

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

★ HIGHER TIER

Q1. ★ Explain how auxin causes a shoot to bend towards light (positive phototropism).

[4 marks]

★ HIGHER TIER

Q2. ★ Explain how auxin causes roots to grow downward (positive gravitropism). Note: auxin has the opposite effect in roots.

[3 marks]

★ HIGHER TIER

Q3. ★ Describe THREE commercial uses of plant hormones.

[3 marks]

Total: 10 marks

Q1 (4 marks) [★ HT]

★ Explain how auxin causes a shoot to bend towards light (positive phototropism).

- Auxin produced at tip of shoot [1]
- In unilateral light, auxin migrates to the shaded side [1]
- Higher auxin concentration on shaded side → cells there elongate more [1]
- Differential elongation → shoot curves/grows towards light source [1]

Q2 (3 marks) [★ HT]

★ Explain how auxin causes roots to grow downward (positive gravitropism). Note: auxin has...

- Auxin accumulates on lower side of root due to gravity [1]
- In roots, high auxin INHIBITS growth (opposite to shoots) [1]
- Lower side grows less than upper side → root curves downward [1]

Q3 (3 marks) [★ HT]

★ Describe THREE commercial uses of plant hormones.

- Rooting powder (auxins): stimulates root growth on cuttings [1]
- Selective weedkiller (auxins): broadleaf weeds absorb more → overgrowth → die; crops unaffected [1]
- Ethene: ripens fruit commercially — controlled, timed ripening [1] — accept: gibberellins for larger/seedless fruit