Full Higher Separate content. ★ = Higher Tier. ◆ = Separate Science only.

Q1. Describe the double circulatory system in mammals.

[2 marks]

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

[2 marks]

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

[4 marks]

★ HIGHER TIER

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

[2 marks]

Total: 10 marks

Heart and Circulation

Q1 (2 marks)

Describe the double circulatory system in mammals.

- Pulmonary circulation: right side of heart → lungs → left side (picks up O■) [1]
- Systemic circulation: left side of heart → body → right side (delivers O■) [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■ 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^3. Calculate cardiac output in cm…

- Cardiac output = 68 × 75 = 5100 cm^3/min [1]
- = 5.1 dm^3/min [1]