231 ف كهرومغناطيسية (1) (3 س0 م)

متطلبات: 102 ف يطرح في الفصل الدراسى الأول

حساب المتجهات التفاضلي والتكاملي ، المحاور شبه المنحنية, الكهروستاتيكية، المجال الكهروستاتيكي وخصائصه ، الجهد الكهربي ، الشغل والطاقة في المجال الكهروستاتيكي ، معادلة لابلاس , النظريات الأحادية0 طرق فصل المتغيرات , الـــــــتمدد المتعدد ، المجال الكهروستاتيكي في المواد ، المغناطوستاتيكية ، قانون قوي لواتتر , قانون بيوت سافار ، خواص المجـــال المغناطيسي ، متجه الجهد المغناطيسي ، المجال المغناطوستاتيكي في المواد

Introduction: General Introduction, Electromagnetism History, Magnets, Magnetic Field.

Magnetic field calculations and effects: Magnetic field calculations (Ampère's circuital law, Biot –Savart law, Lorentz force), Magnetic moment, Effects of an external magnetic field on a magnetic moment(Force on a moment, Torque on a moment), Effects of electric current, Electromagnets(Example: Solenoid, Uses for Electromagnets)

Inductors, Magnetic materials and hystressis loop: Inductors, connection of inductors, paramagnetic, diamagnetic, ferromagnetic, paramagnetic,curie temperature, hystressis loop and magnetic properties.

Electromagnetic Induction: Introduction, Making Electricity,Induced Electric Field Strength(Magnetic Flux,Faraday`s Law, Lenz's Law), Applications (Generators and Dynamos, Electric Guitar, Electric Motor, Helmholtz coil), Mutual Induction.

Transformers: Basic Structure, Principle of Operation, Step-up & Step – down Transformers, The Inductance Coils, Transformer Core, Transformer Equations, . Eddy Currents, Transformers & Electrical Distribution, Commercial Power Generators, Household Uses of Transformers, Impact of Transformers on Society, Effect of High Voltage Power Lines on Humans.

232 ف كهرومغناطيسية (2) (3 س0 م)

متطلبات: 231 ف يطرح في الفصل الدراسي الثانى

كهروديناميكا , القوة الدافعة الكهربية ، قانون فاراداي , معادلات ماكسويل ، أشكال الجهد في الكهروديناميكا ، الطاقة وكميـة الـتحرك في الـكهروديـناميكا ، الموجات الكهرومغناطيسية ، معادلـة الموجة ، الموجات

الكهرومغناطيسية في الأوساط غيــر الموصلة0 الـموجات الكهرومغناطيسية في الأوساط الموصلة، التشتت , الأشعة الكهرومغناطيسية ، الأشعاع ثنائــي القطبــيــة من شحنة نقطيه , التفاعل الإشعاعي ، الكهروديناميكا النسبية0

Electrodynamics: Electrodynamics before Maxwell's equations, Maxwell's correction, Maxwell's equations, Lorentz Force, Worked examples.

Magnetic Induction and Inductors: Mutual Inductance, Self Inductance, Relation between Mutual inductance and self inductance, Total Energy Stored in Inductors , Coupled Inductors. Maxwell's Equations: Notation; Vector calculus, Useful Mathematical Theorems, Units of Physical Constants, James Clerk Maxwell, Field theories, Electromagnetism as a Field theory, Fields and Potentials, The Electromagnetic Field, Electric Polarization, Electric Polarization and Susceptibility, Electric Displacement, Relative permittivity, The Magnetic Field in Materials, Magnetization,Magnetic Susceptibility, Magnetic Permeability, Permittivity and Permeability, Charge, Charge density, Current Density and Conductivity, Gauss` Theorem and Stocks` Theorem, Maxwell`s Equations: Physical Interpretation.

Electromagnetic Wave in Dielectric Media: Electromagnetic Wave Equation in Simple Materials, Monochromatic Plane Wave Solutions to the Wave Equation, Electric and Magnetic Fields in EM Waves, Strength of Electric and Magnetic Fields in EM Waves,, Refractive Index, Energy in Electromagnetic Fields: Poynting`s Theorem, Complex Notation for Plane Wave, Superposition, Dispersion, Polarization, Dispersion in Dielectric Gases, Permittivity in a Static Electric Field, Permittivity in an Oscillating Electric Field, Refractive Index in an Oscillating Electric Field.

Electromagnetic Waves in Conducting Media: Plane monochromatic Wave in a Conducting Material , Plane Monochromatic Wave in a poor conductor, Plane Monochromatic Wave in a good conductor (Phase Velocity in a Good Conductor, Phase Velocity and Group Velocity, Group velocity of an EM wave in a Good Conductor, The Skin depth of a good conductor, Phase difference, EM wave Impedance in a Good Conductor, Energy Densities in an EM wave in a Good Conductor, Complex Conductivity: The Drude Model.

Dipole Radiation: Dipole Radiation, Magnetic dipole Radiation, Polarization of electromagnetic waves.

مع تحياتى

محمد شعبان