

0944 -DIPLOMA IN INFORMATION TECHNOLOGY & ENGINEERING
SEMESTER -I
094423 APPLIED PHYSICS – II

RATIONALE

Applied physics includes the study of a large number of diverse topics related to things that go in the world around us. It aims to give an understanding of this world both by observation and prediction of the way in which objects behave. Concrete use of physical principles and analysis in various fields of engineering and technology are given prominence in the course content.

DETAILED CONTENTS

1. Applications of sound waves

- 1.1 Acoustics of buildings – reverberation, reverberation time, echo, noise, coefficient of absorption of sound, methods to control reverberation time
- 1.2 Ultrasonics – production (magnetostriction and piezo-electric) and their engineering applications

2. Principle of optics

- 2.1 Introduction: reflection of light, image formation in mirrors (convex and concave), refraction and refractive index, image formation in lenses, lens formulae (thin lens only), power of lens, total internal reflection
- 2.2 Defects in image formation by lenses and their correction
- 2.3 Simple and compound microscope, astronomical and Galileo telescope, magnifying power and its calculation (in each case)
- 2.4 Overhead projector and slide projector

3. Electrostatics

- 3.1 Coulombs law, unit charge
- 3.2 Gauss's Law
- 3.3 Electric field intensity and electric potential
- 3.4 Electric field of point charge, charged sphere (conducting and non-conducting), straight charged conductor, plane charged sheet
- 3.5 Capacitance, types of capacitors, capacitance of parallel plate capacitor, series and parallel combination of capacitors
- 3.6 Dielectric and its effect on capacitors, dielectric constant and dielectric break down

4. Electricity

- 4.1 Ohm's law
- 4.2 Resistance of a conductor, specific resistance, series and parallel combination of resistors, effect of temperature on resistance
- 4.3 Kirchhoff's laws, wheatstone bridge principle and its applications
- 4.4 Heating effect of current and concept of electric power

5. Semi conductor physics

- 5.1 Energy bands, intrinsic and extrinsic semi conductors, p-n junction diode and its characteristics
- 5.2 Diode as rectifier – half wave and full wave rectifier, semi conductor transistor pnp and

npn (concept only)

6. Modern Physics

- 6.1 Lasers: concept of energy levels, ionization and excitation potentials; spontaneous and stimulated emission; lasers and its characteristics, population inversion, types of lasers, helium – neon and ruby lasers and applications
- 6.2 Fibre optics: Introduction, optical fiber materials, types, light propagation and applications
- 6.3 Super conductivity: Phenomenon of super conductivity, effect of magnetic field, critical field, type I and type II super conductors and their applications)
- 6.4 Energy sources – conventional and non-conventional (wind, water, solar, bio, nuclear energy), only elementary idea

LIST OF PRACTICALS

1. To verify Ohm's law
2. To verify law of resistances in series and in parallel
3. To determine the magnifying power of a compound microscope
4. To determine the magnifying power of an astronomical telescope
- 51
5. To convert a galvanometer into an ammeter of a given range
6. To convert a galvanometer into a voltmeter of a given range
7. To find the wavelength of a He-Ne laser
8. To find the frequency of a tuning fork by a sonometer
9. To study characteristics of a pn junction diode

RECOMMENDED BOOKS

1. Applied Physics Vol. II, TTTI Publication Tata McGraw Hill, Delhi
2. Basic Applied Physics by RK Gaur; Dhanpat Rai Publications
3. Comprehensive Practical Physics - Volume I and II by JN Jaiswal; Laxmi Publishers
4. Numerical Problems in Physics - Volume I and II by RS Bharaj; Tata McGraw Hill
5. Simple Course in Electricity and Magnetism by CL Arora; S Chand and Co, New Delhi
6. Fundamental Physics - Volume I and II by Gomber and Gogia; Pardeep Publications, Jalandhar
7. A Text Book of Optics by Subramanian and Brij Lal
8. Physics Laboratory Manual by PK Palanisamy, Scitech Publications
9. Fundamentals of Physics by Resnick and Halliday, Asian Books Pvt. Ltd., New Delhi