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

Q1. Explain the hormonal response when blood glucose rises above normal after a meal.

[4 marks]

Q2. Compare Type 1 and Type 2 diabetes in terms of cause, mechanism and treatment.

[4 marks]

★ HIGHER TIER

Q3. ★ Explain why blood glucose control is described as a negative feedback system.

[3 marks]

★ HIGHER TIER

Q4. ★ Explain what glycogenesis and glycogenolysis are and when each occurs.

[2 marks]

Total: 13 marks

Q1 (4 marks)

Explain the hormonal response when blood glucose rises above normal after a meal.

- Pancreatic beta cells detect high blood glucose [1]
- Insulin is secreted into the blood [1]
- Insulin causes cells to take up glucose; liver converts glucose to glycogen (glycogenesis) [1]
- Blood glucose falls back to normal — insulin secretion decreases [1]

Q2 (4 marks)

Compare Type 1 and Type 2 diabetes in terms of cause, mechanism and treatment.

- Type 1: autoimmune — beta cells destroyed → no insulin produced [1] → requires insulin injections [1]
- Type 2: body cells become resistant to insulin (still produced) [1] → managed with diet, exercise, weight loss [1]

Q3 (3 marks) [★ HT]

★ *Explain why blood glucose control is described as a negative feedback system.*

- A change in blood glucose (high or low) triggers a response [1]
- The response OPPOSES the change — high glucose → insulin lowers it; low glucose → glucagon raises it [1]
- This returns blood glucose to the set point — negative feedback restores normal conditions [1]

Q4 (2 marks) [★ HT]

★ *Explain what glycogenesis and glycogenolysis are and when each occurs.*

- Glycogenesis: conversion of glucose → glycogen in the liver (when blood glucose is HIGH / after a meal) [1]
- Glycogenolysis: breakdown of glycogen → glucose (when blood glucose is LOW / during exercise) [1]