WJEC 2014 Online Exam Review

GCE Applied Science Unit 1 1661-01

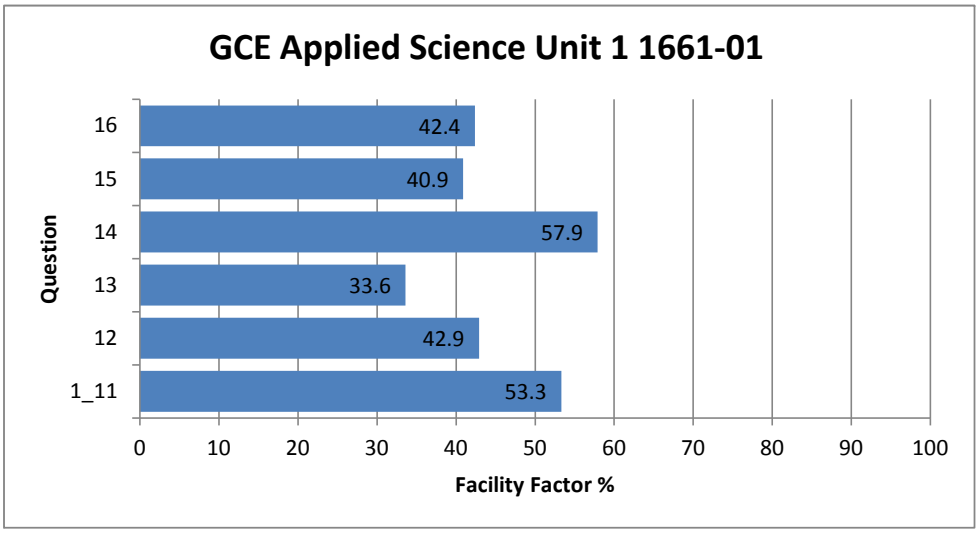
All Candidates' performance across questions

Question Title	N	Mean	S D	Max Mark	F F	Attempt %
1_11	642	17.1	3.9	32	53.3	100
12	640	3.9	1.7	9	42.9	99.7
13	640	4.4	2.3	13	33.6	99.7
14	641	2.9	1.1	5	57.9	99.8
15	636	3.7	2.5	9	40.9	99.1
16	639	5.1	3.1	12	42.4	99.5

12

13

16



Examiner only

SECTION B

Answer **all** *questions*.

12. The table below shows some physiological measurements made on a 20 year old athlete at rest and at the end of a period of strenuous exercise.

Physiological Measurement	At Rest	Immediately after Strenuous Exercise
Breathing rate (breaths min^{-1})	12	.....
Cardiac output (dm^3min^{-1})	5	25
Heart rate (beats min^{-1})	70	190
Stroke volume (cm^3)	71	132
Oxygen consumption (cm^3 min^{-1})	250	2500
Systolic pressure (mmHg)	.....	180

(a) Using the data sheet on **page 32** as a reference, complete the table by estimating the following measurements:

(i) breathing rate at the end of strenuous exercise. [1]

(ii) systolic blood pressure at rest. [1]

(b) Calculate the percentage increase in stroke volume after strenuous exercise. [2]

..... %

Examiner only

(c) Explain why the changes shown in the table opposite occur during exercise. [4]

.....

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(d) Suggest why regular exercise is beneficial for a person's heart. [1]

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Turn over.

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$132 - 71 = \frac{61}{100} = 0 \cdot 61\%$

0·61 %

(c) Explain why the changes shown in the table opposite occur during exercise. [4]

The changes occur during exercise because your body respires more for energy. Your breathing rate increases because you need for oxygen increases. Sweat increases during exercise to cool you down and blood pH decreases as your body contains more carbon dioxide which is acidic.

(d) Suggest why regular exercise is beneficial for a person's heart. [1]

To keep the heart active and healthy to prevent heart attacks or strokes.

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$132 - 71 = \frac{61}{132} \times 100 = 46.2$

46.2% %

Examiner only

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Breathing rate increases as more oxygen needs to be supplied to the blood & CO_2 needs to be exhaled & ease. Heart rate increases as the heart is pumping more to supply to muscles with oxygen and reduce CO_2. Oxygen consumption increases by 2250 cm^3 min^{-1} as tidal volume increases to supply more oxygen to the heart & lastly systolic pressure increases as ventricles are working harder to pump blood.

(d) Suggest why regular exercise is beneficial for a person's heart. [1]

~~Exercise can clear any fatty deposits and~~ increase its efficency to work under pressue

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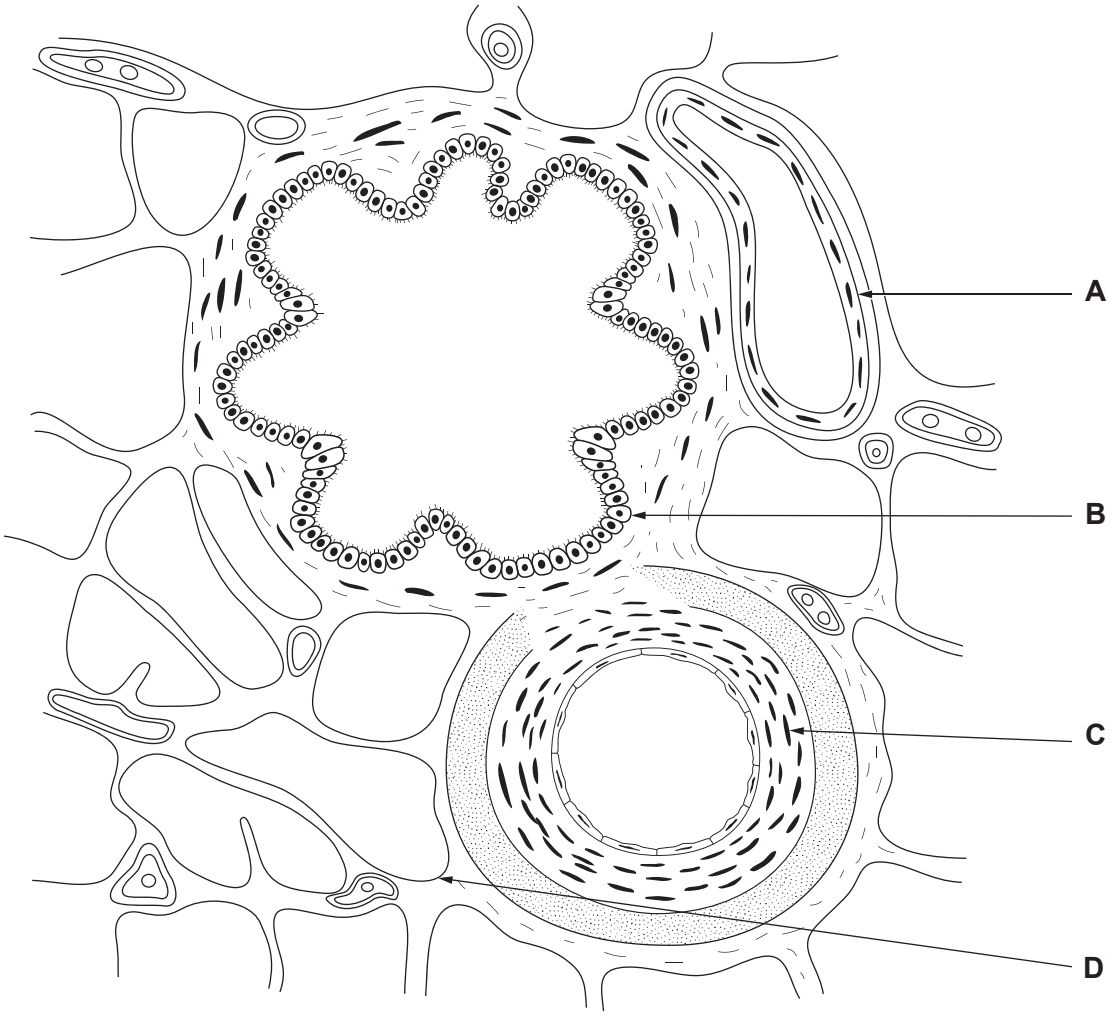
Examiner only

13. The following diagram shows a cross section of the lung tissue.



(a) State the names of structures **A**, **B** and **C**. [3]

D is named for you.

