

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

**Q1. Describe the cell cycle. Explain what happens at each stage.**

[4 marks]

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**Q2. Compare embryonic and adult stem cells. Evaluate the use of embryonic stem cells in medicine.**

[4 marks]

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★ HIGHER TIER

**Q3. ★ Explain how cancer results from failure of normal cell cycle control.**

[3 marks]

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**Total: 11 marks**

**Q1 (4 marks)**

*Describe the cell cycle. Explain what happens at each stage.*

- G1 (interphase): cell grows, new organelles made [1]
- S phase: DNA replicates [1]
- G2: cell checks DNA, prepares for division [1]
- M (mitosis): chromosomes separate; cytokinesis → 2 identical diploid daughter cells [1]

**Q2 (4 marks)**

*Compare embryonic and adult stem cells. Evaluate the use of embryonic stem cells in medici...*

- Embryonic: totipotent; adult: limited range [1]
- Embryonic: could treat many diseases by providing any cell type [1]
- Concern: destroying embryo raises ethical issues [1]
- Risks: immune rejection, possible tumour formation [1]

**Q3 (3 marks) [★ HT]**

*★ Explain how cancer results from failure of normal cell cycle control.*

- Mutations in genes controlling cell cycle checkpoints [1]
- Cells no longer respond to stop signals → divide uncontrollably [1]
- Malignant tumour: cells invade surrounding tissue, can metastasise via blood [1]