

Hydrodynamics

Bernoulli's Principle

- **Concept:** Bernoulli's Principle states that the pressure of a fluid decreases as its velocity increases and vice versa. This principle is derived from the conservation of energy in fluid dynamics, where the total energy in a fluid system remains constant.

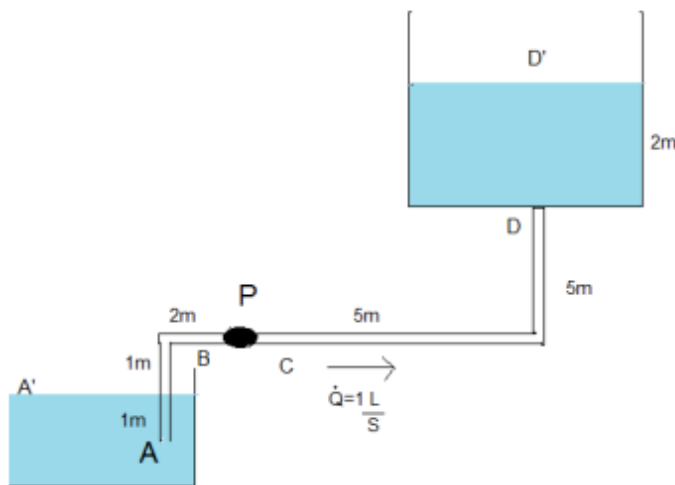


Fig. 1.1 Bernoulli's Principle Demonstration

- **Applications:**
 1. **Aviation and Aerodynamics:** Understanding the lift on airplane wings.
 2. **Venturi Effect:** Used in carburetors and injectors to mix fuel and air by restricting flow, increasing speed, and reducing pressure.
 3. **Flow Measurement:** Utilized in Pitot tubes and Venturi meters to measure fluid velocity and flow.

4. **Blood Flow:** Helps in understanding blood pressure and flow in medical applications.
 5. **Water and Air Purification:** Used in designs to create low-pressure areas for filtration.
 6. **Sprayers and Nozzles:** Employed in devices to convert liquids into fine sprays by reducing pressure and increasing velocity.
- (hydrodynamics)

Hydrodynamic Levitation

- **Concept:** Hydrodynamic levitation involves the suspension of objects in a fluid medium using fluid pressure forces. By manipulating fluid flow patterns and pressure gradients, an upward force is created to counteract gravity, resulting in levitation.
- **Applications:**
 1. **Material Processing:** Used for precision heating, cooling, and shaping of materials.
 2. **Semiconductor Manufacturing:** Enables contactless and contamination-free handling of delicate components.
 3. **Biomedical Engineering:** Facilitates non-invasive manipulation of cells or microorganisms.
- **Experimental Methods:** Experiments are conducted to observe and analyze levitation phenomena, providing insights into the behavior of levitating objects and the effects of fluid properties.



Fig. 3.1 Materials used in the experiment.



Fig. 3.2 Complete Set up