

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

★ HIGHER TIER

Q1. ★ Describe the process of genetic engineering. Name both enzymes used.

[4 marks]

★ HIGHER TIER

Q2. ★ Give ONE advantage and ONE concern about GM crops.

[2 marks]

Total: 6 marks

Q1 (4 marks) [★ HT]

★ Describe the process of genetic engineering. Name both enzymes used.

- Desired gene cut from donor DNA using RESTRICTION ENZYMES [1]
- Plasmid cut with same enzyme → complementary sticky ends [1]
- Gene inserted into plasmid; LIGASE seals joins → recombinant DNA [1]
- Plasmid introduced into host cell; host expresses gene and produces desired protein [1]

Q2 (2 marks) [★ HT]

★ Give ONE advantage and ONE concern about GM crops.

- Advantage: herbicide/pest resistant, higher yield, improved nutrition [1]
- Concern: unknown ecological effects, cross-pollination with wild plants, ethical concerns [1]