A ..... **B** .....

C ..... **D** *alveolus*

Examiner only

(b) Describe **two** adaptations of the alveolus that make it suitable for its function. [2]

.....

.....

(c) State the name of the cells lining structure **C** and describe their function. [2]

Name .....

Function .....

.....

(d) (i) Describe how the structure of the alveoli would differ in a person suffering from emphysema. [2]

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(ii) What effect would these changes have on gas exchange? [1]

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(e) The peak flow of a person suffering from emphysema is likely to be different to that of a healthy person.

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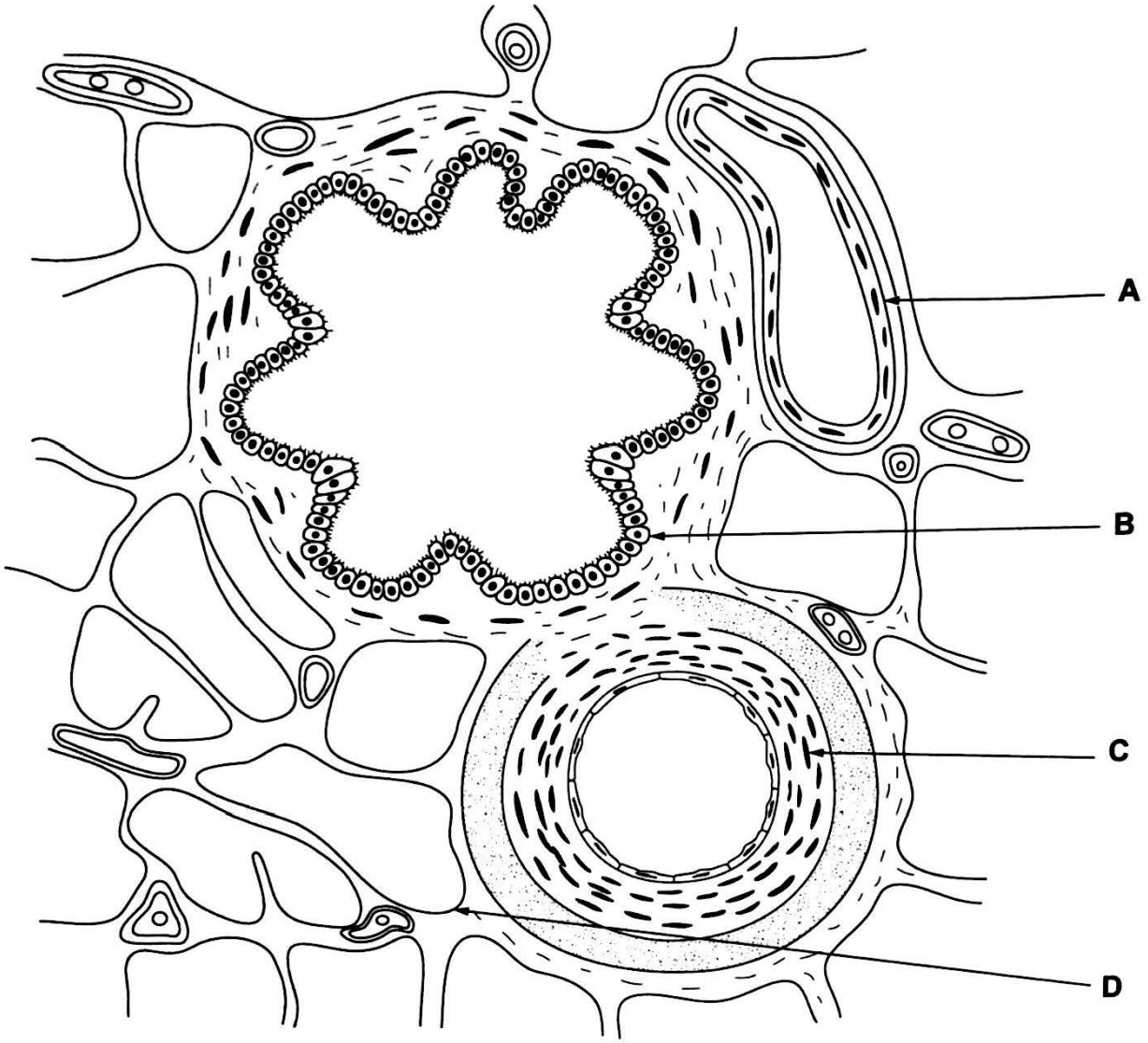

(a) State the names of structures **A**, **B** and **C**. [3]

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A Thrombocyte

B Bronchiole

C Red blood cell (Erythrocyte)

D *alveolus*

Examiner only

(b) Describe **two** adaptations of the alveolus that make it suitable for its function. [2]

Has thin cell walls suitable for gas exchange and does't allow larger substances pass through.

(c) State the name of the cells lining structure **C** and describe their function. [2]

Name Red blood cell

Function To carry oxygen around the body to all of the body's tissues.

(d) (i) Describe how the structure of the alveoli would differ in a person suffering from emphysema. [2]

The alveoli wouldn't have much shape, it would be loose making it hard to take in oxygen.

(ii) What effect would these changes have on gas exchange? [1]

oxygen and carbon dioxide will not diffuse as easy.

(e) The peak flow of a person suffering from emphysema is likely to be different to that of a healthy person.

(i) Describe how a peak flow meter is used to measure peak flow rate. [2]

You tightly seal your mouth around the mouth piece, take a deed breath in, blow out as hard and fast as you can to measure your peak flow rate.

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emphysema would lower the peak flow rate.

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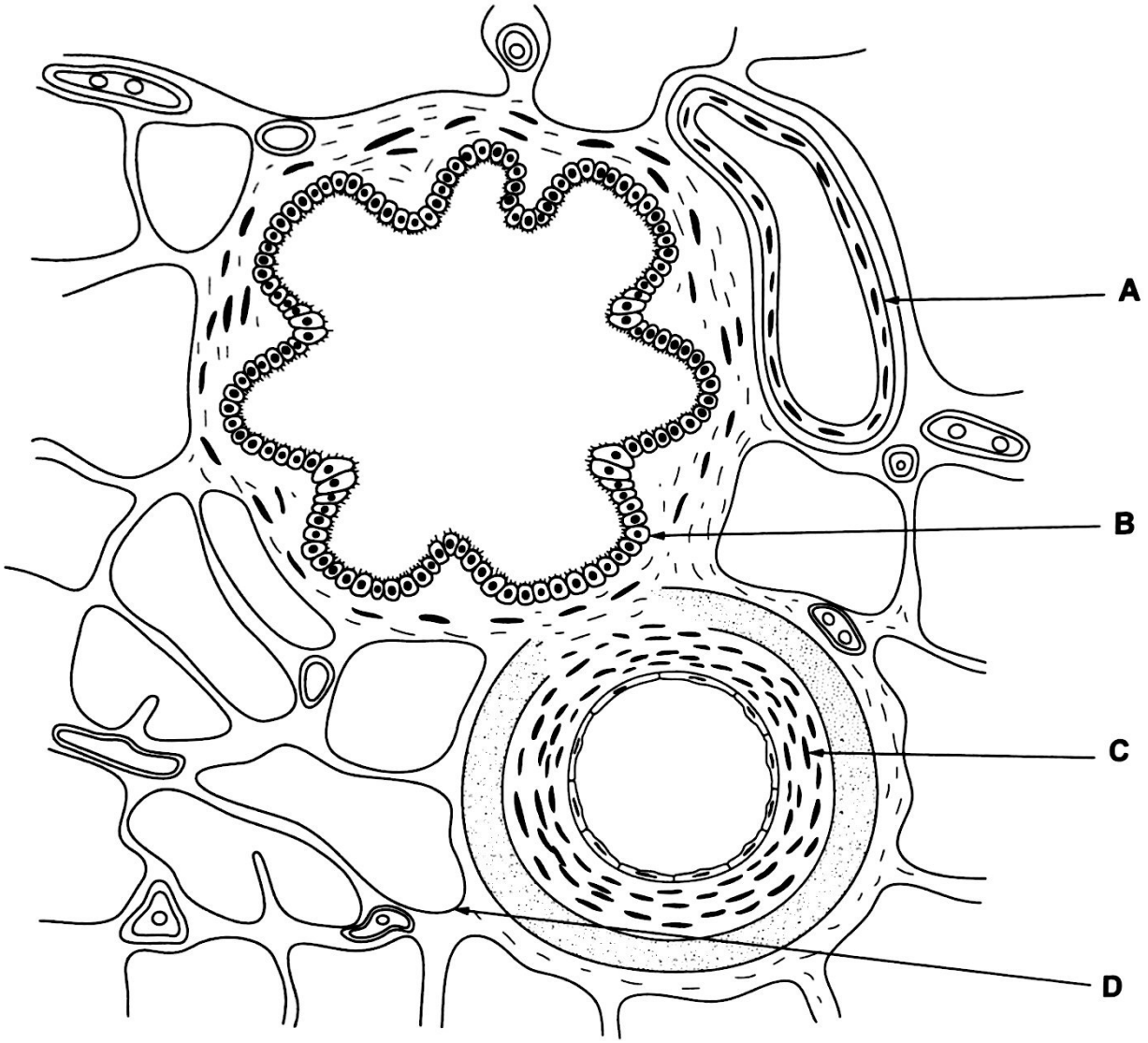

