

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

**Q1. Explain why the mammalian circulation is called a double circulatory system.**

[3 marks]

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**Q2. Compare arteries and veins. Link each structural feature to its function.**

[3 marks]

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★ HIGHER TIER

**Q3. ★ A patient's heart rate is 72 bpm with stroke volume of 75 cm<sup>3</sup>. Calculate cardiac output in dm<sup>3</sup>/min.**

[2 marks]

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**Total: 8 marks**

**Q1 (3 marks)**

*Explain why the mammalian circulation is called a double circulatory system.*

- Right side pumps deoxygenated blood to lungs (pulmonary circulation) [1]
- Left side pumps oxygenated blood to body (systemic circulation) [1]
- Two separate circuits — prevents mixing of oxygenated and deoxygenated blood [1]

**Q2 (3 marks)**

*Compare arteries and veins. Link each structural feature to its function.*

- Arteries: thick elastic walls — withstand and smooth high pressure from heart [1]
- Veins: valves — prevent backflow of low-pressure blood [1]
- Arteries: narrow lumen maintains pressure; veins: wide lumen reduces resistance [1]

**Q3 (2 marks) [★ HT]**

*★ A patient's heart rate is 72 bpm with stroke volume of 75 cm<sup>3</sup>. Calculate cardiac output ...*

- $72 \times 75 = 5400 \text{ cm}^3/\text{min}$  [1]
- $= 5.4 \text{ dm}^3/\text{min}$  [1]