

# *Electromagnetic*

## **CHAPTER (1) CHARGES, FORCES, FIELDS, & ENERGIES**

Static electricity

Inverse square law

Super position forces

Electric field strength

Potential energy

Electric potential difference

Applicable example “Xerography”

## **CHAPTER (2) GAUSSLAW**

The law

Electric field about along, straight, charged cylinder .

Applied examples ”Motors”

## **CHAPTER (3) EFFECT OF DIELECTRIC MATERIALSON ELECTROSTATIC FIELD**

Polarization of dielectrics in electric field.

Relative permittivity

Electric flux

Flux density in a cylindrical system

## **CHAPTER (4) CHARGE-COUPLED DEVICES**

The potential well

Charge transfer

Input & Output

Imaging application

## **CHAPTER (5) ENERGY IN ELECTROSTATIC SYSTEMS**

Energy stored in terms of capacitance & potential

Energy stored in terms of field quantities E&D

Determination of forces in the electrostatic field

System maintained at constant charge & system maintained at constant potential

## **CHAPTER (6) THE MAGNETIC FIELD & FLUX DENSITY**

Basic magnetism

A sign convention

Force on a current-carrying conductor lying in a plane which is perpendicular to the line of action of uniform magnetic field.

Force on a current carrying conductor which is not at right angles to the magnetic field

Magnetic force between two long parallel current conductors

## **CHAPTER (7) AMPERES CIRCUITAL LAW & MAGNETIC CIRCUITS**

The circuital law & some examples

Boundary conditions

Displacement current

Incompleteness of the circuital law

Magnetic circuits

Effect of a non – linear magnetizing characteristic

Electrical circuit analogue

Examples

## **CHAPTER (8) ELECTROMAGNETIC INDUCTION**

Electromagnetic induction

The flux cutting rule

Mutual inductance

Self inductance

## **CHAPTER (9) ENERGY STORAGE IN MAGNETIC FIELD & HYSTERESIS**

Energy storage by current flow in an inductive circuit

Energy storage in a linear magnetic circuit

Determination of force from energy considerations

Force of attraction between magnetized iron surfaces

Hysteresis loss

Eddy – current loss

## **CHAPTER (10) MAXWELL**

Mathematical terminology

Sign conventions

Wave propagation in free space

Maxwell's equations