EXAM PAPERS PRACTICE

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Practice questions created by actual examiners and assessment experts

Detailed mark scheme

Suitable for all boards

Designed to test your ability and thoroughly prepare you

Level: HL IB in Biology
Subject: Biology
Topic: IB HL Biology
Type: Topic Question

All International Baccalaureate IB Topic Questions HL Biology

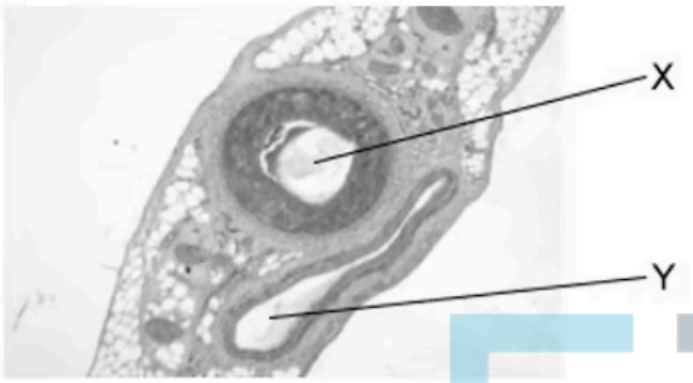
BIOLOGY

HL - IB

Key skills

Question 1

The image below shows two structures commonly found in mammals. A light microscope was used to view the sample.



Identify the structures labelled X and Y along with one correct feature of these structures.

	X	Y	Feature
A	Vein	Artery	**Y** contains deoxygenated blood
B	Trachea	Artery	the lumen of **X** allows air to pass through
C	Artery	Vein	**Y** contains many cells filled with oxyhaemoglobin
D	Artery	Vein	**X** contains many cells filled with oxyhaemoglobin

[1 mark]

Question 2

The table gives the features of three blood vessels in the mammalian circulatory system.

Vessel 1	Vessel 2	Vessel 3
Thin layer of smooth muscle with few elastic fibres	Thick layer of elastic fibres and smooth muscle	No elastic fibres or smooth muscle

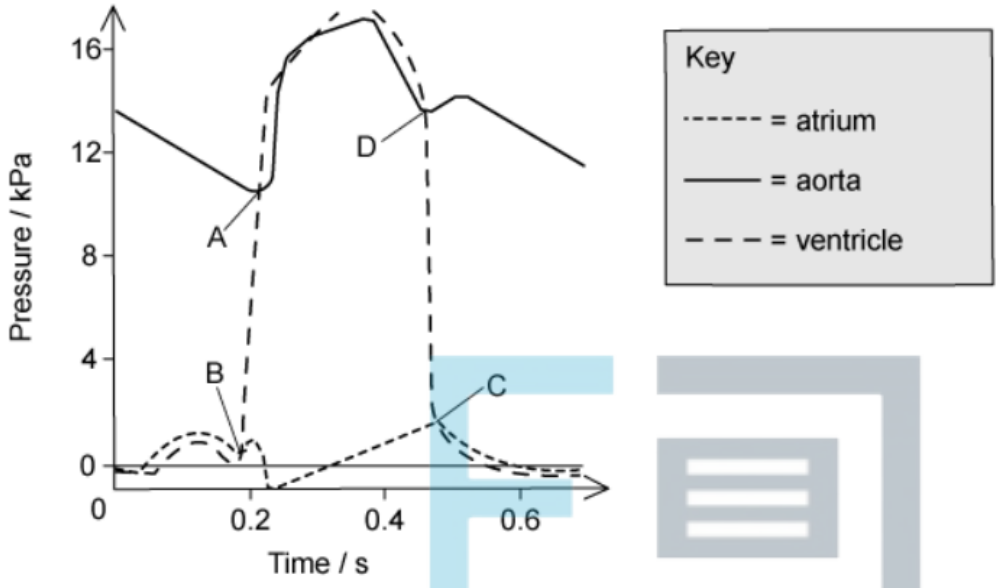
What are vessels 1, 2 and 3?

