

Physics Mechanics Questions And Answers

Brief Answers to the Big Questions

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Brief Answers to the Big Questions is a popular science book written by physicist Stephen Hawking, and published by Hodder & Stoughton (hardcover) and Bantam Books (paperback) on 16 October 2018. The book examines some of the universe's greatest mysteries, and promotes the view that science is very important in helping to solve problems on planet Earth. The publisher describes the book as "a selection of [Hawking's] most profound, accessible, and timely reflections from his personal archive", and is based on, according to a book reviewer, "half a million or so words" from his essays, lectures and keynote speeches.

The book was incomplete at the time of the author's passing in March 2018, but was completed

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with "his academic colleagues, his family and the Stephen Hawking Estate". The book includes...

Philosophy of physics

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In philosophy, the philosophy of physics deals with conceptual and interpretational issues in physics, many of which overlap with research done by certain kinds of theoretical physicists. Historically, philosophers of physics have engaged with questions such as the nature of space, time, matter and the laws that govern their interactions, as well as the epistemological and ontological basis of the theories used by practicing physicists. The discipline draws upon insights from various areas of philosophy, including metaphysics, epistemology, and philosophy of science, while also engaging with the latest developments in theoretical and experimental physics.

Contemporary work focuses on issues at the foundations of the three pillars of modern physics:

Quantum mechanics: Interpretations of quantum...

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Chemical physics

statistical and classical mechanics, chemical kinetics, and laser physics." While at the interface of physics and chemistry, chemical physics is distinct

Chemical physics is a branch of physics that studies chemical processes from a physical point of view. It focuses on understanding the physical properties and behavior of chemical systems, using principles from both physics and chemistry. This field investigates physicochemical phenomena using techniques from atomic and molecular physics and condensed matter physics.

The United States Department of Education defines chemical physics as "A program that focuses on the scientific study of structural phenomena combining the disciplines of physical chemistry and atomic/molecular physics. Includes instruction in heterogeneous structures, alignment and surface phenomena, quantum theory, mathematical physics, statistical and classical mechanics, chemical kinetics, and laser physics."

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The Flying Circus of Physics by Jearl Walker (1975, published by John Wiley and Sons; "with Answers" in 1977; 2nd edition in 2007), is a book that poses and answers 740 questions that are concerned with everyday physics. There is a strong emphasis upon phenomena that might be encountered in one's daily life. The questions are interspersed with 38 "short stories" about related material.

The book covers topics relating to motion, fluids, sound, thermal processes, electricity, magnetism, optics, and vision.

There is a website for the book which stores over 11,000 references, 2,000 links, new material, a detailed index, and other supplementary material. There is also a collection of YouTube videos by the author on the material. See External links at the bottom of this page.

Jearl Walker is a professor...

Quantum mechanics

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quantum information science. Quantum mechanics can describe many systems that classical physics cannot. Classical physics can describe many aspects of nature

Quantum mechanics is the fundamental physical theory that describes the behavior of matter and of light; its unusual characteristics typically occur at and below the scale of atoms. It is the foundation of all quantum physics, which includes quantum chemistry, quantum biology, quantum field theory, quantum technology, and quantum information science.

Quantum mechanics can describe many systems that classical physics cannot. Classical physics can describe many aspects of nature at an ordinary (macroscopic and (optical) microscopic) scale, but is not sufficient for describing them at very small submicroscopic (atomic and subatomic) scales. Classical mechanics can be derived from quantum mechanics as an approximation that is valid at ordinary scales.

Quantum systems have bound states that are...

Physics

including mechanics, electromagnetism, statistical mechanics, thermodynamics, quantum

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mechanics, relativity, nuclear and particle physics, and atomic and molecular

Physics is the scientific study of matter, its fundamental constituents, its motion and behavior through space and time, and the related entities of energy and force. It is one of the most fundamental scientific disciplines. A scientist who specializes in the field of physics is called a physicist.

Physics is one of the oldest academic disciplines. Over much of the past two millennia, physics, chemistry, biology, and certain branches of mathematics were a part of natural philosophy, but during the Scientific Revolution in the 17th century, these natural sciences branched into separate research endeavors. Physics intersects with many interdisciplinary areas of research, such as biophysics and quantum chemistry, and the boundaries of physics are not rigidly defined. New ideas in physics often...

Theoretical physics

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Theoretical physics is a branch of physics that employs mathematical models and abstractions of physical objects and systems to rationalize, explain, and predict natural phenomena. This is in contrast to experimental physics, which uses experimental tools to probe these phenomena.

The advancement of science generally depends on the interplay between experimental studies and theory. In some cases, theoretical physics adheres to standards of mathematical rigour while giving little weight to experiments and observations. For example, while developing special relativity, Albert Einstein was concerned with the Lorentz transformation which left Maxwell's equations invariant, but was apparently uninterested in the Michelson–Morley experiment on Earth's drift through a luminiferous aether. Conversely...

Ensemble (mathematical physics)

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In physics, specifically statistical mechanics, an ensemble (also statistical ensemble) is an idealization consisting of a large number of virtual copies (sometimes infinitely many) of a system, considered all at once, each of which represents a possible state that the real system might be in.

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In other words, a statistical ensemble is a set of systems of particles used in statistical mechanics to describe a single

system. The concept of an ensemble was introduced by J. Willard Gibbs in 1902.

A thermodynamic ensemble is a specific variety of statistical ensemble that, among other properties, is in statistical equilibrium (defined below), and is used to derive the properties of thermodynamic systems from the laws of classical or quantum mechanics.

Relational quantum mechanics

Relational quantum mechanics (RQM) is an interpretation of quantum mechanics which treats the state of a quantum system as being relational, that is,

Relational quantum mechanics (RQM) is an interpretation of quantum mechanics which treats the state of a quantum system as being relational, that is, the state is the relation between the observer and the system. This interpretation was first delineated by Carlo Rovelli in a 1994 preprint, and has since been expanded upon by a number of theorists. It is inspired by the key idea behind special relativity, that the details of an observation depend on the reference frame of the

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observer, and Wheeler's idea that information theory would make sense of quantum mechanics.

The physical content of the theory has not to do with objects themselves, but the relations between them. As Rovelli puts it:

"Quantum mechanics is a theory about the physical description of physical systems relative to other systems..."

History of physics

electromagnetism and statistical mechanics were discovered. At the beginning of the 20th century, physics was transformed by the discoveries of quantum mechanics, relativity

Physics is a branch of science in which the primary objects of study are matter and energy. These topics were discussed across many cultures in ancient times by philosophers, but they had no means to distinguish causes of natural phenomena from superstitions.

The Scientific Revolution of the 17th century, especially the discovery of the law of gravity, began a process of knowledge accumulation and specialization that gave rise to the field of physics.

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Mathematical advances of the 18th century gave rise to classical mechanics, and the increased use of the experimental method led to new understanding of thermodynamics.

In the 19th century, the basic laws of electromagnetism and statistical mechanics were discovered.

At the beginning of the 20th century, physics was transformed by the discoveries...

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