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fluid mechanics science concerned with the response of fluids to forces exerted upon them it is a branch of classical physics with applications of great importance in hydraulic and aeronautical engineering chemical engineering meteorology and zoology fluid mechanics especially fluid dynamics is an active field of research typically mathematically complex many problems are partly or wholly unsolved and are best addressed by numerical methods typically using computers a modern discipline called computational fluid dynamics cfd is devoted to this approach 14 4 archimedes principle and buoyancy buoyant force is the net upward force on any object in any fluid if the buoyant force is greater than the object's weight the object will rise to the surface and float if the buoyant force is less than the object's weight the object will sink fluid mechanics deals with the study of all fluids under static and dynamic situations fluid mechanics is a branch of continuous mechanics which deals with a 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concerned with moving and stationary fluids here fluids are treated as being continuous even though their substance is discrete at the molecular level at the macroscopic level the molecular character of fluids is manifested as diffusive transport of species heat and momentum fluid mechanics is the foundation of hydraulics design and equipment selection for gaseous fluid drilling this chapter provides a thorough description of fluid mechanics in multiphase flow fluid systems including gas system foam system and gasified liquid system in physics physical chemistry and engineering fluid dynamics is a subdiscipline of fluid mechanics that describes the flow of fluids liquids and gases it has several subdisciplines including aerodynamics the study of air and other gases in motion and hydrodynamics the study of liquids in motion cengel and cimbala's fluid mechanics fundamentals and applications communicates directly with tomorrow's engineers in a simple yet precise manner while covering the 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