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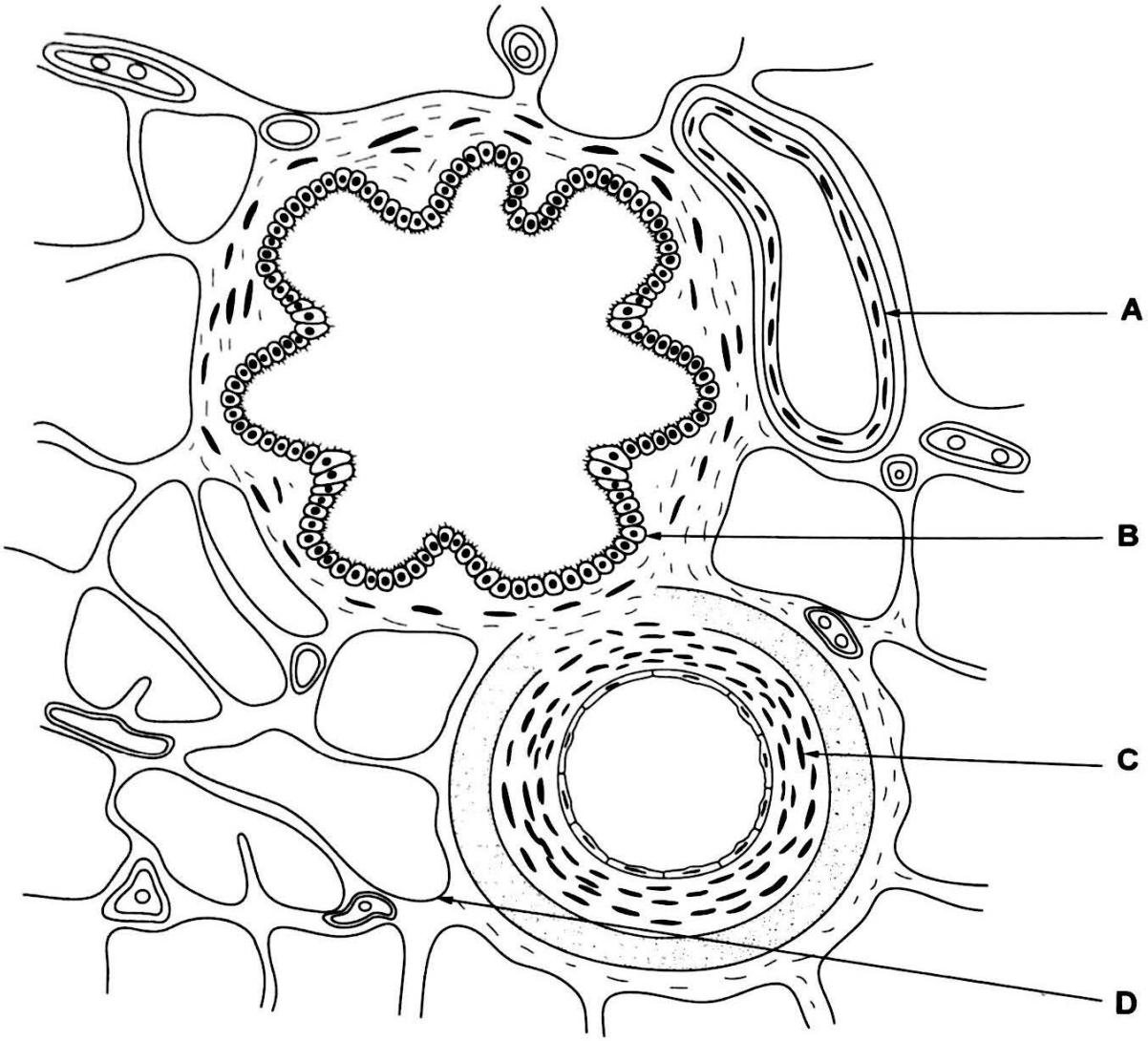

(a) State the names of structures **A**, **B** and **C**.

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B Erythrocyte

C Leucocyte

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Examiner only

(b) Describe **two** adaptations of the alveolus that make it suitable for its function. [2]

Large surface area to aid diffusion

Surfactant to maintain surface tension and prevent collapse.

(c) State the name of the cells lining structure **C** and describe their function. [2]

Name Leucocytes

Function fight infection by engulfing pathogens

(d) (i) Describe how the structure of the alveoli would differ in a person suffering from emphysema. [2]

Alveoli walls break down and merge, ~~and~~ ~~surface tension~~ ~~widening~~ of reduced surface area; ~~[illegible]~~

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Would limit efficient gas exchange.

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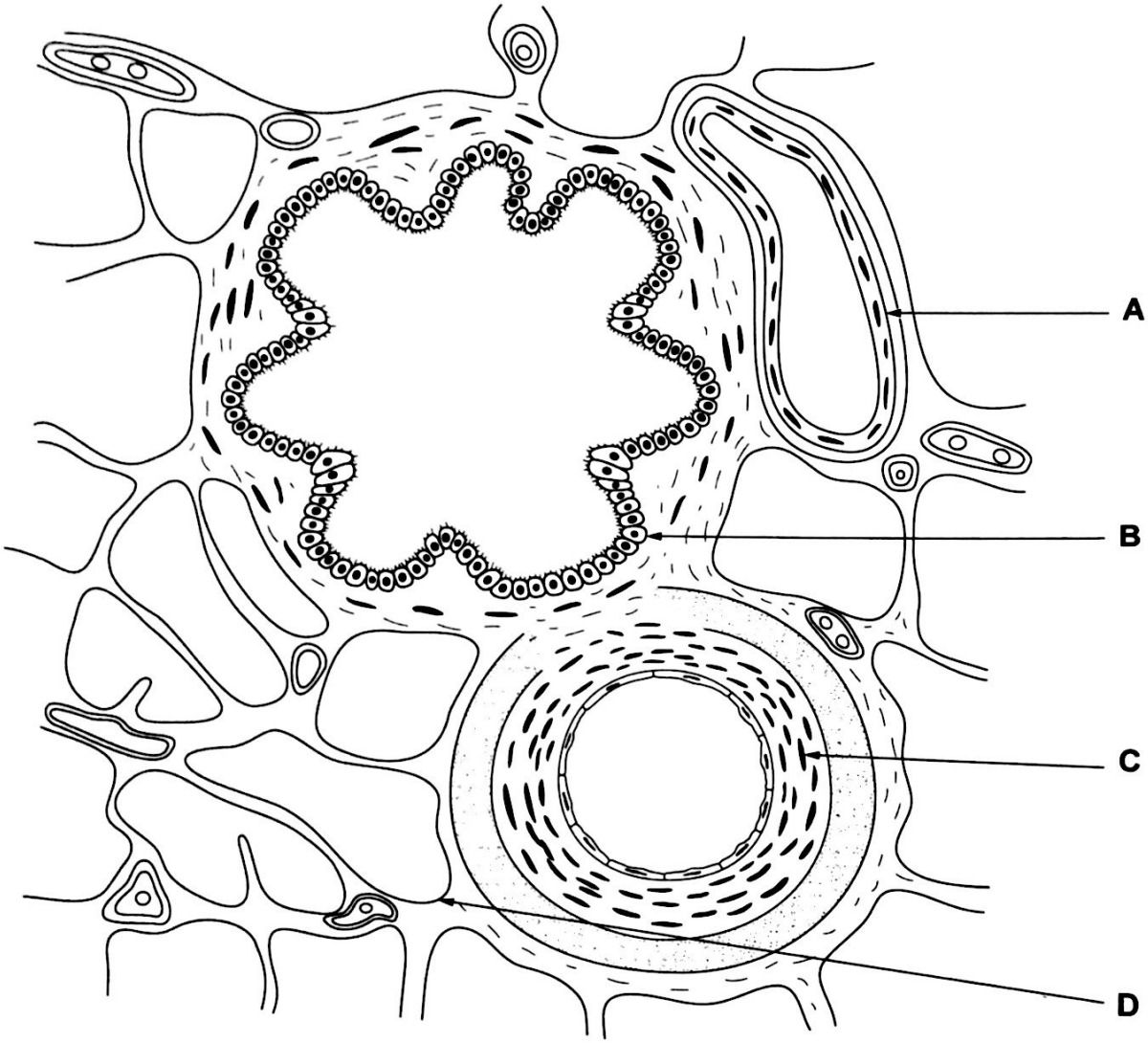

