

YEAR – II	ELECTRICITY AND MAGNETISM	PH404S
SEMESTER - IV		HRS/WK - 8
CORE - 4		CREDIT - 6

OBJECTIVES:

- To Understand The Electrostatics Concept And The Laws Associated With Them
- To acquire knowledge of chemical effects of electric current
- To study the concepts of DC circuits
- To study the basics of AC
- To understand the concepts of magnetic materials

UNIT I ELECTROSTATIC

(24 hours)

Coulom’s law – electric intensity and electric potential – electrical images- electric intensity and potential due to an earthed conducting sphere applying the principle of electrical images- electric dipole – potential and intensity due to a dipole – capacity – capacitance of a spherical and cylindrical capacitor – energy of a charged capacitor – loss of energy due to sharing of charges

UNIT II CHEMICAL EFFECTS OF ELECTRIC CURRENT

(24 hours)

Faraday’s laws of electrolysis – ionic velocities and mobility – calculation and experimental determination of ionic mobility – transport number- thermoelectricity- Peltier coefficient – Thomson coefficient – application of thermodynamics to a thermocouple and connected relations- thermoelectric diagram and uses

UNIT III DC CIRCUITS

(24 hours)

Growth and decay of current in a circuit containing resistance and inductance – Growth and decay of charge in a circuit containing resistance and capacitor-

Growth and decay of charge in a LCR circuit – condition for the discharge to be oscillatory – frequency of oscillation – network analysis – Thevenin and Norton’s theorems

UNIT IV ALTERNATING CURRENTS

(24 hours)

Peak, average and RMS values of AC voltage and current – power factor and current values in an AC circuit contain LCR(reactance and impedance) series and parallel resonant circuits – power in an AC

circuit – wattless current- choke coil- construction and working of transformers- energy losses – AC motors – single phase, three phase – star and delta connection –electric fuses- circuit breakers

UNIT V MAGNETIC PROPERTIES OF MATERIALS

(24 hours)

Susceptibility- permeability- intensity of magnetization and the relation $B= \mu(H+I)$, I-H and B-H curves for a magnetic material using magnetometer method and ballistic galvanometer method – Terrestrial magnetism – magnetic elements- dip circle.

TEXT BOOKS:

1. Murugesan R,2006,Electricity and magnetism,8th edition,New Delhi,S.Chand&co.
2. Brijlal and N.Subramanian, Electricity and magnetism,6th edition,Agra,Ratan&Prakash
3. Narayanamoorthy M&Nagarathnam N, Electricity and magnetism,4TH edition,Meerut,National publishing Co.
4. Tewari K K ,2001, Electricity and magnetism,3RD EDITION,new Delhi,S.Chand&co.

REFERENCE BOOK:

1. David J Griffith,1997,Introduction to electrodynamics,2ND EDITION,New delhi,Prentice Hall of India Pvt.Ltd.
2. Sehgal D.L. Chopra K L and Sehgal N K , Electricity and Magnetism,New Delhi,Sultan chand&co
3. Brij Lal,Subramanian N and Jivan Seshan,2005,Mechanics and Electromagnetics ,New Delhi, Eurasia Publishing House Pvt .Ltd

QUESTION PATTERN

Time: 3 Hours

Max. Marks: 75

Section – A (10 X 2 = 20)

(Answer ALL the questions)

(Two questions from each Unit)

Section – B (5 X 5 = 25)

(Answer all the questions)

(One question from each Unit; either or pattern and any one of the questions will be a problem; both part)

Section C (3 X 10 = 30)

(Answer any Three Questions out of five)

(One Question from each unit and it may have subdivisions)