Higher Tier — Separate Science

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

Q1. Explain how blood glucose is controlled when it falls below the normal range.

[4 marks]

Q2. Compare Type 1 and Type 2 diabetes.

[4 marks]

Q3. Describe the thermoregulation responses when body temperature rises above 37°C.

[4 marks]

Total: 12 marks

Q1 (4 marks)

Explain how blood glucose is controlled when it falls below the normal range.

- Alpha cells in pancreas detect low blood glucose [1]
- Glucagon released into blood [1]
- Glucagon causes liver to break down glycogen → glucose (glycogenolysis) [1]
- Glucose released into blood → concentration rises back to normal [1]

Q2 (4 marks)

Compare Type 1 and Type 2 diabetes.

- Type 1: autoimmune — beta cells destroyed → no insulin → injections required [1+1]
- Type 2: insulin resistance — cells cannot respond → managed with diet/exercise/medication [1+1]

Q3 (4 marks)

Describe the thermoregulation responses when body temperature rises above 37°C.

- Hypothalamus detects rise in blood temperature [1]
- Sweating: evaporation removes heat [1]
- Vasodilation: more blood near skin surface → more heat radiated [1]
- Hairs lie flat: reduce insulating air layer [1]