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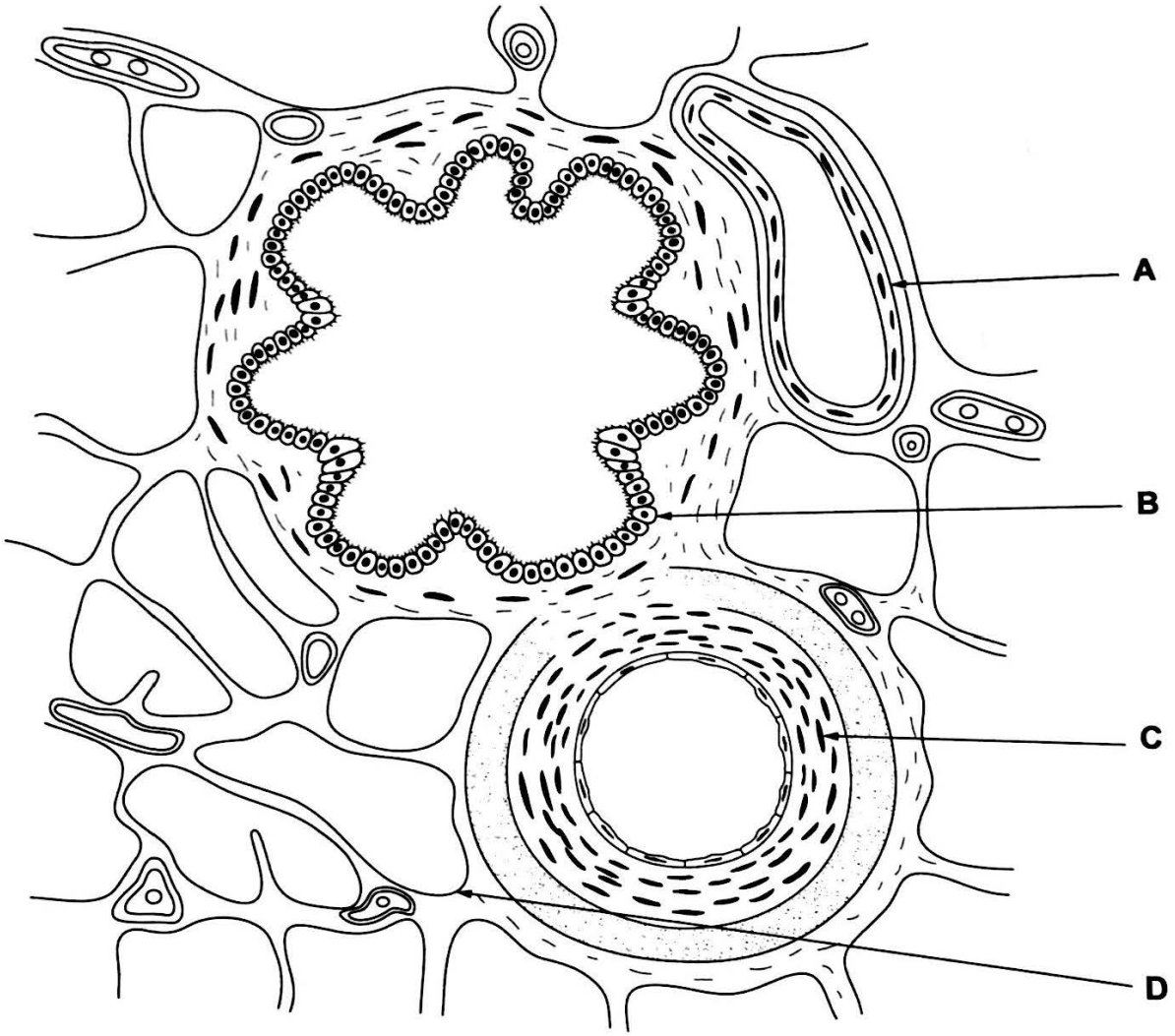

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Examiner only

(b) Describe **two** adaptations of the alveolus that make it suitable for its function. [2]

large surface area to exchange ~~no~~ gasses & surrounded by an extensive network of capillaries which make diffusion quicker.

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Name ~~Capillary~~. ~~Artery~~ Thick muscular layer

Function prevents the artery from bursting under the high pressue.

(d) (i) Describe how the structure of the alveoli would differ in a person suffering from emphysema. [2]

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Gas exchange would be reduced.

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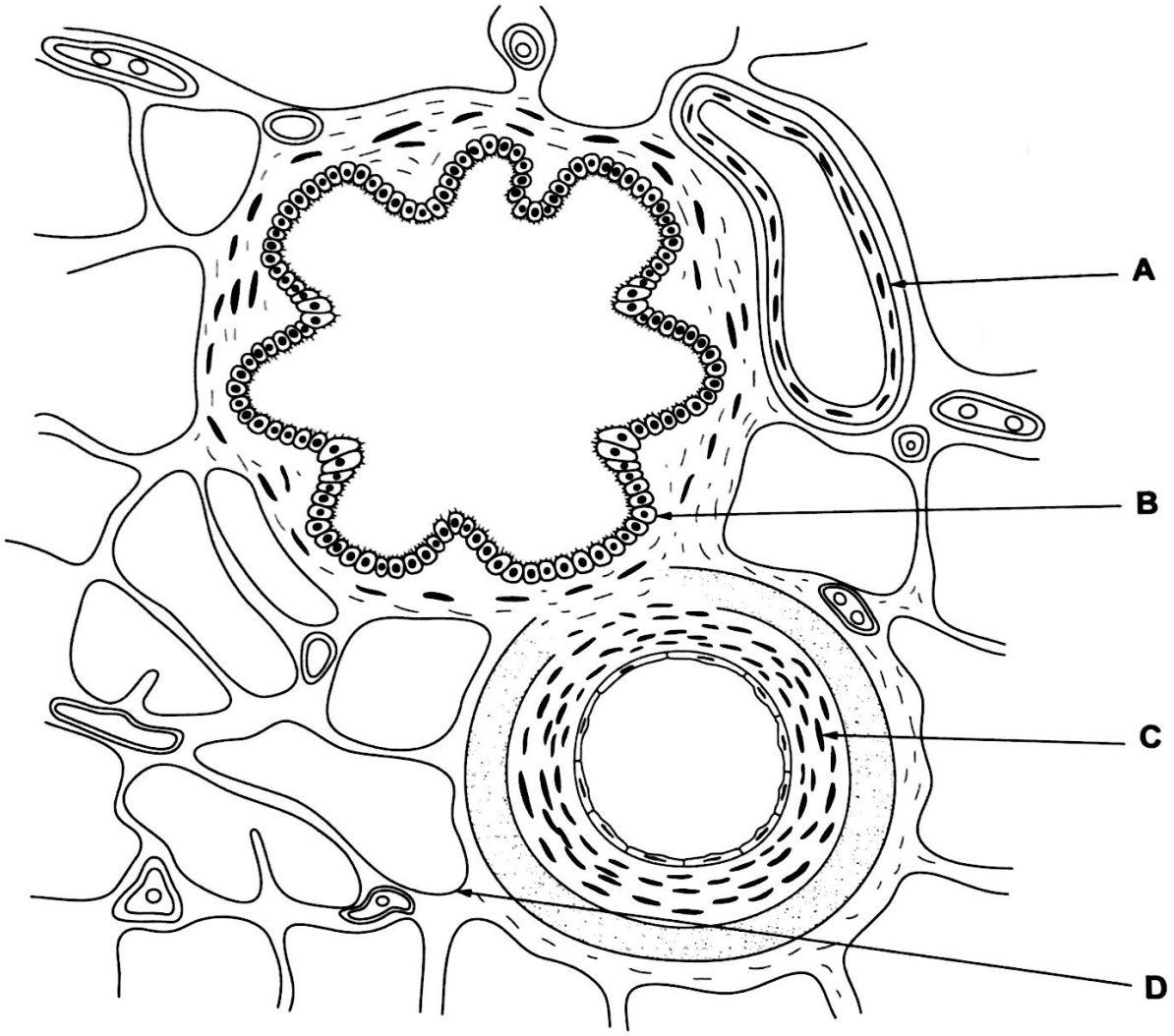

