Higher Tier — Separate Science

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

Q1. State TWO uses of mitosis in the human body.

[2 marks]

Q2. Describe the sequence of events in mitosis, starting with DNA replication.

[4 marks]

Q3. Explain how cancer arises from abnormal cell division.

[3 marks]

★ HIGHER TIER

Q4. ★ Describe the differences between a benign and a malignant tumour. Explain why malignant tumours are more dangerous.

[3 marks]

Total: 12 marks

ll Division — Mitosis

Q1 (2 marks)

State TWO uses of mitosis in the human body.

- Growth — increasing the number of cells [1]
- Repair / replacement of damaged or worn-out cells [1]

Q2 (4 marks)

Describe the sequence of events in mitosis, starting with DNA replication.

- DNA replicates — each chromosome is copied exactly [1]
- Chromosomes condense and become visible [1]
- Chromosomes line up at the equator of the cell [1]
- Spindle fibres pull chromosome copies to opposite poles → cell divides → two genetically identical daughter cells, each with the original chromosome number [1]

Q3 (3 marks)

Explain how cancer arises from abnormal cell division.

- Mutations in genes that control the cell cycle [1]
- Normal checkpoints fail — cells no longer respond to stop signals [1]
- Cells divide continuously and uncontrollably → tumour forms [1]

Q4 (3 marks) [★ HT]

★ Describe the differences between a benign and a malignant tumour. Explain why malignant …

- Benign: stays localised, does not invade surrounding tissue [1]
- Malignant: invades surrounding tissue; cells can break off and travel in blood/lymph to form secondary tumours (metastasis) [1]
- Malignant is more dangerous because secondary tumours can form in vital organs and are difficult to treat [1]