

The heart and circulation: practice questions

7 questions · 23 marks · mark scheme at the back

For Pearson Edexcel International GCSE Biology 4BI1 and Science (Double Award) 4SD0. **Biology only** is not in the Double Award and is only examined on Paper 2.

Name

Total / 23

1 What is the effect of adrenaline on the heart? [1 mark]

- A. ☐ It decreases the heart rate
- B. ☐ It increases the heart rate
- C. ☐ It stops the valves from closing
- D. ☐ It makes the septum thicker

2 Explain why the wall of the left ventricle is thicker than the wall of the right ventricle. [3 marks]

3 Explain why the heart rate increases during exercise. [3 marks]

4 A student counted 20 pulses in 15 seconds at rest and 38 pulses in 15 seconds straight after exercise. Calculate the increase in heart rate in beats per minute. [3 marks]

Answer =

5 Explain how coronary heart disease develops and how lifestyle and other factors may increase the risk of developing it.

[6 marks]

[illegible]

6 Explain how the structure of a capillary is related to its function.

[3 marks]

[illegible]

7 Name the blood vessel that (a) carries blood from the aorta to the kidneys, (b) carries blood from the gut to the liver, (c) carries deoxygenated blood from the heart to the lungs, (d) carries blood from the liver to the vena cava.

[4 marks]

[illegible]

Mark scheme

One mark for each point unless a maximum is given. Words in brackets are not needed for the mark.

1. [1]

B B (1)

2. [3]

- the left ventricle pumps blood around the whole body (1)
- the right ventricle pumps blood only to the lungs (1)
- a higher pressure is needed to pump blood around the body, so it needs more muscle (1)

3. [3]

- muscles respire faster / more (1)
- more oxygen and glucose are needed (1) allow more energy needed
- more carbon dioxide is produced and must be removed (1)
- increased heart rate delivers blood to the muscles faster (1)
- Max 3

4. [3]

- resting rate = $20 \times 4 = 80$ beats per minute (1)
- rate after exercise = $38 \times 4 = 152$ beats per minute (1)
- increase = 72 beats per minute (1) (allow ecf from one error)

5. [6]

Level 3 5-6	A detailed explanation of how CHD develops in the coronary arteries and its effect on the heart muscle, with at least three risk factors each linked to how they increase the risk. The answer is well organised and uses scientific terms.
Level 2 3-4	Describes how CHD develops or its effect, and gives at least two risk factors with some explanation of how they increase the risk.
Level 1 1-2	Names one or two risk factors, or states that the arteries are blocked, with little or no explanation.

Indicative content

- fatty material builds up in the coronary arteries, narrowing them
- less blood flows to the heart muscle, so it receives less oxygen and glucose and cannot respire enough
- this can cause chest pain or a heart attack
- a diet high in saturated fat / cholesterol increases the fatty deposits
- smoking damages the artery lining, raises blood pressure and reduces the oxygen carried by the blood
- high blood pressure damages the artery walls
- lack of exercise, obesity and stress are linked to raised blood pressure
- genetic factors (family history) and age also increase the risk

6. [3]

- the wall is one cell thick (1)
- so there is a short diffusion distance (1)
- very narrow and forms a large network, so a large surface area / reaches every cell (1)
- function is to exchange substances between the blood and cells (1)
- Max 3

7. [4]

- (a) renal artery (1)
- (b) hepatic portal vein (1)
- (c) pulmonary artery (1)
- (d) hepatic vein (1)