

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

**Q1. Define stem cell and explain why stem cells are important in medicine.**

[2 marks]

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**Q2. Compare embryonic and adult stem cells in terms of their potency, source and ethical status.**

[4 marks]

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★ HIGHER TIER

**Q3. ★ Evaluate the therapeutic use of embryonic stem cells to treat conditions such as Parkinson's disease.**

[4 marks]

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Total: 10 marks

**Q1 (2 marks)**

*Define stem cell and explain why stem cells are important in medicine.*

- Undifferentiated cell that can divide and differentiate into specialised cell types [1]
- Can potentially replace damaged or diseased tissue — e.g. treat leukaemia, Parkinson's, diabetes [1]

**Q2 (4 marks)**

*Compare embryonic and adult stem cells in terms of their potency, source and ethical statu...*

- Embryonic: totipotent — can become any cell type; adult: limited range e.g. blood cells only [1]
- Embryonic: from blastocyst stage embryo; adult: from tissues such as bone marrow [1]
- Embryonic: ethically controversial — requires destruction of embryo [1]
- Adult: less controversial — harvested from living donor [1]

**Q3 (4 marks) [★ HT]**

*★ Evaluate the therapeutic use of embryonic stem cells to treat conditions such as Parkins...*

- Embryonic stem cells are totipotent — could differentiate into any neuronal cell type needed [1]
- Could provide a cure rather than only symptom management [1]
- Obtaining embryonic stem cells destroys a human embryo — raises ethical concerns about destroying potential human life [1]
- Risk: immune rejection unless therapeutic cloning used; risk of tumour formation; long-term effects unknown [1]