

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

**Q1. Define osmosis precisely, using the terms water potential and partially permeable membrane.**

[2 marks]

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**Q2. A student places potato cylinders in different concentrations of sucrose solution. In a 1.0 mol/dm<sup>3</sup> solution, the potato lost 18% of its mass. In distilled water, it gained 9% mass. Explain both results.**

[4 marks]

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**Q3. Explain the difference between a turgid and plasmolysed plant cell and why turgidity is important.**

[3 marks]

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★ HIGHER TIER

**Q4. ★ State the water potential of pure water and explain why solutions have a lower water potential.**

[1 mark]

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Total: 10 marks

**Q1 (2 marks)**

*Define osmosis precisely, using the terms water potential and partially permeable membrane...*

- Net movement of water molecules [1]
- From high water potential (dilute solution) to low water potential (concentrated solution) through a partially permeable membrane [1]

**Q2 (4 marks)**

*A student places potato cylinders in different concentrations of sucrose solution. In a 1....*

- In 1.0 mol/dm<sup>3</sup>: solution has lower water potential than potato cell contents [1]
- Water moves out of potato cells by osmosis → cells become flaccid → mass decreases [1]
- In distilled water: water has higher water potential than inside cells [1]
- Water moves into cells by osmosis → cells become turgid → mass increases [1]

**Q3 (3 marks)**

*Explain the difference between a turgid and plasmolysed plant cell and why turgidity is im...*

- Turgid: water absorbed by osmosis → vacuole swells → presses against cell wall → firm cell [1]
- Plasmolysed: water lost by osmosis → membrane pulls away from cell wall → limp cell [1]
- Turgidity provides structural support in plants without a skeleton — prevents wilting [1]

**Q4 (1 mark) [★ HT]**

*★ State the water potential of pure water and explain why solutions have a lower water pot...*

- Pure water: water potential = 0 (kPa) [1] — solutes lower water potential because solute particles reduce the proportion of free water molecules