I B. Tech II Semester Supplementary Examinations, January/February - 2023
APPLIED PHYSICS
(Common to EEE, ECE, CSE, EIE, IT)

Time: 3 hours　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　Max. Marks: 75

Answer any FIVE Questions ONE Question from Each Unit
All Questions Carry Equal Marks
~~~~~~

UNIT-I

1.　a)　Explain how Newton's rings are formed? Show that the diameters of Newton's rings are proportional to the square root of natural numbers.　[8M]

　　b)　What do you mean by resolving the power of an optical instrument? Obtain an expression for resolving power a telescope.　[7M]

(OR)

2.　a)　Explain interference in thin film. Obtain conditions for the formation of dark and bright fringes when the thin film is exposed to monochromatic light of wavelength (λ).　[8M]

　　b)　 Obtain an expression for the grating equation with a neat ray diagram.　[7M]

UNIT-II

3.　a)　Obtain an expression for the Schrodinger time independent wave equation.　[8M]

　　b)　What are the matter waves? Discuss their properties in detail.　[7M]

(OR)

4.　a)　Write the Schrodinger equation for a particle in a box and solve it to obtain energy Eigen values and Eigen functions.　[8M]

　　b)　Describe G. P. Thomson's experiment in support of the de-Broglie hypothesis.　[7M]

UNIT-III

5.　a)　Derive the expression for the electrical conductivity of material using quantum free electron theory.　[8M]

　　b)　Discuss failures of the classical free electron theory. How are they overcome in quantum free electron theory?　[7M]

(OR)

6.　a)　Explain the Kronig-Penny model of solids and show that it leads to the energy Band structure of solids.　[8M]

　　b)　What is Fermi energy function? Explain with the help of a diagram how it varies with the change of temperature.　[7M]

UNIT-IV

7.　a)　Obtain the expression for carrier concentration in the valence band of an intrinsic semiconductor.　[8M]

　　b)　Explain how the Fermi level of intrinsic semiconductors is dependent on temperature and carrier concentration.　[7M]

(OR)

8.　a)　What is Hall Effect? Deduce an expression for the Hall coefficient.　[8M]

　　b)　Derive an expression for carrier concentration in an N-type semiconductor.　[7M]

UNIT-V

9. a) Define polarization and electric flux density vectors in dielectrics and show that electronic polarizability is directly proportional to the volume of the atom. [8M]

   b) What do you mean by orientational polarization? Discuss the temperature dependence of orientational polarization. [7M]

(OR)

10. a) Classify magnetic materials on the basis of permanent dipole moment. [8M]
    b) Discuss the Weiss theory of ferromagnetism. [7M]

*****