Principles of physics : a calculus-based text

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Abstrak

Synopsis

An Invitation to Physics. 1. Introduction and Vectors. Context 1: Alternative-Fuel Vehicles. 2. Motion in One Dimension. 3. Motion in Two Dimensions. 4. The Laws of Motion. 5. More Applications of Newton's Laws. 6. Energy of a System. 7. Conservation of Energy. Context 1 Conclusion: Present and Future Possibilities. Context 2: Mission to Mars. 8. Momentum and Collisions. 9. Relativity. 10. Rotational Motion. 11. Gravity, Planetary Orbits, and the Hydrogen Atom. Context 2 Conclusion: A Successful Mission Plan. Context 3: Earthquakes. 12. Oscillatory Motion. 13. Mechanical Waves. 14. Superposition and Standing Waves. Context 3 Conclusion: Minimizing the Risk. Context 4: Heart Attacks. 15. Fluid Mechanics. Context 4 Conclusion: Heart Attacks Context 5: Global Warming. 16. Temperature and the Kinetic Theory of Gases. 17. Energy in Thermal Processes: The First Law of Thermodynamics. 18. Heat Engines, Entropy, and the Second Law of Thermodynamics. Context 5 Conclusion: Predicting the Earth's Surface Temperature. Context 6: Lightning. 19. Electric Forces and Electric Fields. 20. Electric Potential and Capacitance. 21. Current and Direct Current Circuits. Context 6 Conclusion: Determining the Number of Lightning Strikes. Context 7: Magnetism in Medicine. 22. Magnetic Forces and Magnetic Fields. 23. Faraday's Law and Inductance. Context 7 Conclusion: Nuclear Magnetic Resonance and Magnetic Resonance Imaging Context 8: Lasers. 24. Electromagnetic Waves. 25. Reflection and Refraction of Light. 26. Image Formation by Mirrors and Lenses. 27. Wave Optics. Context 8 Conclusion: Using Lasers to Record and Read Digital Information. Context 9: The Cosmic Connection. 28. Quantum Physics. 29. Atomic Physics. 30. Nuclear Physics. 31. Particle Physics. Context 9 Conclusion: Problems and Perspectives. Appendix A: Tables. Appendix B: Mathematics Review. Appendix C: Periodic Table of the Elements. Appendix D: SI Units. Answers to Quick Quizzes and Odd-Numbered Problems. Index.