	Vein	Capillary	Artery
A	3	2	1
B	1	3	2
C	2	3	1
D	1	2	3

[1 mark]

Question 3

The graph below shows the pressure in different parts of the heart during one cardiac cycle.

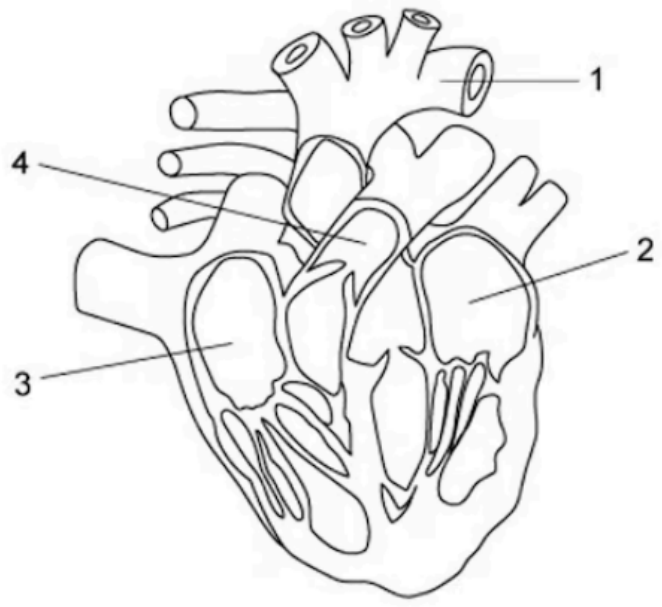


At which point does the semilunar valve of the aorta close?

[1 mark]

Question 4

The diagram below shows the heart and associated blood vessels.



Which of the following would be correct for the flow of blood through the heart?

