

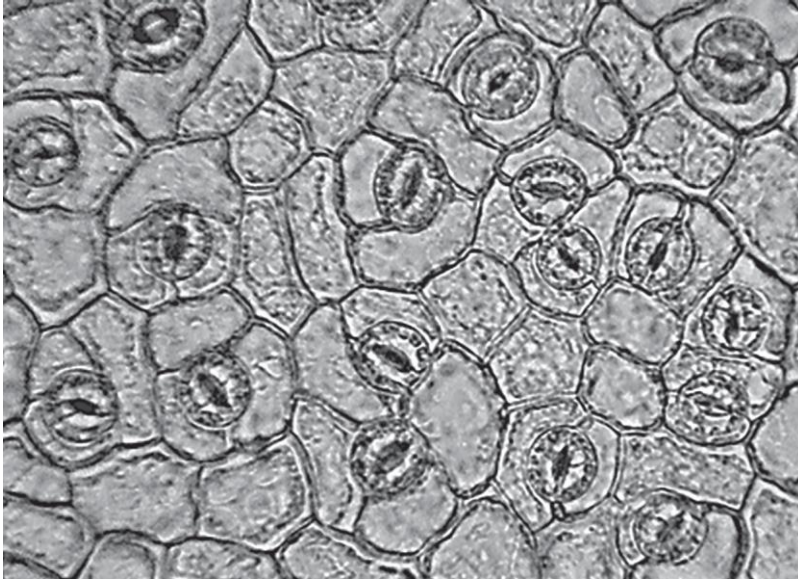
**A Level Biology A**  
**H420/01 Biological Processes**

**Question Set 24**

Multiple Choice Questions

- 1 A student counted stomata on a leaf using a light microscope. The image below shows the stomata that were visible.

The image magnification is  $\times 60$ .



Which of the options, A to D, is the correct stomatal density of this leaf?

- A 7.50 stomata  $\text{mm}^{-2}$
- B 0.13 stomata  $\text{mm}^{-2}$
- C 2428 stomata  $\text{mm}^{-2}$
- D 0.21 stomata  $\text{mm}^{-2}$

Your answer

[1]

- 2** Bony fish absorb dissolved oxygen from the water using gills. Water is passed through the buccal cavity and over the gill lamellae. The oxygen saturation of the blood and water changes as the water passes over the gills.

Which of the statements, **A** to **D**, correctly describes the way oxygen is transferred into the blood at the gills?

- A** Blood and water flow in a concurrent system with a constant concentration gradient between them.
- B** Blood and water flow in a countercurrent system with a constant concentration gradient between them.
- C** Blood and water flow in a concurrent system with a greater concentration gradient between them at the start of the gill lamella.
- D** Blood and water flow in a countercurrent system with a greater concentration gradient between them at the start of the gill lamella.

Your answer

[1]

- 3** Which of the statements, **A** to **D**, correctly describes the process of adhesion?

- A** attraction of water molecules to the impermeable walls of xylem tissue
- B** attraction of water molecules to other water molecules in the xylem tissue
- C** active transport of water molecules into phloem tissue
- D** attraction of water molecules to other water molecules in the phloem tissue

Your answer

[1]

- 4 Different sized mammals have different surface area to volume ratios.

The table shows the surface areas and volumes of four different groups of mammals.

Mammal genus	Surface area (m <sup>2</sup> )	Volume (m <sup>3</sup> )
<i>Oryctolagus</i>	0.48	$2.0 \times 10^{-2}$
<i>Equus</i>	18.26	2.24
<i>Mus</i>	$1.9 \times 10^{-3}$	$7.2 \times 10^{-5}$
<i>Rattus</i>	0.32	$1.6 \times 10^{-2}$

Which of the options, A to D, is the correct order of surface area to volume ratios for the different mammals, arranged from the largest to the smallest?

- A *Oryctolagus*, *Rattus*, *Equus*, *Mus*
- B *Mus*, *Rattus*, *Oryctolagus*, *Equus*
- C *Mus*, *Oryctolagus*, *Rattus*, *Equus*
- D *Equus*, *Mus*, *Oryctolagus*, *Rattus*

Your answer

[1]

- 5 Mistletoe is a plant parasite that lives on the stems of other plants. It survives by removing water and assimilates from the host plant.

The mistletoe binds to the stem of the host plant and grows a specialised root-like tissue called a haustorium that attaches to different tissues in the stem.

One species of mistletoe, *Viscum minimum*, contains no chloroplasts.

Which of the options, **A to D**, explains why *V. minimum* does not need chloroplasts?

- A the haustorium of *V. minimum* attaches to sieve tube elements
- B the haustorium of *V. minimum* attaches to xylem vessels
- C the haustorium of *V. minimum* attaches to meristem cells
- D the haustorium of *V. minimum* attaches to cambium tissue

Your answer

[1]

6 Which of the following statements, **A** to **D**, correctly explains a feature of an efficient gaseous exchange surface?