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16. Catrin was studying the electrical activity of the heart as part of her Applied Science course. She learnt that the heart muscle was myogenic and that the electrical excitation spread in a particular route, to ensure that the chambers contract in the correct sequence.

(a) State what is meant by the term *myogenic*. [1]

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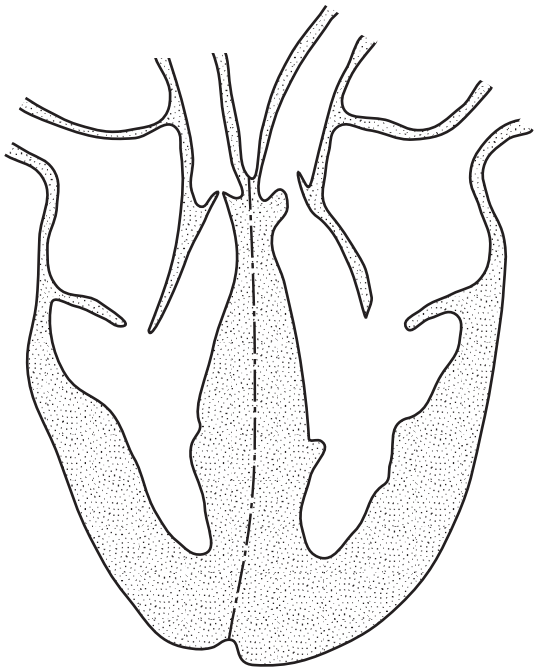
(b) (i) Catrin studied the role of the Atrio-Ventricular Node, Purkinje (Purkyne) tissue and Sino-Atrial Node. On the diagram below, show the position of these **three** structures. [3]



(ii) On the diagram above, use arrows to show the path of the electrical impulse across the heart. [3]

Examiner only

(c) The atrio-ventricular septum is a thin layer of tissue between the outer walls of the atria and ventricles. Explain the role of the atrio-ventricular septum. [2]

.....

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.....

(d) Name the equipment used to determine the electrical activity of the heart. [1]

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(e) In Britain, about 10 000 people a year are fitted with an artificial pacemaker to treat an abnormally slow heartbeat.

An artificial pacemaker

(i) What is the medical term given to a heart beat of less than 60 beats per minute? [1]

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(ii) What region mentioned in part *(b)* is mimicked by an artificial pacemaker? [1]

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END OF PAPER

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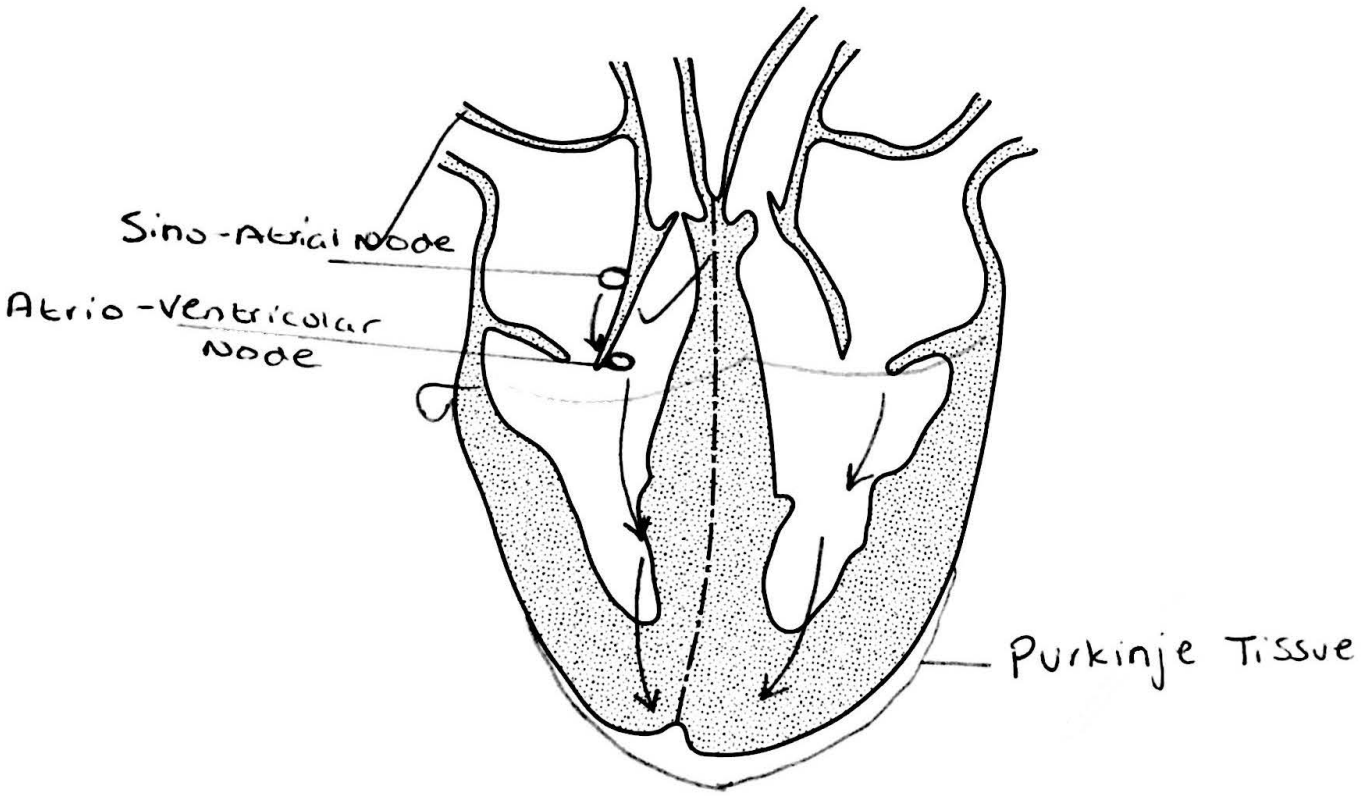

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The role of the atrio-ventricular septum is to control the electrical impulses that are being sent from the Sino-Atrial Node.

