

Higher Combined version — Higher Tier (★) included; Separate-only (◆) removed.

**Q1. Describe the double circulatory system in mammals.**

[2 marks]

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**Q2. Explain why the left ventricle has a thicker muscular wall than the right ventricle.**

[2 marks]

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**Q3. Describe how coronary heart disease develops. Describe TWO treatments and evaluate ONE of them.**

[4 marks]

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★ HIGHER TIER

**Q4. ★ A patient has heart rate 68 bpm and stroke volume 75 cm<sup>3</sup>. Calculate cardiac output in cm<sup>3</sup>/min and in dm<sup>3</sup>/min.**

[2 marks]

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Total: 10 marks

**Q1 (2 marks)**

*Describe the double circulatory system in mammals.*

- Pulmonary circulation: right side of heart → lungs → left side (picks up O<sub>2</sub>) [1]
- Systemic circulation: left side of heart → body → right side (delivers O<sub>2</sub>) [1]

**Q2 (2 marks)**

*Explain why the left ventricle has a thicker muscular wall than the right ventricle.*

- Left ventricle pumps blood around the whole body — much longer circuit requiring higher pressure [1]
- Thicker muscle generates greater force to push blood further [1]

**Q3 (4 marks)**

*Describe how coronary heart disease develops. Describe TWO treatments and evaluate ONE of ...*

- Fatty plaques (atherosclerosis) build up in coronary arteries, narrowing them → reduces O<sub>2</sub> to heart muscle [1]
- Stents: inserted to widen artery — effective, minimally invasive, but blood clot risk [1]
- Statins: reduce LDL cholesterol — must be taken lifelong, side effects possible, but reduces risk of further plaques [1]
- Bypass surgery: reroutes blood — highly effective long-term but major surgery with risks [1]

**Q4 (2 marks) [★ HT]**

*★ A patient has heart rate 68 bpm and stroke volume 75 cm<sup>3</sup>. Calculate cardiac output in cm<sup>3</sup>...*

- Cardiac output =  $68 \times 75 = 5100 \text{ cm}^3/\text{min}$  [1]
- =  $5.1 \text{ dm}^3/\text{min}$  [1]