

The heart and circulation: practice questions

7 questions · 19 marks · mark scheme at the back

For Edexcel GCSE Biology 1BI0 and Combined Science 1SC0. **Triple only** is not in Combined Science. **Higher tier** is only on the Higher paper.

Name

Total / 19

1 Which blood vessel carries oxygenated blood from the lungs to the heart? [1 mark]

- A. ☐ Aorta
- B. ☐ Pulmonary artery
- C. ☐ Pulmonary vein
- D. ☐ Vena cava

2 Explain the role of the valves in the heart. [2 marks]

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

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4 A person has a heart rate of 72 beats per minute and a stroke volume of 70 cm³. Calculate the cardiac output. Include the unit. [2 marks]

Answer =

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- 5** A person has a cardiac output of 6300 cm^3 per minute and a heart rate of 90 beats per minute. Calculate the stroke volume. **[3 marks]**

Answer =

[illegible]

- 6** A student counts 21 pulse beats in 15 seconds. Calculate the student's heart rate in beats per minute. **[2 marks]**

Answer =

[illegible]

- 7** Explain how the structure of the heart and the circulatory system allow blood to be delivered to both the lungs and the rest of the body. **[6 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]

C C (pulmonary vein)

2. [2]

- prevent backflow of blood (1)
- so the blood flows in one direction only (1)

3. [3]

- left ventricle pumps blood around the whole body (1)
- right ventricle pumps blood only to the lungs (1)
- so the left ventricle needs to produce a higher pressure / more force, so a thicker muscle wall is needed (1)

4. [2]

- 72×70 (1)
- = 5040 cm³ per minute (1) allow cm³/min; correct answer with no working = 2 marks; 5040 with no unit or the wrong unit = 1 mark

5. [3]

- stroke volume = cardiac output $\div$ heart rate (1)
- $6300 \div 90$ (1)
- 70 cm³ (1)

6. [2]

- $21 \times 4 / 21 \div 15 \times 60$ (1)
- = 84 beats per minute (1) allow bpm

7. [6]

Level 3 5-6	A clear and logical explanation which follows the blood through both circuits, naming the major vessels and explaining the roles of the valves and the different wall thicknesses.
Level 2 3-4	Some of the structure is described with some explanation of function, but the account of the route or the adaptations may be incomplete.
Level 1 1-2	Some structures or vessels are named, with little or no explanation of how they relate to function.

Indicative content

- double circulatory system: one circuit to the lungs, one to the body
- deoxygenated blood enters the right atrium from the vena cava, and passes to the right ventricle
- right ventricle pumps blood to the lungs through the pulmonary artery
- oxygenated blood returns in the pulmonary vein to the left atrium, then the left ventricle
- left ventricle pumps blood to the body through the aorta
- left ventricle has a thicker wall than the right ventricle because it pumps blood at higher pressure around the whole body, while the right ventricle pumps to the lungs
- valves prevent backflow so blood flows one way
- ventricle walls are thicker than atrium walls because they pump blood out of the heart