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

Q1. Describe the process of selective breeding and ONE disadvantage.

[3 marks]

★ HIGHER TIER

Q2. ★ Describe the process of genetic engineering to produce herbicide-resistant crops. Name the enzymes.

[4 marks]

Q3. Evaluate the use of genetically modified (GM) crops.

[4 marks]

Total: 11 marks

g and Genetic Engineering (4.5–4.7)

Q1 (3 marks)

Describe the process of selective breeding and ONE disadvantage.

- Select individuals with desired traits → breed → select offspring → repeat [1]
- Improves traits over generations [1]
- Disadvantage: reduces genetic diversity / inbreeding risk [1]

Q2 (4 marks) [★ HT]

★ Describe the process of genetic engineering to produce herbicide-resistant crops. Name t…

- Herbicide resistance gene cut from donor DNA using RESTRICTION ENZYMES [1]
- Inserted into plasmid vector; LIGASE seals joins [1]
- Recombinant plasmid introduced into plant cells (e.g. via Agrobacterium) [1]
- Plants grown from transformed cells — all carry resistance gene [1]

Q3 (4 marks)

Evaluate the use of genetically modified (GM) crops.

- Benefit: herbicide/pest resistant — reduces chemical use [1]
- Benefit: improved nutrition (e.g. golden rice) / higher yield [1]
- Concern: GM genes may spread to wild plants — ecological consequences [1]
- Concern: ethical issues, corporate control of seed supply [1]