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Nota di contenuto	Preface -- Preface to the first edition -- Part I. Let's start -- A little math we will need… and a clinical application immediately -- Part II. Gases, bubbles and surroundings -- Perfect coffee and oxygen cylinders: the ideal gas law -- Boats, balloons, and air bubbles: Archimedes' principle -- Air bubbles in the blood sample: better or worse oxygenation? Dalton's law and Fick's law -- Cold, sparkling drinks, and blood gas analysis: Henry's law -- Bubbles, tracheal tube cuffs, and reservoir bags: surface tension and Laplace's law -- Part III. Fluids in motion or at rest: masks, tubes, invasive pressure measurement, and hemodynamics -- Continuity equation and Bernoulli's theorem: Venturi masks, Hemodynamic instability, and Echocardiography -- From tubes and catheters to the basis of hemodynamics: the Hagen-Poiseuille equation -- Toothpaste, sea deeps, and invasive pressure monitoring: Stevin's law and Pascal's principle -- Part IV. Heat, temperature, and electric current: hemodynamic monitoring and more -- Heat, cardiac output, and what is the future: laws of thermodynamics -- Electric current, Ohm's law,

circuit elements: hemodynamic monitoring, temperature probes, platelet function testing, and defibrillators -- Part V. Forces in action -- Doors, steering wheels, laryngoscopes, and central venous catheters: the moment of a force -- Friction, trigonometry, and Newton’s laws: all about Trendelenburg position -- Part VI. Inhalation anesthesia -- Physics in a Vaporizer: saturated vapor pressure, heat of vaporization, and Thermal expansion -- Part VII. Electromagnetic waves and Optics -- Light, air pollution and pulse oximetry: the Beer-Lambert law -- Scattering of Electromagnetic Waves: Blue Skies, Cerebral Oximetry, and Some Reassurance about X-Rays -- Sunsets and Optical Fibers: Fermat’ s Principle and Snell’s Law -- Part VIII. Sound waves, resonance, ultrasonography -- Origin and propagation of sound, Resonance: the Voice of Xenon… and something more on Invasive Pressure Monitoring -- Ultrasounds and Doppler Effect: Echocardiography and, again, Hemodynamic Monitoring -- Action movies and Echocardiography: the Nyquist theorem -- Part IX. And Finally -- Activated clotting time and… A brief look at Relativity.

Sommario/riassunto

This book, now in its 2nd edition, discusses, explains and provides detailed, up-to-date information on physics applied to clinical practice in anesthesiology and critical care medicine, with the aid of simple examples from daily life. Almost everything that happens around us, including in the operating room and intensive care units, can be explained by physical laws. An awareness and understanding of relatively simple laws such as the Hagen-Poiseuille equation, or of slightly more complex topics such as harmonic motion and electromagnetism, to name just a few, offer anesthesiologists and intensivists fascinating insights into why they do what they do. After an introductory chapter that brushes up on all the (few) mathematics the reader will need to face the book, with many practical examples and clinical applications, each of the following 20 chapters deals with some everyday phenomena, explains them with one or more physical laws, and shows why these laws are important in anesthesia and critical care practice. Many illustrations are included for extra clarity. This enriched and updated edition of Physics for Anesthesiologists is intended for anesthesiologists, intensivists, anesthesia and intensive care medicine teachers and trainees, as well as medical students.