- A** The layers are thin for a short diffusion distance.
- B** There is a good blood supply, so the system reaches equilibrium quickly.
- C** There is an increased surface area to reduce surface area to volume ratio.
- D** Ventilation takes place to reduce concentration gradient of dissolved gases.

Your answer

[1]

7 Which of the statements, **A** to **D**, applies to transpiration **and** evaporation?

- A** It occurs at a faster rate at higher humidity.
- B** It occurs at a slower rate at greater wind speed.
- C** It occurs at a slower rate at higher temperature.
- D** It occurs at the surface of leaves.

Your answer

[1]

8 Which of the statements, **A** to **D**, explains why diastole follows systole in the mammalian heart?

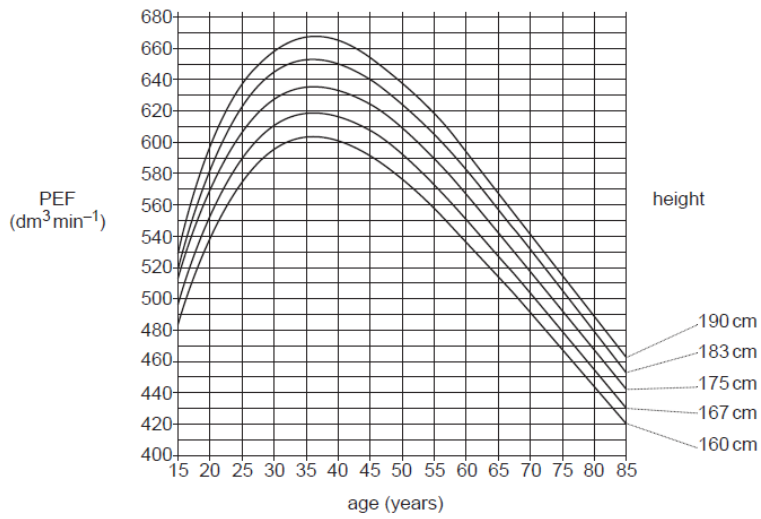
- A** Cardiac muscle is myogenic.
- B** Cardiac muscle takes a short time to repolarise after being stimulated.
- C** The aorta is capable of maintaining the pressure generated by the left ventricle.
- D** The SAN receives impulses from the AVN.

Your answer

[1]

- 9 Peak expiratory flow (PEF) is a measure of the maximum rate at which a person can exhale.

The graph below shows the typical PEF values for men of different ages and heights.



Which of the following is the percentage increase from the PEF of a 20 year old man of 175 cm to the PEF of a 45 year old man of 183 cm?

- A 19.4%
- B 10.9%
- C 12.3%
- D 8.1%

Your answer

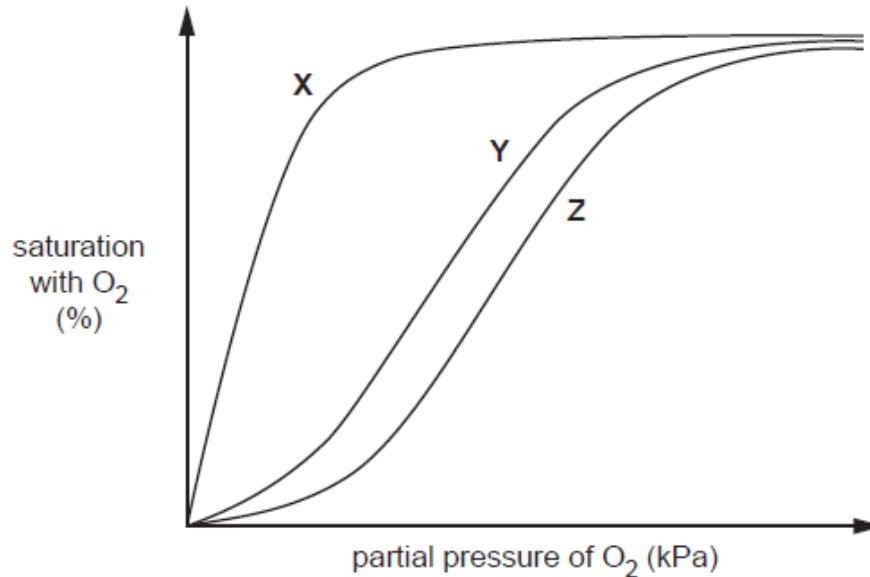
[1]

10

Myoglobin is a protein found in muscle. Myoglobin has a very high affinity for oxygen at most partial pressures of oxygen.

The figure below shows dissociation curves for

- adult haemoglobin
- fetal haemoglobin
- myoglobin.



Which of the following rows, **A** to **D**, shows the correct labels for the lines on the graph?

	<b>X</b>	<b>Y</b>	<b>Z</b>
<b>A</b>	myoglobin	fetal haemoglobin	adult haemoglobin
<b>B</b>	fetal haemoglobin	adult haemoglobin	myoglobin
<b>C</b>	adult haemoglobin	fetal haemoglobin	myoglobin
<b>D</b>	myoglobin	adult haemoglobin	fetal haemoglobin

Your answer

[1]

**Total Marks for Question Set 24: 10**

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