1. Record Nr. UNINA9911047720103321

Autore	Rahmani-Andebili Mehdi
Titolo	Electromagnetics : Practice Problems, Methods, and Solutions / / by Mehdi Rahmani-Andebili
Pubbl/distr/stampa	Cham : , : Springer Nature Switzerland : , : Imprint : Springer, , 2025
ISBN	9783031954009 9783031953996
Edizione	[1st ed. 2025.]
Descrizione fisica	1 online resource (612 pages)
Collana	Physics and Astronomy Series
Disciplina	537.6
Soggetti	Electrodynamics Physics Astronomy Magnetism Mathematical physics Classical Electrodynamics Physics and Astronomy Theoretical, Mathematical and Computational Physics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Ch 1: Cartesian, Cylindrical, and Spherical Coordinate Systems: Part A -- Ch 2: Cartesian, Cylindrical, and Spherical Coordinate Systems: Part B -- Ch 3: Gradient, Divergence, Curl, and Laplacian: Part A -- Ch 4: Gradient, Divergence, Curl, and Laplacian: Part B -- Ch 5: Electric Field and Electric Flux: Part A -- Ch 6: Electric Field and Electric Flux: Part B -- Ch 7: Electric Potential: Part A -- Ch 8: Electric Potential: Part B -- Ch 9: Electric Potential Energy: Part A -- Ch 10: Electric Potential Energy: Part B -- Ch 11: Polarization and Electric Field in Dielectrics and Boundary Conditions: Part A -- Ch 12: Polarization and Electric Field in Dielectrics and Boundary Conditions: Part B -- Ch 13: Flat, Cylindrical, and Spherical Capacitors: Part A -- Ch 14: : Flat, Cylindrical, and Spherical Capacitors: Part B -- Ch 15: Method of Image Charge in Electrostatics: Part A -- Ch 16: Method of Image Charge in Electrostatics: Part B -- Ch 17: Flat, Cylindrical, and Spherical Resistors and Boundary Conditions for Electric Current: Part A -- Ch 18: Flat,

Cylindrical, and Spherical Resistors and Boundary Conditions for Electric Current: Part B -- Ch 19: Magnetic Field and Magnetic Flux: Part A -- Ch 20: Magnetic Field and Magnetic Flux: Part B -- Ch 21: Electromagnetic Force and Torque: Part A -- Ch 22: Electromagnetic Force and Torque: Part B -- Ch 23: Ampere's Circuital Law and Magnetic Energy: Part A -- Ch 24: Ampere's Circuital Law and Magnetic Energy: Part B -- Ch 25: Magnetic Vector Potential: Part A -- Ch 26: Magnetic Vector Potential: Part B -- Ch 27: Magnetization: Part A -- Ch 28: Magnetization: Part B -- Ch 29: Boundary Conditions and Method of Image Current in Magnetostatics: Part A -- Ch 30: Boundary Conditions and Method of Image Current in Magnetostatics: Part B -- Ch 31: Electromagnetic Induction: Part A -- Ch 32: Electromagnetic Induction: Part B.

Sommario/riassunto

This essential study guide is designed for students enrolled in an electromagnetics or electrodynamics course. The textbook includes problems with detailed solutions to enhance students' understanding of the subject matter. It features partially and fully solved exercises and hints for required formulas and answers. This structure enables students to practice independently while guiding them through problem-solving methods. The material covered in the book includes the cartesian, cylindrical, and spherical coordinate systems; the conversions between the coordinate systems; gradient, divergence, curl, and Laplacian operators; electric flux and electric field; electric potential; electric potential energy due to discrete and continuous charge distributions; polarization and electric field in dielectrics; boundary conditions for electric current and electric and magnetic fields; flat, cylindrical, and spherical capacitors and resistors; method of image charge for grounded conductors and isolated conductors; magnetic flux and field due to linear, surface, and volume currents; electromagnetic force and torque; Ampere's circuital law; magnetic energy; magnetic vector potential; magnetization in magnetic materials; method of image current in magnetostatics; and electromagnetic induction. With its comprehensive solutions, multiple problem-solving approaches, and clear explanations of concepts, this hands-on guide will help improve students' problem-solving skills and foster a solid understanding of electromagnetics. Additionally, it serves as a valuable resource for instructors in developing questions, tests, and quizzes. Includes a wide selection of basic and advanced examples, exercises, and problems categorized by difficulty level; Provides detailed and instructor-recommended solutions and methods, along with clear explanations; Enhances exam preparation for the FE and PE with targeted practice tests.