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Chapter-1

1) Define torque and moment of inertia. Derive a relation for rotational K.E of body.

2) Define angular momentum. Show that the angular momentum is conserved if there is no applied external torque.

3) Define periodic motion. Explain the oscillation of horizontal mass spring system.

4) What is simple harmonic motion? Show that in S.H.M the kinetic energy and potential energy vary time but the total energy remains constant.

Chapter-2

1) Define magnetic dipole moment. Derive an expression for torque on a current loop in terms of dipole moment and applied magnetic field.

2) Derive an expression for magnetic energy of a dipole placed in a uniform magnetic field.

3) What is hall effect? Derive an expression for hall coefficient and establish the relation with mobility of charge carriers and conductivity of wire.

Chapter-3

1) Explain the theory of black body radiation. Why this theory needs quantum mechanical interpretation? How this interpretation become experimentally successful? Explain.

OR

What is black body and black body radiation? Explain the characteristics of blackbody radiation.

2) Explain how Frank-Hertz experiment demonstrate the existance of discrete energy levels in atoms.

3) What is De-Broglie hypothesis? Explain Davission-Germer experiment to show the electron behaves like a wave?

4) State uncertainity principle. Justify "The measuring process introduces uncertainity".

5) What is group velocity. Show that group velocity is equal to particle velocity.

Chapter-4

Imp 1. What are the physical significance of wave function (Ψ). Derive the time independent schrondinger wave equation.

Imp 2. What are the characteristics of wave function(Ψ). Derive the time dependent schodinger wave equation.

Imp 3. [Application of Schodinger theory:-]
Show that the energy of an electron that is confined in an infete potential is quantized, and hence determine normalized wave function of an electron confined in an infinete potential well.

V.V.I 4. Schrondinger wave equation for H-atom (V.V.I)

(5.) Derive an expression for total energy of an electron revolving around the nucleus in an external magnetic field. Explain it.
lesser imp but Imp

OR

How Zeeman Effect demonstrate the idea of space quantization.

(6.) Obtain an expression for the force experienced by an electron revolving around the nucleus in presence of magnetic field gradient. [Stern-Gerlach Experiment]
lesser imp

Imp 7. Physical Significance of various quantum numbers and Degeneracy of Energy levels of the Hydrogen atom.

Chapter=6

1) Electrical conductivity of intrinsic semiconductor
2) Current flow across P-N junction diode.
   (a) Equilibrium current across PN junction diode.
   (b) Diode eqⁿ (Net flow of charge across P-N junction).
3) C-E characteristics (lesser imp)
4) C-B characteristics (lesser imp)
5) Transistor as voltage amplifier.
6) JFET

Additional → Photo conductivity (easier), Metal-metal junction (contact potential) (easier — once look at exam time), Voltage-Current (V-I) characteristics of P-N junction.

Chapter=7

1) Universal gates, RS-flip flop.
2) Astable multivibrator.
3) Semiconductor - purification.
4) Process of I.C. - production.
5) Electronic component fabrication on a chip.