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An Electrocardiagraph

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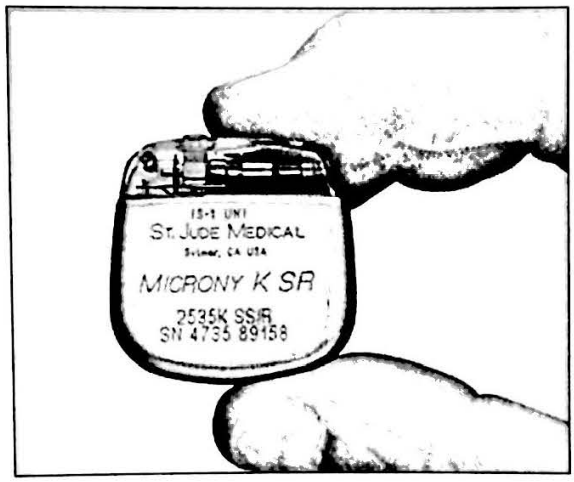

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Sino-Atrial Node

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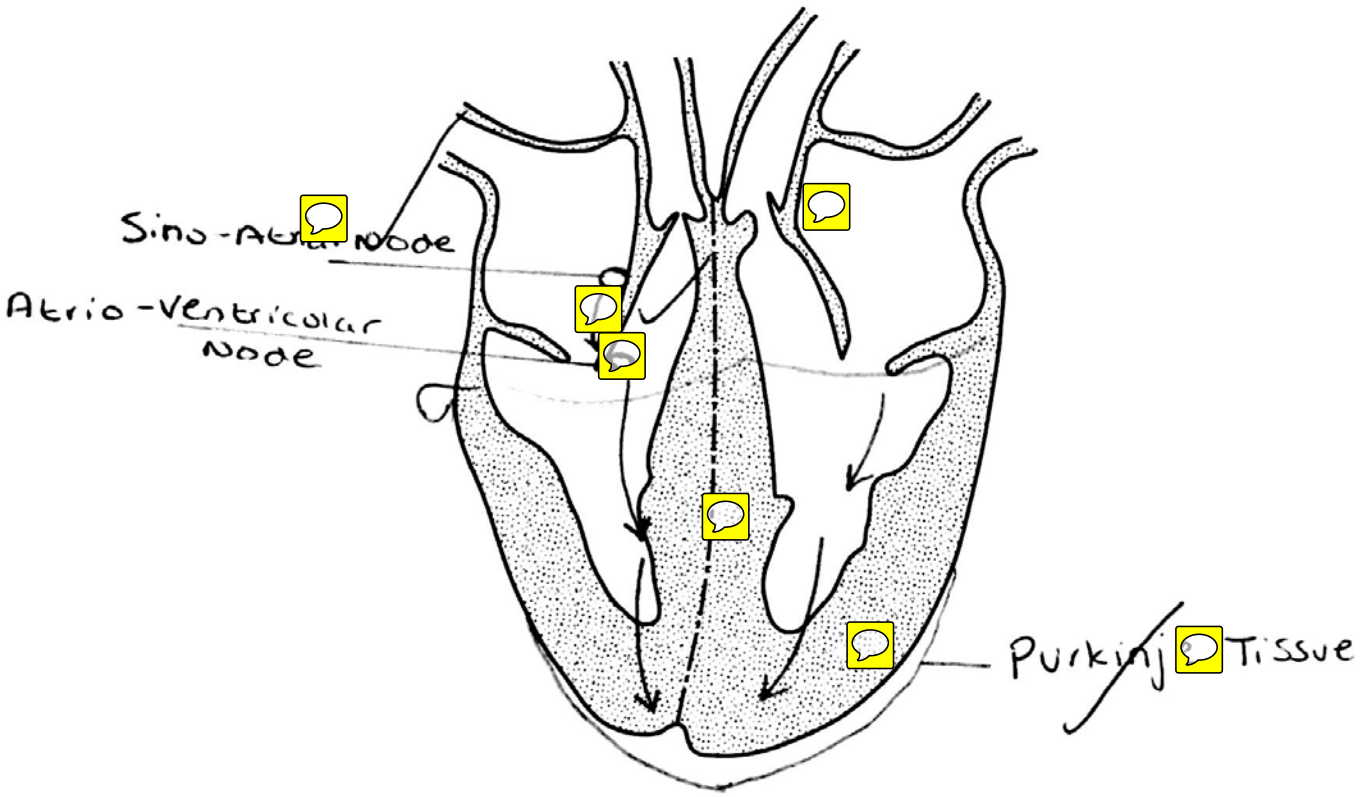

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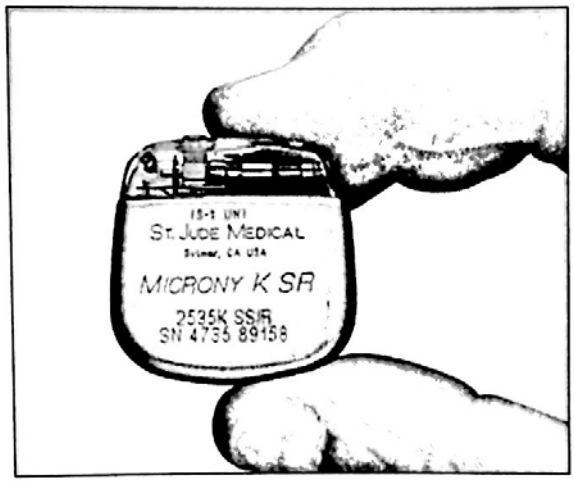
The role of the atrio-ventricular septum is to control the electrical impulses that are being sent from the Sino-Atrial Node.

(d) Name the equipment used to determine the electrical activity of the heart. [1]

An Electrocardiagraph

(e) In Britain, about 10000 people a year are fitted with an artificial pacemaker to treat an abnormally slow heartbeat.



An artificial pacemaker

(i) What is the medical term given to a heart beat of less than 60 beats per minute? [1]

Tachycardia

(ii) What region mentioned in part *(b)* is mimicked by an artificial pacemaker? [1]