A. 4 → 3 → 2 → 1

B. 3 → 4 → 2 → 1

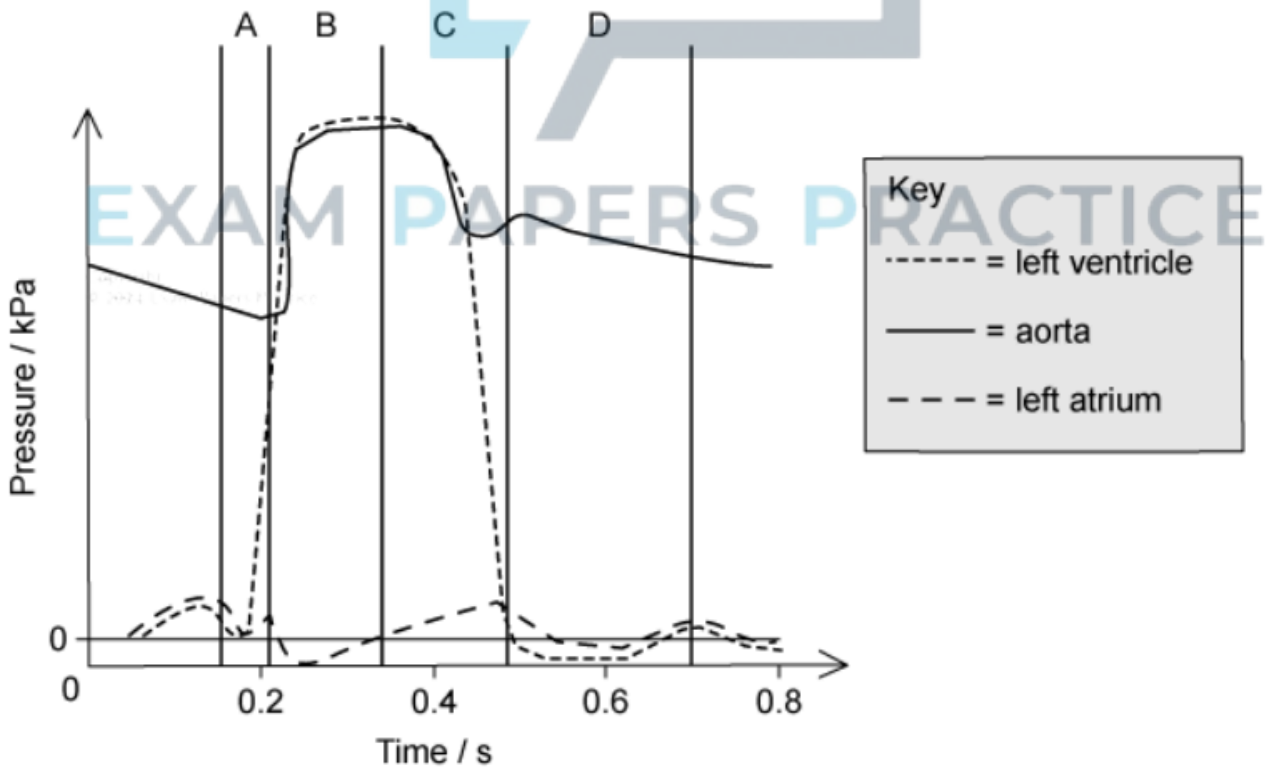
C. 2 → 1 → 4 → 3

D. 1 → 2 → 3 → 4

[1 mark]

Question 5

The graph below shows the pressure in different parts of the left side of the heart during one cardiac cycle.

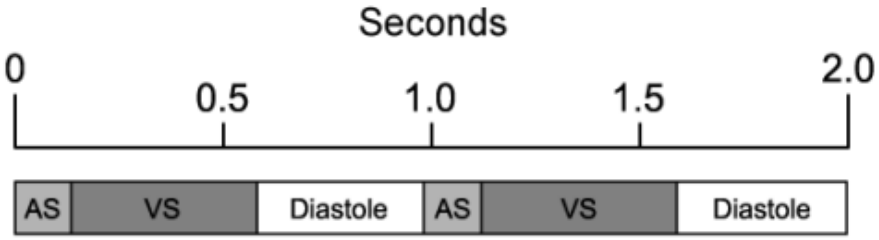


At The end of which section in the graph (A, B, C or D) would the ventricle be full of blood?

[1 mark]

Question 6

The diagram below shows two cardiac cycles of a patient. The events of the cycle are placed next to a timescale.



Key:
AS = atrial systole
VS = ventricular systole

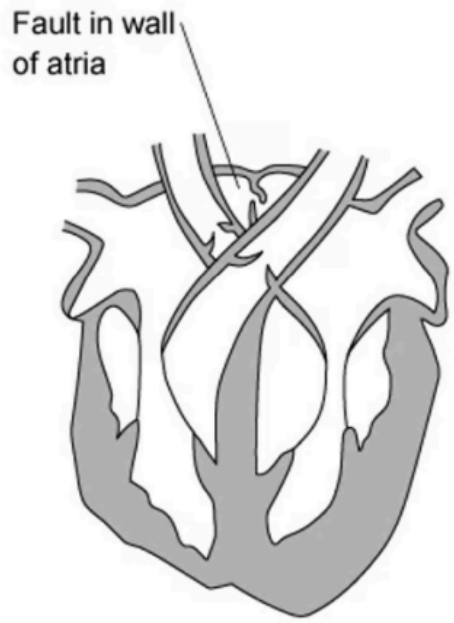
What Is the patient's heart rate in beats per minute?

A. 80
B. 60
C.120
D. 65

[1 mark]

Question 7

The diagram shows a fault in the wall of the atria.



Which of the following would describe the effect of this fault?

A.Irregular heartbeat.

B. Ventricular systole is delayed.

C.Increased pressure in the pulmonary artery.

D. Reduced oxygen saturation of haemoglobin.

[1 mark]

Question 8

Which of the following is not a contributing factor of atherosclerosis formation?

A. Damage to the endothelium of the arteries.

B. The circulation of unsaturated fats in the bloodstream.

C. High blood pressure in the arteries.

D. Build-up of atheromas under the endothelium.

[1 mark]

Question 9

When a very narrow glass tube known as a capillary tube is dipped into water, water can flow up the tube despite the opposing force of gravity.

