

Distance, Displacement and Speed

Chapter 7: Motion · Topic 1

Key Concept

Speed is calculated as distance travelled divided by time taken ($\text{Speed} = \text{Distance}/\text{Time}$) and is a scalar quantity, while velocity is calculated as displacement divided by time ($\text{Velocity} = \text{Displacement}/\text{Time}$) and is a vector quantity, including direction. A car driving around a circular track back to its starting point has covered a large distance but has zero displacement, meaning its average velocity for the trip would be zero, even though its average speed is not.

Quick Revision Notes

- Distance: total path length covered (scalar). Displacement: shortest straight-line distance with direction (vector).
- $\text{Speed} = \text{Distance}/\text{Time}$ (scalar). $\text{Velocity} = \text{Displacement}/\text{Time}$ (vector).
- Displacement can be zero even if distance travelled is large (e.g., a round trip).
- A car completing a circular loop has zero displacement but non-zero distance travelled.

Practice Questions

- 1 A car travels 100km in 2 hours. Calculate its average speed.
- 2 Explain why an object moving in a complete circle back to its start has zero displacement.
- 3 What is the key difference between speed and velocity?