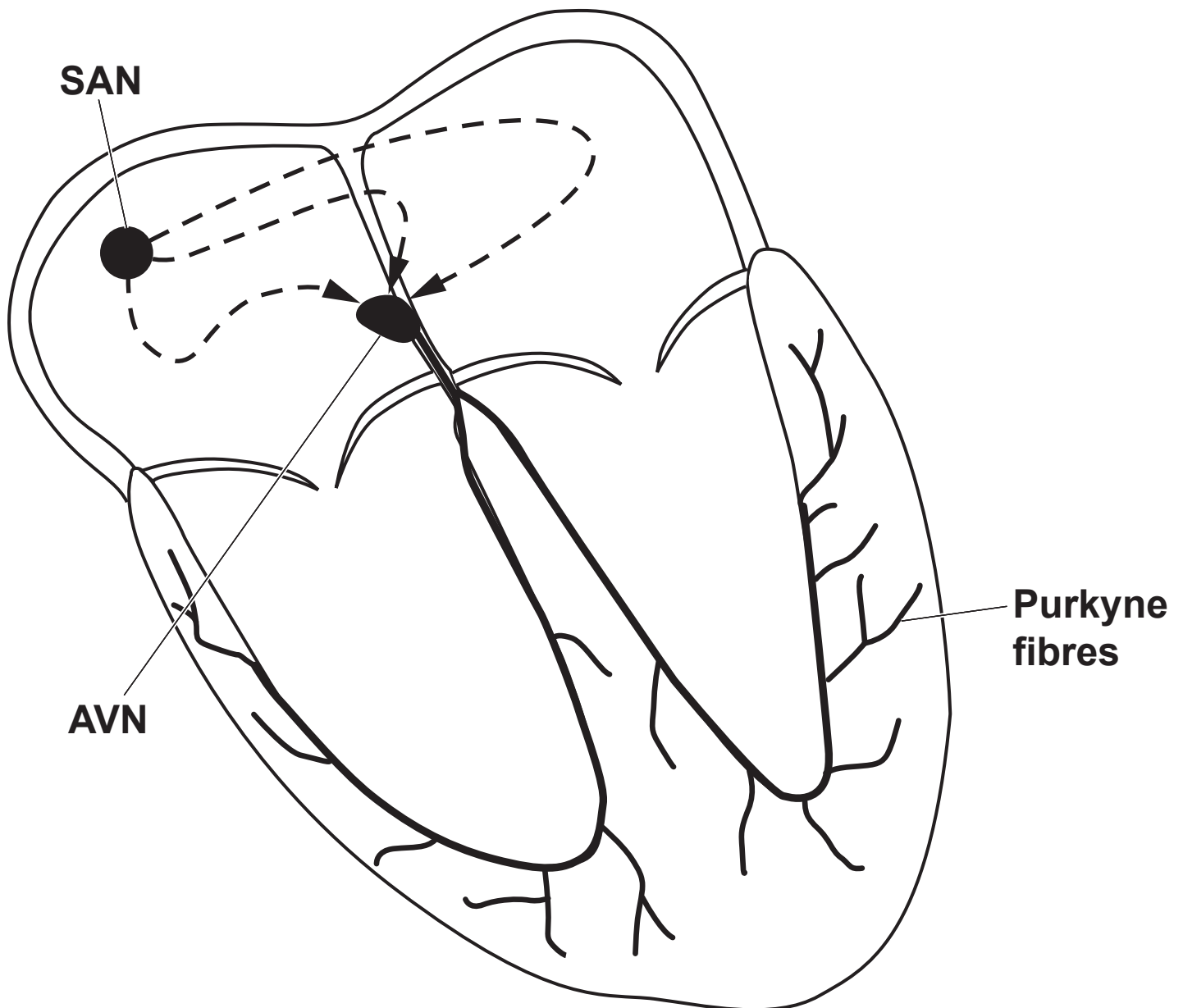
_____ **[1]**

(b)*The diagram shows the internal structure of the heart and the positions of:

sinoatrial node (SAN)

atrioventricular node (AVN)

Purkyne fibres



[illegible]

(c) Shanti has developed hypertension (high blood pressure).

(i) State ONE risk factor for hypertension.

