

Assignment Question

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Unit - I

- Q.1. Deduce expression for energy of a particle trapped in a one dimensional box.
- Q.2. Establish relationship between particle and group velocities.
- Q.3. Derive the time dependent and time independent schrodinger wave equation.
- Q.4. State and explain uncertainty principle.
- Q.5. Derive the expression for energy and momentum operator.

Unit - II

Q.1. Explain Newton's rings experiment in detail and also show that the diameter of n^{th} dark ring is proportional to \sqrt{n} .

Q.2. Derive the derivation of Young's double slit experiment. and find the expression for fringe width.

Q.3. Derive an expression for the intensity in Fraunhofer diffraction at a single slit.

Q.4. Explain Michelson interferometer with the help of necessary diagram.

Q.5. Explain the Rayleigh's criterion. Derive expression for resolving power of grating.

Unit - III

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Q.1. What is Hall effect? Derive expression for Hall voltage and Hall coefficient.

Q.2. Explain motion of electron in solid on the basis of Kronig-Penney Model.

Q.3. Distinguish between intrinsic and extrinsic semiconductor.

Q.4. Explain P-N Junction diode and its V-I characteristics.

Q.5. Derive the Bloch's theorem and explain the importance of Bloch's theorem.

Q.6. Explain the construction and working with the help of V-I characteristics of these devices.

(i) photo diode

(iii) Solar cell

(ii) Tunnel diode

(iv) Zener Diode.

Unit-IV.

- Q.1. What are transition probabilities?
obtain the relation between Einstein's transition probabilities.
- Q.2. Describe construction and working of Ruby / Nd:YAG Laser.
- Q.3. Explain the construction and working of CO_2 / He-Ne Laser.
- Q.4. Explain the principle of propagation of light waves within a fibre. Derive expression for acceptance angle and define acceptance cone.
- Q.5. Describe Single mode step index fibre, multimode step index fibre and graded index fibre. with the help of diagram.

Unit- V

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- Q.1. Explain how Maxwell modified the Ampere's law to accept this as one of the Maxwell's equations.
- Q.2. State and explain Gauss's and Stoke's theorem.
- Q.3. Calculate the electric field and electrostatic potential for a charge distribution?
- Q.4. Find the Maxwell's equation in vacuum.
- Q.5. Find the curl of following function.

$$\vec{F} = 3x\hat{i} - 2yz\hat{k} + 4x^2yz\hat{j}$$

- Q.6. Derive equation of continuity.
- Q.7. Find the gradient of following.

$$4x^2 - 3xy - 8z^2y.$$