Code No:**21BS1104** **RM21** **SET - 1**

I B.Tech- I Semester Supply Examinations, October -2022

APPLIED PHYSICS

(Com. to ECE Branch Only)

Time : 3 Hours Max.Marks:70

Answer any five Questions one Question from Each Unit
All Questions Carry Equal Marks

UNIT -I

1	A)	With a ray diagram, explain the theory of thin film interference by reflection.	7M
	B)	A soap film of refractive index μ is 1.33 and thickness 5000A^0 is exposed to white light having the radius of curvature is 10 cm. What wavelength in visible region is reflected?	7M
		OR	
2	A)	Explain the construction and working of Nicol's prism.	7M
	B)	Derive the expression for thickness of quarter and half wave plates.	7M

UNIT -II

3	A)	Distinguish between spontaneous emission and stimulated emission.	7M
	B)	Develop the relation between the probability of spontaneous emission and probability stimulated emission in terms of Einstein Coefficients.	7M
		OR	
4	A)	Obtain the mathematical expression for acceptance angle for an optical fiber.	7M
	B)	Classify the optical fibers based on their refractive index profile.	7M

UNIT -III

5	A)	Explain the origin of magnetic moment at the atomic level.	7M
	B)	Distinguish the properties of Dia, Para and Ferro magnetic materials.	7M
		OR	
6	A)	Define the following terms in dielectrics. i) Electric dipole moment ii)Polarizability iii) Dielectric constant	6M
	B)	Explain the electronic polarization in atoms.	4M
	C)	Calculate the electric susceptibility for a gas whose dielectric constant is 1.000057.	4M

UNIT -IV

7	A)	State and explain the Heisenberg's Uncertainty principle.	7M
	B)	Derive the Schrodinger time independent wave equation.	7M
		OR	
8	A)	Explain the assumptions of quantum free electron theory to overcome the drawbacks in classical free electron theory.	7M
	B)	Derive the expression for electrical conductivity based on quantum free electron theory.	7M

UNIT -V

9	A)	Derive the expression for effective mass of an electron.	7M
	B)	How can you classify materials into conductors, semiconductors and insulators based on band theory?	7M
		OR	
10	A)	Describe drift and diffusion currents in a semiconductor.	7M
	B)	Explain Hall effect and derive an expression for Hall coefficient.	7M