Exam Papers Practice

6.2 The Blood System

Mark Schemes

Course	DP IB Biology
Section	6. Human Physiology
Topic	6.2 The Blood System
Difficulty	Medium

To be used by all students preparing for DP IB Biology HL
Students of other boards may also find this useful

1

The correct answer is **D** because it shows the artery (X) with thick muscle and elastic tissue and a small lumen compared to the vein (Y). The red blood cells in X will mainly contain haemoglobin that is bound to oxygen, or oxyhaemoglobin.

A is incorrect because X and Y are the wrong way around.

B is incorrect because the trachea is the windpipe down to the lungs and not a blood vessel.

C is incorrect because by the time blood has reached Y it is likely to have given up its oxygen to respiring tissues, and so will contain haemoglobin but not oxyhaemoglobin.

2

The correct answer is **A**; a theory requires evidence to support observations made.

C is incorrect as it makes no reference to an explanation for the observed phenomenon.

B and **D** are incorrect as they both define how a hypothesis is used before any investigations have been carried out or evidence collected.

3

The correct answer is **B**; arteries have a thick layer of muscle and elastic fibres to withstand high pressure, veins have thinner tissue layers and valves to prevent backflow and capillaries have just one layer of cells to maximise diffusion.

4

The correct answer is **D** because the semilunar valves will close after ventricular contraction when pressure is higher in the aorta than the ventricle; this prevents backflow of blood from the aorta into the ventricle.

A, B and **C** are all incorrect; **A** is where semilunar valves open, **B** is where atrioventricular valves shut, **C** is where atrioventricular valves open.

5

The correct answer is **B** because blood flows into the right atrium (3) of the heart first, followed by the ventricles and then out of the heart via the pulmonary artery (4). Blood then re enters the heart from the lungs via the left atrium (2), moves down into the left ventricle before exiting via the aorta (1).

A, C and **D** are incorrect because each one involves the blood flowing backward through the heart e.g. from ventricle to atria; this cannot happen.

6

The correct answer is **A** because it marks the end of atrial systole when contraction of the atria forces blood into the ventricles so that they become full of blood.

B is incorrect as it shows the ventricular systole when the blood is being pushed out of the ventricles.

C and **D** are incorrect because they represent diastole when the atria and ventricles are relaxing; at this stage the chambers of the heart begin to fill with blood, but neither are completely full yet.

7

The correct answer is **B**.

2 heart beats in 2 seconds
= 1 beat per second
= 60 bpm → beats per minute

8

The correct answer is **D**; the hole between the left and right atria shown in the diagram would allow the mixing of oxygenated blood from the left atrium and the deoxygenated blood from the right atrium. The mixing of the blood would reduce the overall oxygen saturation of haemoglobin as deoxygenated blood would be pumped around the body and not just to the lungs.

A and **B** are incorrect as they are issues which would be caused by problems with the SA or AV nodes.

C is incorrect because the pulmonary artery takes blood from the right ventricle to the lungs; the pressure generated by the right ventricle would not be affected by a fault in the wall between the atria.

9

The correct answer is **B** because low density lipoproteins increase the risk of atherosclerosis formation and not high density lipoproteins.

10

The correct answer is **B**; the heart must beat faster if pressure, oxygen and pH are low as it is important for the respiring tissues to have a supply of oxygen and for carbon dioxide, which decreases pH, to be removed.

High blood pressure, high blood oxygen, and high blood pH all result in the slowing down of the heart rate by a nerve signal from the inhibitory centre.