What is this model demonstrating?

A. Translocation

B. A hydrostatic pressure gradient

C. Cohesion between water molecules

D. Adhesion between water molecules

[1 mark]

Question 10

The following steps describe the process of transpiration.

I. Water is drawn from xylem vessels to replace the water lost

II. A pulling force is transmitted throughout the xylem vessels all the way down the stem of the plant and to the ends of
the xylem in the roots

III. Water evaporates from the surfaces of cells inside a leaf

IV. A low pressure is generated within the xylem

What Is the correct order of the steps?

A.III → II → IV → I

B.III → I → IV → II

C.I → III → IV → II

D.I → IV → III → II

[1 mark]

Question 11

Which of the following relates to xylem vessels?

I. Transport organic compounds from source to sink

II. Transport mineral ions from roots to leaves

III. Provides mechanical support to the plant

IV. Closely associated with companion cells to assist with loading of sucrose

A.I only

B.II and III only

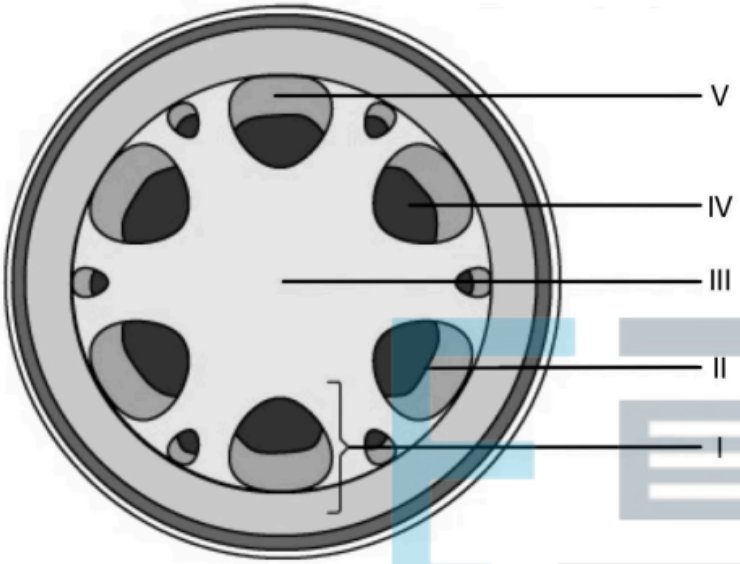
C.I, II and III

D.III and IV only

[1 mark]

Question 12

A student drew a diagrammatic representation of a transverse section of a plant stem based on what they saw using a light microscope.



Identify the correct labels required for the drawing above.

	I	II	III	IV	V
A	Vascular bundle	Pith	Phloem	Cambium	Xylem
B	Phloem	Xylem	Vascular bundle	Cambium	Pith
C	Vascular bundle	Xylem	Pith	Cambium	Phloem
D	Vascular bundle	Cambium	Pith	Xylem	Phloem

[1 mark]

Question 13

When water is taken up by roots, what process is responsible for this and what is the cause behind this process?

	Process	Cause
A	Cohesion	The concentration of solutes in the soil is higher than in the roots
B	Cohesion	The concentration of solutes in the soil is lower than in the roots
C	Osmosis	The concentration of solutes in the soil is higher than in the roots
D	Osmosis	The concentration of solutes in the soil is lower than in the roots

[1 mark]

Question 14

Identify the process by which mineral ions in soil move towards the root cell membrane.

A. Translocation

B. Transport Through proteins known as protein pumps

C. Osmosis

D. Mass flow of water

[1 mark]

Question 15

Which of the following correctly identifies a source and a sink in a plant?

	Source	Sink
A	Sprouting potato tubers	Growing apples
B	Growing apples	Sprouting potato tubers
C	Young, growing potato tubers	Mature leaves
D	Growing apples	Young, growing potato tubers

[1 mark]

Question 16

The following steps describe the process of translocation.

