BHARATHIAR UNIVERSITY, COIMBATORE

ALLIED PHYSICS PAPER FOR B. Sc MATHS / CHEMISTRY
2012-2013 BATCH AND ONWARDS

ALLIED PHYSICS PAPER I

No.of Credit Hours: 4 per week

Subject Description:

This paper presents the basic principles of mechanics, heat and sound.
This paper gives the Knowledge of depth for students regarding the motion of the particles, liquids and the propagation of heat and sound waves.

Goal:

To enable the students in order to learn the basic principles, theory and concepts of mechanics, heat and sound.

Objectives

To give the description for the students in order to
Learn motion of rigid bodies.
Acquire basic knowledge of heat energy.
Know about the propagation of sound waves.
Get a depth of knowledge of physics in day today life.

UNIT- I

Gravitation: Newton's law of Gravitation-Determination of G by Boy's method-mass and density of earth – acceleration due to gravity- Determination of g by compound pendulum.

Elasticity: Basic concepts – bending of beams – depression of cantilever-Determination of Y by uniform and non- uniform bending method- Torsion in a wire-Determination of rigidity modulus by torsional pendulum.

UNIT II

Heat and thermodynamics : Vanderwaal's equation of state-critical constants of a gas-derivation of critical constants in terms of Vanderwaal's contants – Joule – Thomson – effect – Theory of J-K effect – K-Onnes method.- properties of liquid Helium I and II.

Sound: Doppler effect – applications – determination of frequency of alternating current by Sonometer – Ultrasonics – production, properties and applications

UNIT III

Solar Physics: - solar constant – measurement of solar radiations by Pyroheliometer and Pyranometer – general applications of solar energy – flat–plate collector - box type cooker - solar water heaters – solar photo – votaic cells – general applications of solar cells.

UNIT IV

Electricity: Conversion of Galvanometer into Ammeter and voltmeter – figure of merit of a galvanometer – Ballistic Galvanometer – theory and charge of sensitiveness – measurement of capacitance – measurement of Themo EMF and resistance by potentiometer – applications of electromagnetic induction - Transformers – theory, energy loss and applications

UNIT V

Magnetism : Basic concepts of magnetic materials – magnetic properties of Dia, Para and Ferro magnetic materials – Area of (B-H) loop – electric and magnetic circuits – Curie temperature – applications of Ferrites in computer memory

Books for references:

1. Properties of matter and sound – Brijlal subramaniam
2. Properties of matter and sound – R. Murugesan
3. Solar Energy utilization – G.D. Ravi
4. Solar Energy Utilization – Sukhatme
5. Heat and Thermodynamics -- Brijlal subramaniam
6. Heat and Thermodynamics – Narayanamurthi and Nagarathinam
7. Sound -- Brijlal subramaniam
8. Sound – R.L. Seihgal
9. Electricity and magnetism — R. Murugesan
10. Electricity and magnetism — Narayanamurthi and Nagarathinam
11. Electricity and magnetism -- Brijlal subramaniam

ALLIED PHYSICS PAPER FOR B.Sc. MATHS / CHEMISTRY 2012-2013 BATCH AND ONWARDS

ALLIED PHYSICS PAPER II

No.of Credit Hours: 4 per week

Subject Description:

This paper presents the basic principles of mechanics, heat and sound.

This paper gives the Knowledge of depth for students regarding the motion of the particles, liquids and the propagation of heat and sound waves.

Goal: To enable the students in order to learn the basic principles, theory and concepts of mechanics, heat and sound.

Objectives

To give the description for the students in order to
Learn motion of rigid bodies.
Acquire basic knowledge of heat energy.
Know about the propagation of sound waves.
Get a depth of knowledge of physics in day today life.

UNIT- I

Modern physics: Photo electric effect – Einstein's photo electric equation – verification of Einstein's photo electric equation by Millican's experiment – photo electric cells – applications

Wave mechanics: De Broglie matter waves – calculation of De Broglie wave length – Experimental study of De Broglie matter wave by G.P.Thomson experiment.

UNIT- II

Nuclear physics : characteristics of nuclear forces – nuclear structure by liquid drop model – Binding energy – mass defect – particle accelerators – cyclotron and betatron – artificial transmutations by α – particles - nuclear Fission and nuclear Fusion (basic idea only) – elementary particles – Leptons, Mesons and Baryons

UNIT III

Laser physics: Purity of spectral lines – Coherence length and time – spontaneous and induced emissions – population inversion – meta stable state – conditions for laser actions – Ruby laser – Helium – neon laser – applications of lasers – Raman effect – Raman shift – stokes and anti stokes lines – Laser Raman Spectrometer.

UNIT IV

Semiconductor physics: Volt – Ampere Characteristics of P-N junction Diode – Zener diode – applications of Zener diodes - Volt – Principles of LED and LCD – Frequency Modulation and Amplitude modulation – basic principles of antennas – block diagram of Superhetrodyne receiver – block diagram of monochrome TV receiver – basic principles and applications of RADAR.

UNIT V

Integrated Electronics: Steps in fabrication of Monolithic IC's – General applications of IC's – operational amplifiers as an adder and subs tractor.

Digital Electronics: Analog and digital computers – organization of digital computers – number systems – conversion of binary into decimal – conversion of decimal to binary – binary addition and subtraction – Basic logic gates – NAND and NOR as an universal logic gates – Demorgan's theorems – Boolean algebra – applications of Demorgans theorems.

BOOKS FOR REFERANCE

1. Modern physics – R. Murugesan
2. Engineering physics – Gaur & Gupta
3. Engineering physics – M. Arumugam
4. Laser Physics – Thiagarajan
5. Principles of Electronics – V.K. Metha
6. Basic Electronics – B.L. Theraja
7. Fundamentals of digital computers – Bartee
8. Digital principles and Applications – Malvino & Leech

ALLIED PHYSICS PRACTICALS
FOR B.SC (MATHS/CHEMISTRY)
2012-2013 BATCH AND ONWARDS

LIST OF EXPERIMENTS (**ANY 12** EXPERIMENTS ONLY)

1. Acceleration due to gravity-Compound pendulum method
2. Moment of inertia – Torsional pendulum method
3. Young's modulus - Uniform bending - Optic lever method
4. Young's modulus - Non-uniform bending - Pin and microscope
5. Rigidity modulus – Static torsion method.
6. Frequency of A.C - Sonometer
7. Thermal conductivity - Lee's disc method.
8. Refractive index of a solid prism - Spectrometer
9. Refractive index of a liquid prism – Spectrometer
10. (i-d) curve - solid prism - Spectrometer
11. Wavelengths of spectral lines – Grating - Normal incidence - Spectrometer
12. Wavelength of spectral lines – Grating - Minimum deviation - Spectrometer
13. Radius of curvature of lens - Newton's rings method.
14. Viscosity of highly viscous liquid - Stoke's method.
15. Surface tension - Drop weight method
16. Low range voltmeter calibration - Potentiometer
17. Low range ammeter calibration - Potentiometer
18. Construction of IC regulated power supply
19. Characteristics of Pn Junction diode
20. Characteristics of Zener diode
21. Construction of Hartley oscillator
22. Construction of Colpitt's oscillator
23. Verification of truth tables of logic gates