Sino-Atrial Node

END OF PAPER

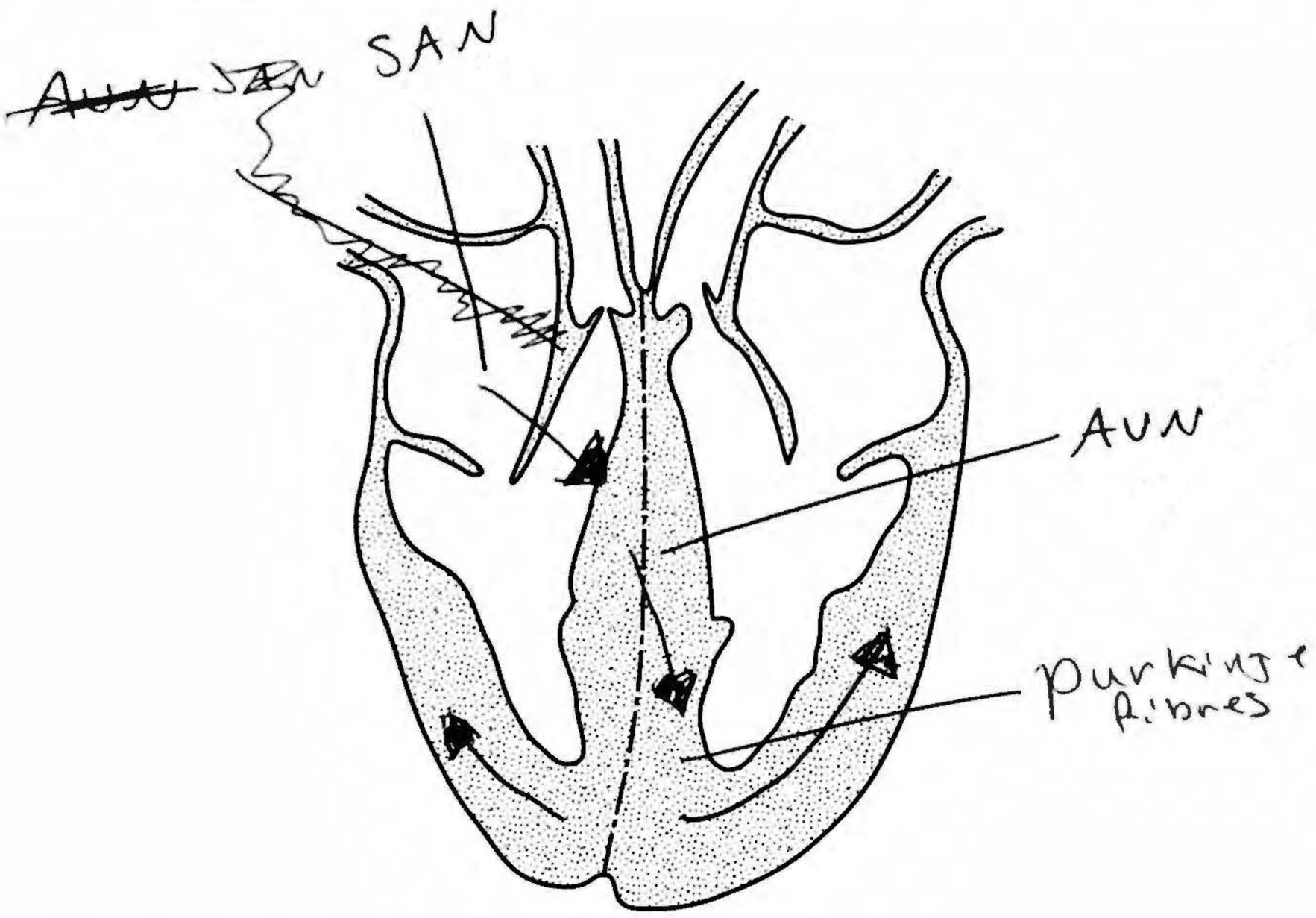
Examiner only

16. Catrin was studying the electrical activity of the heart as part of her Applied Science course. She learnt that the heart muscle was myogenic and that the electrical excitation spread in a particular route, to ensure that the chambers contract in the correct sequence.

(a) State what is meant by the term *myogenic*. [1]

~~[illegible] the heart beats beats and~~ when the heart beats is triggered ~~it~~ by itself

(b) (i) Catrin studied the role of the Atrio-Ventricular Node, Purkinje (Purkyne) tissue and Sino-Atrial Node. On the diagram below, show the position of these **three** structures. [3]



(ii) On the diagram above, use arrows to show the path of the electrical impulse across the heart. [3]

Examiner only

(c) The atrio-ventricular septum is a thin layer of tissue between the outer walls of the atria and ventricles. Explain the role of the atrio-ventricular septum. [2]

filtering blood of impurities.

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ECG trace

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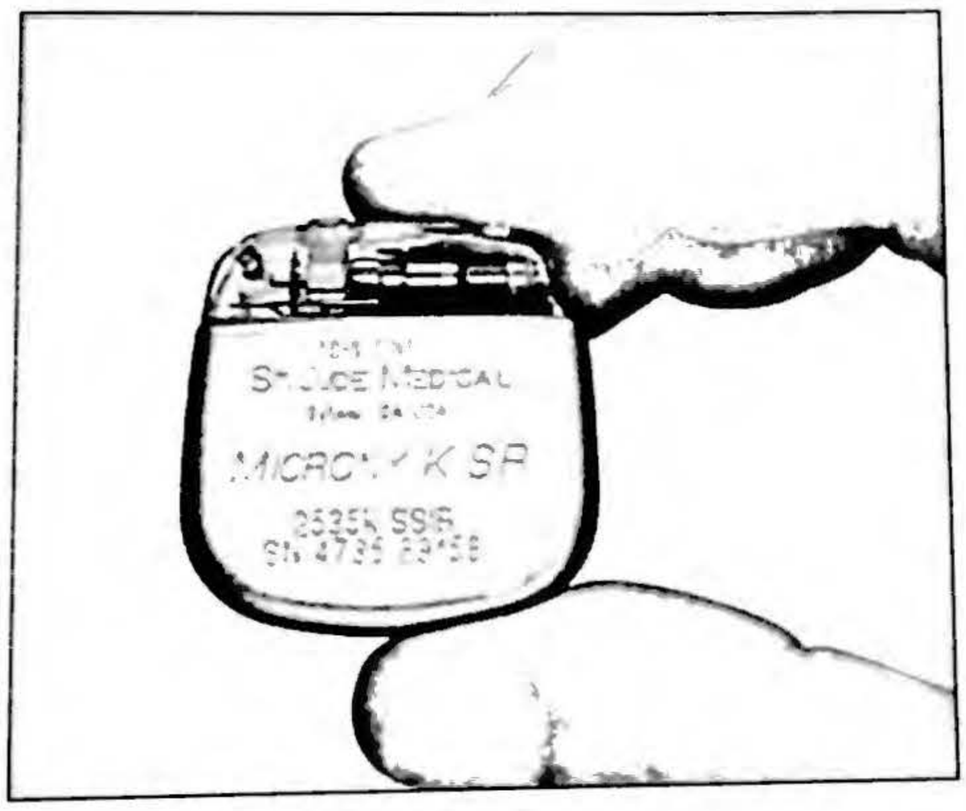

An artificial pacemaker

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SAN

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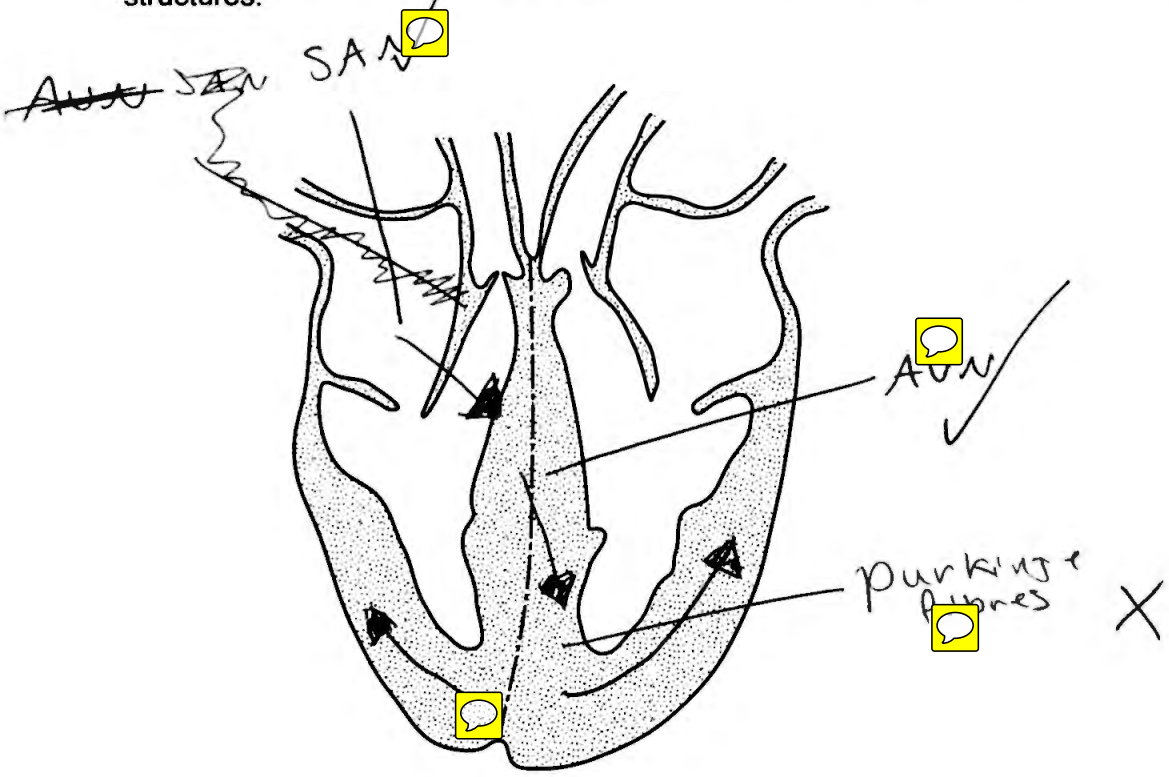

