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Level: HL IB in Biology
Subject: Biology
Topic: IB HL Biology
Type: Mark Scheme

All International Baccalaureate IB Topic Questions HL Biology

BIOLOGY

HL - IB

Key skills

Answer 1

The correct answer is D because:

- All blood vessels have a smooth layer of endothelial cells surrounding the lumen.
- Arteries and veins have a layer of smooth muscle and an outer layer of collagen fibres but only arteries have a thick layer of smooth muscle and elastic fibres to withstand high blood pressure.

A is incorrect because veins don't have a thick layer of smooth muscle and few elastic fibres.

B is incorrect because capillary walls are made only from a layer of endothelial cells.

C is incorrect because venules don't have a thick layer of smooth muscle and few elastic fibres.

Answer 2

The correct answer is B because:

Daphnia magna has one heart through which hemolymph moves once during each complete circuit which therefore is a single circulatory system.

The blood is pumped around the body cavity rather than through blood vessels, so it is an open system.

A is incorrect because the *Daphnia magna* do not have blood vessels and therefore is not a closed system.

C is incorrect because the *Daphnia magna* do not have blood vessels and therefore their circulatory system is not a closed system. The blood only circulates once around the body cavity per pump.

D is incorrect because the blood only circulates once around the body cavity per pump and there is not a closed system to feed into two separate sides of the heart.

Answer 3

The correct answer is B (early diastole) - events described in the question.

A is incorrect because point W is ventricular systole - events described in the question.

C is incorrect because point Z is diastole - events described in the question.

D is incorrect because late diastole occurs after point Z - events described in the question.

Answer 4

The incorrect statement (and correct answer to this question) is C, which is describing the position of the atrioventricular node (AVN).

Statements A, B and D are all correct factual statements. A misconception is that the wave of contraction from the SAN only affects the atria; it affects ventricles too, having been transmitted via the AVN.

Answer 5

The correct answer is B because:

- Plasmodesmata are narrow threads of cytoplasm that pass through the cell walls of adjacent plant cells.
- Plasmodesmata allow:
    - Communication between cells
    - Cytoplasmic movement of nutrients between cells
    - Symplastic movement of water

The communication between neighbouring cells via the plasmodesmata is achieved by the cytoplasmic movement of substances between cells.

Cell recognition is carried out by surface chemicals on membranes. A typical example is a hormone receptor site or an antigen binding site on a cell.

Answer 6

The correct answer is C. Leaves act as a source due to the production of sugars by photosynthesis. The movement of these organic compounds into the phloem sieve tubes in the leaves will increase the solute concentration/osmolarity of the sieve tubes and will result in the movement of water into the sieve tubes by osmosis. This leads to an increase in the hydrostatic pressure inside the sieve tubes in and near the leaves The opposite process will occur at the fruit, which acts as a sink, and a low hydrostatic pressure will be present in the sieve tubes at this point. This creates a pressure gradient between the leaves (source) and fruit (sink) which drives the mass flow of phloem sap from the leaves to the fruit.

A: The active loading of sucrose occurs near the leaves and not the fruit.

B: The movement of water within the phloem sieve tubes may influence hydrostatic pressure, but it is not the main factor that determines the direction of mass flow. The movement of water is determined by the difference in solute concentration between the source and the sink.

D: The unloading of organic compounds from the phloem sieve tubes will decrease the osmolarity of the phloem sap in the sieve tubes.