

Name : DR. ARVIND GARG

class : B.Sc. 1st (Semester II)

18 weeks plan (January 2018 to April 2018)

January 2018

Unit - I (Moment of Inertia)

Week 1

- o Rotation of Rigid body
- o Moment of inertia
- o Torque
- o Angular momentum

Week 2

- o Kinetic ^{energy} ~~theory~~ of Rotation
- o Theorem of perpendicular/parallel axes and their proof
- o Moment of inertia of solid sphere
- o Moment of inertia of hollow sphere
- o Moment of inertia of spherical shell
- o Moment of inertia of solid cylinder

Week 3

- o Moment of inertia of hollow cylinder and solid bar of rectangular cross-section
- o Flywheel
- o Moment of inertia of an irregular body

Week 4

- o Acceleration of a body rolling down on an inclined plane
- o Numerical problems
- o Discussion problems

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February 2018

Unit-II (Elasticity)

Week 1

- o Elasticity
- o stress and strain
- o Hooke's law
- o Elastic constants and their relations
- o Poisson's ratio

Week 2

- o Torsion of cylinder and twisting couple
- o Determination of coefficient of modulus of rigidity for the material of wire by Maxwell's needle

Week 3

- o Bending of beam
(Bending moment and its magnitude)
- o cantilever and centrally loaded beam
- o Determination of Young's modulus for the material of the beam

Week 4

- o Elastic constants for the material of the wire by Searle's method
- o Numericals
- o Discussion Queries

March 2018

Experiment of

Unit - III (Kinetic Theory of Gases - I)

Week 2

- Assumption of kinetic theory of gases
- Pressure of an ideal gas

Week 3

- Kinetic interpretation of temperature
- Ideal gas equation
- Degree of freedom
- Law of equipartition of energy and its application for specific heat of gases

Week 4

- Real gases
- Vander Waal's equation
- Brownian motion
- Numerical problems & queries

April 2018

Unit - IV (Kinetic Theory of Gases - II)

Week 1

- Maxwell's distribution of speed and velocities with derivation

Week 2

- Experimental verification of Maxwell's law of speed distribution
- Most probable speed

Experiment No.

~~Week 2~~

Week 3

- o Average and r.m.s. speed
- o Mean free path
- o Transport of energy

Week 4

- o Transport of momentum
- o Diffusion of gases
- o Numerical problems
- o Discussion problems

DR. ARVIND GARG

B.Sc. IIIrd (Computers Non-Medical)

January 2018 to April 2018

~~Notes~~

Unit Chapter 1: (Crystal structure - I)
 Week 1 (January 2018)

o crystalline and glassy forms

o liquid crystals

o crystal structure

Week 2

o Periodicity

o Lattice and basis

o crystal translational vectors & axes

o unit cell and primitive cell

Week 3

o Wigner-Seitz primitive cell

o symmetry operations for a two dimensional crystal.

o Bravais lattices in two and three dimensions

o crystal planes and Miller indices

Week 4

o interlayer spacing

o crystal structures of Zinc sulphide, sodium chloride and

Diamond

o Numerical problems

o Doubts regarding ~~unit cell~~.

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(February 2018)

Unit-II (Crystal structure -II)

Week 1

- o X-ray diffraction
- o Bragg's law and experimental X-ray diffraction methods

Week 2

- o k-space ~~reciprocal~~
- o Reciprocal lattice and its physical significance

Week 3

- o Reciprocal lattice vectors
- o Reciprocal lattice to a simple cubic lattice, b.c.c. and f.c.c.

Week 4

- o Numericals
- o Discussions related to unit.

March 2018

~~Week 1~~ Unit-III (superconductivity)

Week 2

- o Historical Introduction
- o survey of super conductivity
- o super conducting systems

~~Week 3~~

- o High T_c super conductors
- o Isotopic effect
- o critical magnetic field
- o Meissner's effect

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- o London Theory
- o Ginzburg-Landau equation
- o classification of superconductors (Type I and Type II)
- o BCS Theory of superconductivity

Week 4

- o Flux ~~Quant~~ Quantization
- o Josephson effect (AC & DC)
- o Practical applications of superconductivity and their limitations
- o Power application of superconductors
- o Numericals & Discussions

April 2018

Unit - IV (Introduction to Nano Physics)

Week 1

- o Definition
- o Length scale
- o Importance of Nano scale & Technology

Week 2

- o History of Nano technology
- o Benefits and challenges in molecular manufacturing

Week 3

- o molecular assembler concept
- o understanding advanced capabilities
- o vision and objective of Nano Technology

Week 4

- o Nanotechnology in different fields
 - automobile
 - electronics
 - biotechnology
 - materials
 - medicines etc.

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