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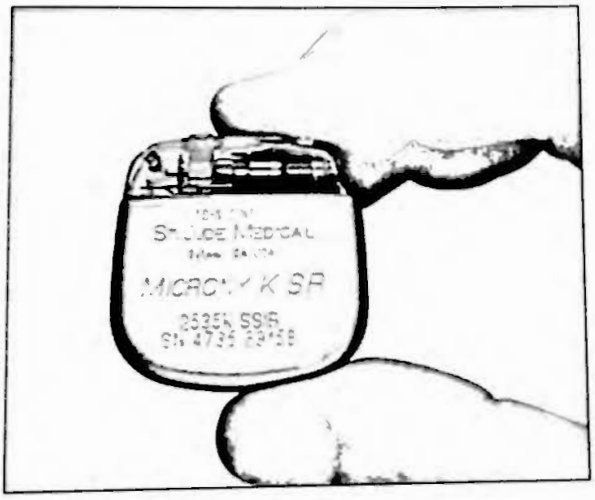

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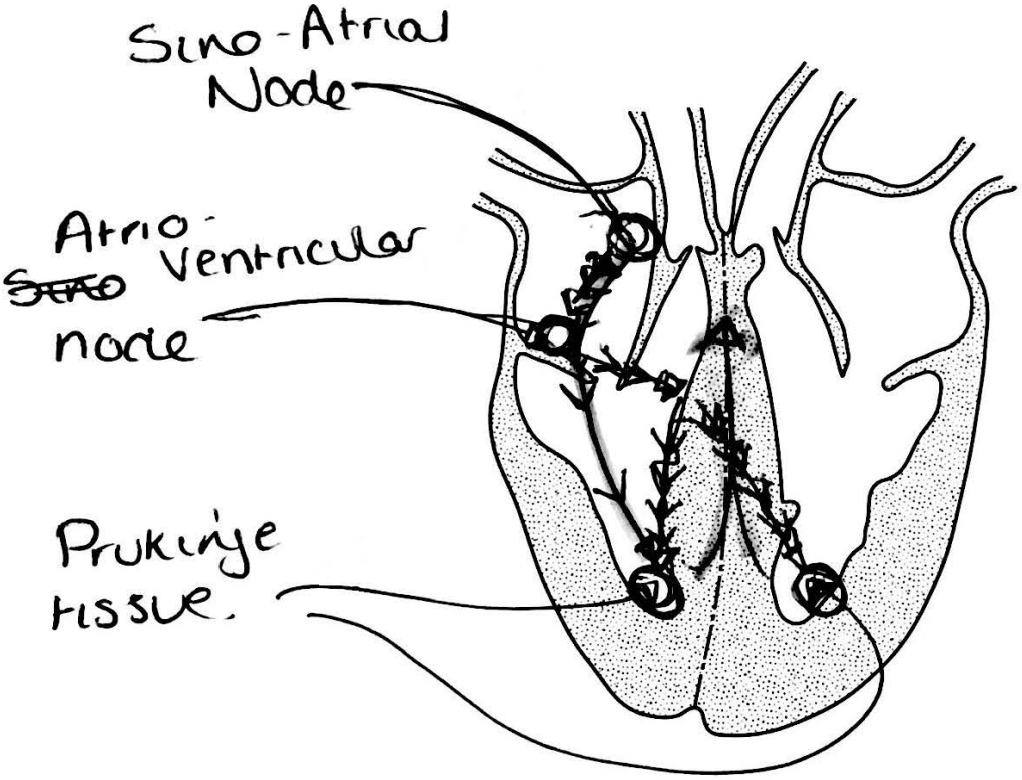

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Examiner only

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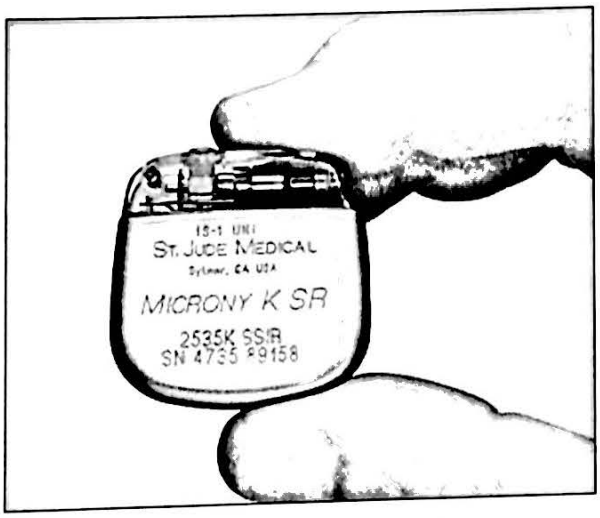

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Sino Atrial Node

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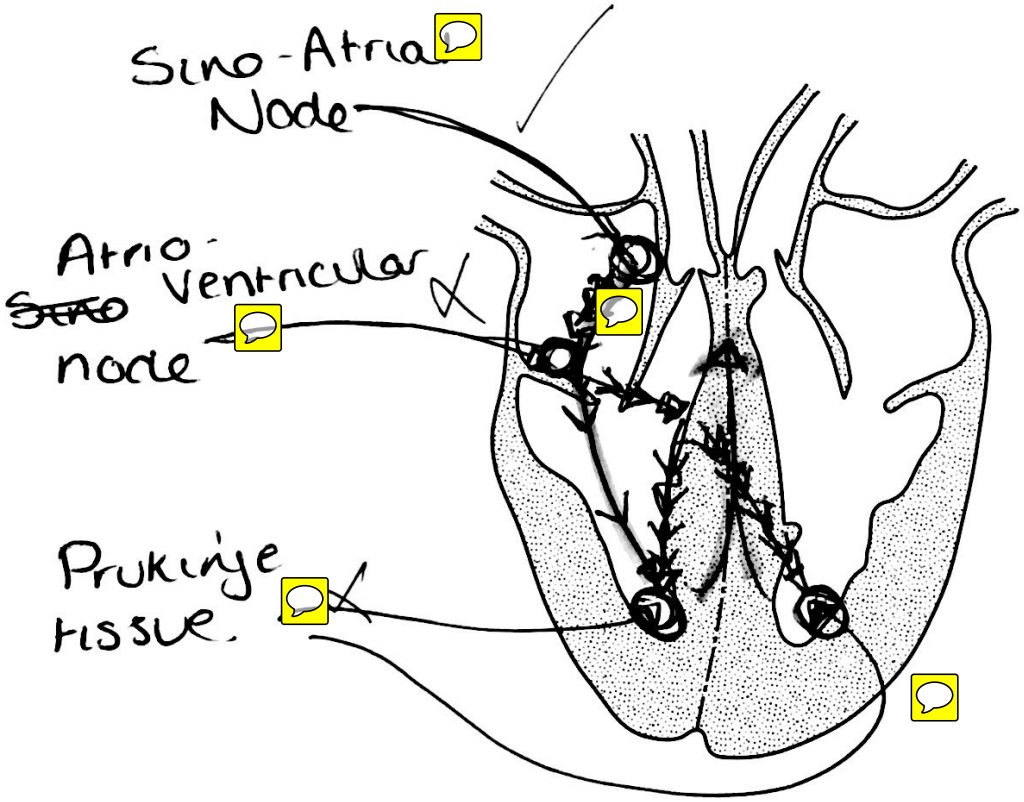

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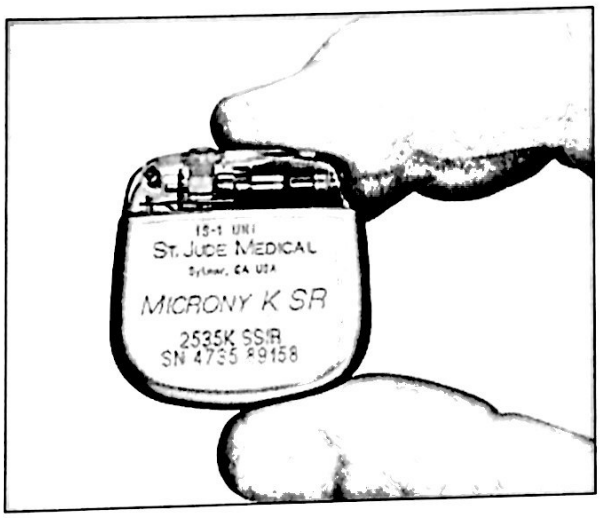

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