Higher Tier — Separate Science

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

Q1. Explain how guard cells control the opening and closing of stomata.

[3 marks]

★ HIGHER TIER

Q2. ★ Explain how auxin causes positive phototropism in a plant shoot.

[4 marks]

★ HIGHER TIER

Q3. ★ Give THREE commercial applications of plant hormones.

[3 marks]

Total: 10 marks

Q1 (3 marks)

Explain how guard cells control the opening and closing of stomata.

- In light/adequate water: guard cells become turgid → bow outward → stoma opens [1]
- In darkness/drought: guard cells lose water → flaccid → stoma closes [1]
- This balances gas exchange (photosynthesis) against water conservation [1]

Q2 (4 marks) [★ HT]

★ *Explain how auxin causes positive phototropism in a plant shoot.*

- Auxin produced at shoot tip [1]
- Unilateral light → auxin migrates to shaded side [1]
- Higher auxin on shaded side → cells elongate more [1]
- Differential elongation → shoot curves towards light [1]

Q3 (3 marks) [★ HT]

★ *Give THREE commercial applications of plant hormones.*

- Rooting powder (auxin): stimulates root growth on cuttings [1]
- Selective weedkiller (auxin): kills broadleaf weeds without harming narrow-leaf crops [1]
- Ethene: ripens fruit commercially at controlled time [1] — accept: gibberellins for larger/seedless fruit