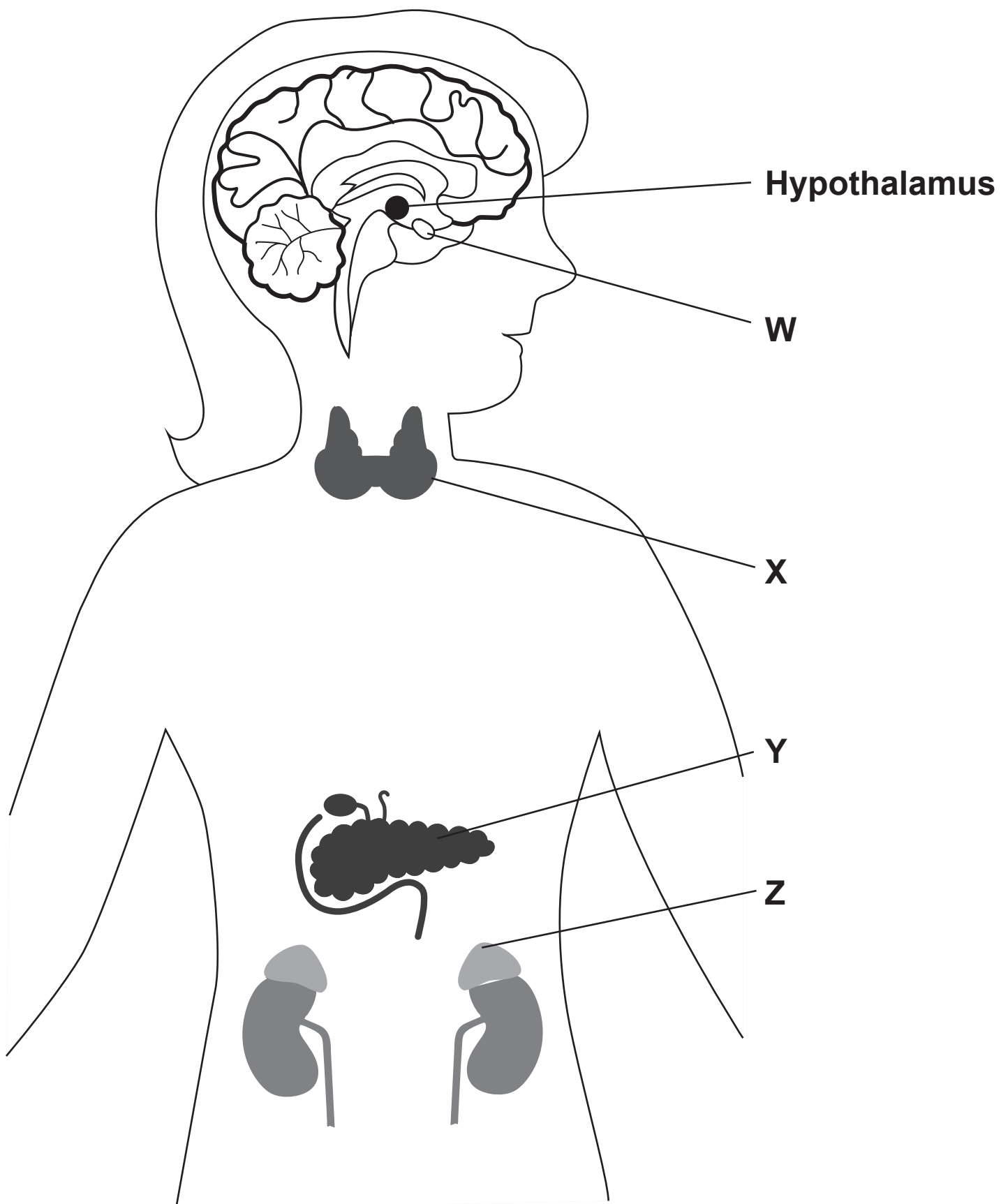
[1]

(ii) Outline ONE method that Shanti can use to monitor their hypertension.

[2]

- (d) The blood has a role in transporting hormones produced by the endocrine system.

The diagram shows some parts of the endocrine system.



- (i) Use the diagram to help you complete the table below about the functions of parts of the endocrine system. [5]

Part of endocrine system	Letter on diagram	Function
Pancreas		Produces insulin to control blood glucose levels
	Z	
Pituitary		Produces hormones that help to regulate other endocrine glands
Thyroid	X	

- (ii) The parts of the endocrine system have a role in homeostasis.

State what the term HOMEOSTASIS means.

[1]

EXTRA ANSWER SPACE

If you need extra space use these lined pages. You must write the question numbers clearly in the margin.

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]



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