

18 Lecture - PHY101

Important Subjective

What is the Navier-Stokes equation, and what does it describe?

Answer: The Navier-Stokes equation is a set of equations that describe the conservation of momentum and mass in a fluid. It describes the motion of fluids, including liquids and gases, under various conditions.

What is turbulence, and how does it occur in fluids?

Answer: Turbulence is a chaotic and unpredictable flow behavior that occurs when fluids are subjected to high velocities or shear forces. It is characterized by eddies and vortices that cause fluctuations in velocity and pressure.

What is viscosity, and how is it affected by temperature and pressure?

Answer: Viscosity is the resistance of a fluid to flow. It is dependent on the internal friction between the molecules of a fluid and can be affected by temperature, pressure, and the presence of other substances in the fluid.

What is surface tension, and how does it influence the behavior of liquids?

Answer: Surface tension is the tendency of the surface of a liquid to minimize its surface area, which causes liquids to form spherical droplets or to wet surfaces. This property is important in the behavior of liquids in capillary tubes, where the surface tension can cause the liquid to rise or fall depending on the angle of the tube.

What is Bernoulli's principle, and how is it used in engineering?

Answer: Bernoulli's principle states that as the velocity of a fluid increases, the pressure of the fluid decreases. This principle is used in a variety of applications, including the design of airplane wings and the operation of carburetors in engines.

How does the behavior of gases differ from that of liquids?

Answer: Gases are much more compressible than liquids and have no definite volume or shape. The behavior of gases is described by the ideal gas law, which relates the pressure, temperature, and volume of a gas.

What is compressibility, and how does it relate to the behavior of gases?

Answer: Compressibility is the ability of a substance to be compressed or expanded under different conditions. Gases are highly compressible, which makes them useful in a variety of applications, such as in the operation of internal combustion engines.

What is the role of fluid dynamics in medicine?

Answer: Fluid dynamics is used in medicine to study blood flow and respiratory systems. Understanding the behavior of fluids in the human body can help diagnose and treat a variety of medical conditions.

How does the study of fluid mechanics contribute to the design of ships and boats?

Answer: The study of fluid mechanics is important in the design of ships and boats because it allows engineers to understand the behavior of water and waves under different conditions. This knowledge is used to design vessels that are safe and efficient in a variety of weather and water conditions.

What is the practical application of the physics of fluids in weather forecasting?

Answer: The physics of fluids is used in weather forecasting to study the behavior of atmospheric gases and water vapor. This information is used to predict weather patterns, including the movement of storms and the development of severe weather conditions.