

Upthrust in Fluids, Archimedes' Principle and Floatation

Chapter 5: Upthrust in Fluids, Archimedes' Principle and Floatation · Topic 1

Key Concept

Archimedes' Principle states that the upthrust on a submerged object equals the weight of fluid displaced by that object.

An object floats if its weight is less than or equal to the maximum upthrust (weight of fluid it can displace), and sinks if weight exceeds this.

The concept of density helps explain floatation - objects less dense than the fluid float, while denser objects sink.

Understanding upthrust and floatation explains why ships (despite being heavy) float, and helps design vessels and swimming aids.

Quick Revision Notes

- Archimedes' Principle: upthrust equals weight of displaced fluid.
- Objects float if weight $\leq$ maximum upthrust.
- Objects sink if weight exceeds upthrust.
- Density determines floatation.
- Less dense objects than the fluid float.
- Denser objects sink.
- This explains why heavy ships float.
- It helps design vessels and swimming aids.

Practice Questions

- 1 Discuss Archimedes' Principle with an example.
- 2 Explain why a solid iron ball sinks but a ship floats.
- 3 Research how submarines control floating and sinking.
- 4 Discuss the relationship between density and floatation.
- 5 Calculate upthrust for a given displaced fluid weight.
- 6 Explain floatation in your own words.