I. The solute concentration in the phloem sieve tubes increases

II. The increase in hydrostatic pressure causes phloem sap to flow towards sinks

III. Organic compounds are actively loaded into phloem sieve tubes

IV. Water moves into phloem vessels by osmosis

What Is the correct order of the steps?

A.III → II → IV → I

B.III → I → IV → II

C.I → III → IV → II

D.I → IV → III → II

[1 mark]

Question 17

Which of the following statements apply to phloem sieve tubes?

I. They transport organic compounds from sink to source

II. They provides mechanical support to the plant

III. They are closely associated with companion cells to assist with loading of sucrose

IV. They consist of living cells that form a continuous tube for the transport of phloem sap

A.I only

B.II and III only

C.I, II and IV

D.III and IV only

[1 mark]

Question 18

Which of the following does not contribute to generating a high hydrostatic pressure atthe source?

A. A high solute concentration in phloem sieve tubes due to the loading of sucrose

B. The incompressibility of water molecules

C. The rate at which sucrose is converted to starch in storage tissue

D. Rigid plant cell walls made of cellulose

[1 mark]

Question 19

Girdling, or ring-barking, involves the removal of a strip of bark around the entire circumference of a tree trunk. This
removes the outer part of the vascular bundles which results in the death of the entire tree overtime.

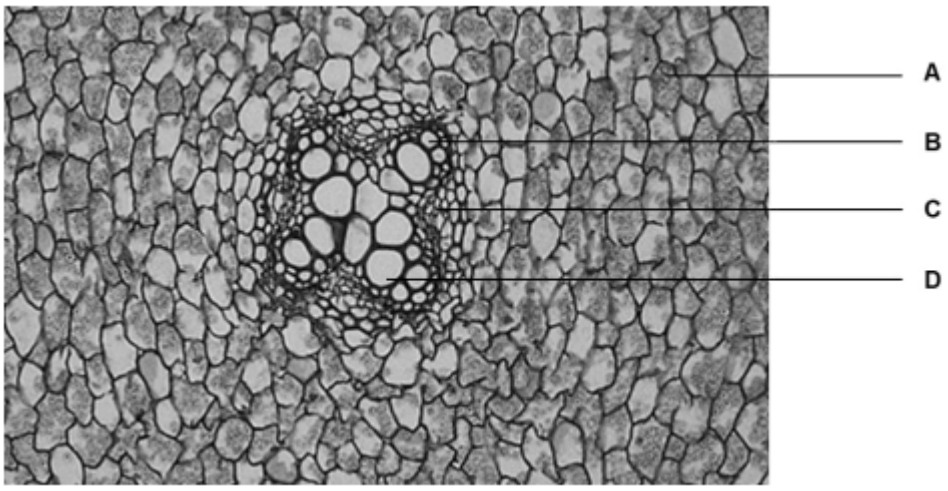
What could be a possible explanation for this?

A. Xylem is removed from the vascular bundles, so water and mineral salts cannot be transported to the leaves
B. Phloem is removed from the vascular bundles, so sugars cannot be transported to the roots
C. Xylem is removed from the vascular bundles, so sugars cannot be transported to the roots
D. Phloem is removed from the vascular bundles, so water and mineral salts cannot be transported to the leaves

[1 mark]

Question 20

The following photomicrograph shows the vascular bundle in a root.



Which letter identifies the phloem?

[1 mark]

Question 21

Aphid stylets can be used to measure phloem transport rates in plants. It was found that the transport rate in stylets located close to a source was much higher compared to those located close to a sink.

What could be a possible explanation for this?

A. The hydrostatic pressure at a sink is low due to the buildup of sucrose in the phloem sieve elements
B. The hydrostatic pressure at a sink is high due to water moving into phloem sieve elements by osmosis
C. There is a high hydrostatic pressure at the source due to the incompressibility of water
D. There is a low hydrostatic pressure at the source due to a low solute concentration in the sieve tube elements

[1 mark]