

Fluid Mechanics Flashcards Che114 PDF

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What is the definition of fluid mechanics?

Fluid mechanics is the branch of physics that studies the behavior of fluids (liquids and gases) at rest and in motion.

What is the difference between a fluid and a solid?

Fluids can flow and take the shape of their container, while solids have a fixed shape and volume.

What is Pascal's principle?

Pascal's principle states that a change in pressure applied to an enclosed fluid is transmitted undiminished to all portions of the fluid and to the walls of its container.

What is Bernoulli's equation?

Bernoulli's equation relates the pressure, velocity, and height of a fluid in steady flow, stating that an increase in the speed of a fluid occurs simultaneously with a decrease in pressure or potential energy.

What is viscosity?

Viscosity is a measure of a fluid's resistance to flow or deformation, often described as the 'thickness' of a fluid.

What is the continuity equation in fluid mechanics?

The continuity equation states that for an incompressible fluid, the mass flow rate must remain constant from one cross-section of a pipe to another, expressed as $A_1V_1 = A_2V_2$, where A is the cross-sectional area and V is the fluid velocity.

What is laminar flow?

Laminar flow is a type of fluid flow in which the fluid moves in smooth, parallel layers with minimal disruption between them.

What is turbulent flow?

In turbulent flow, the fluid undergoes irregular fluctuations and mixing, characterized by chaotic changes in pressure and velocity.

What is the Reynolds number?

The Reynolds number is a dimensionless quantity used to predict flow patterns in different fluid flow situations, calculated as the ratio of inert forces to viscous forces.

What is the hydrostatic pressure?

Hydrostatic pressure is the pressure exerted by a fluid at rest due to the weight of the fluid above it, calculated as $P = \rho gh$, where P is pressure, ρ is fluid density, g is acceleration due to gravity, and h is the height of the fluid column.