O.P.Code:23HS0840	R23	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech I Year II Semester Supplementary Examinations December-2025
ENGINEERING PHYSICS
(Common to CE, ME, CAD, CSM, CCC, CIC, CAI)

Time: 3 Hours **Max. Marks: 70**

PART-A
(Answer all the Questions **10 x 2 = 20** Marks)

1	a	Define Diffraction.	CO1	L1	2M
	b	Define Resolving Power of Grating.	CO1	L1	2M
	c	Define Bragg's condition for X-Ray diffraction.	CO2	L1	2M
	d	Define lattice parameter?	CO2	L1	2M
	e	What is Bohr magnetron?	CO4	L1	2M
	f	What is hysteresis?	CO4	L1	2M
	g	Define mean free path.	CO5	L1	2M
	h	What is Fermi energy level?	CO5	L1	2M
	i	What is Drift and Diffusion in semiconductors.	CO6	L1	2M
	j	What is extrinsic semiconductor?	CO6	L1	2M

PART-B
(Answer all Five Units **5 x 10 = 50** Marks)

UNIT-I

2	a	Distinguish between Fraunhofer and Fresnel's diffraction.	CO1	L3	5M
	b	Compare Interference and Diffraction.	CO1	L2	5M
		OR			
3	a	Explain the production of plane polarized light using Nicol Prism.	CO1	L2	5M
	b	Describe the propagation of polarized light in Quarter –Wave plate.	CO1	L3	5M

UNIT-II

4	a	Explain the various types of Bravais lattices with a neat sketch.	CO2	L2	4M
	b	Define atomic packing fraction and derive it for simple cubic crystal structure.	CO2	L3	6M
		OR			
5	a	Explain how crystal structure determined by Powder X-Ray diffraction method.	CO2	L2	5M
	b	What are the advantages of Powder X-Ray diffraction method?	CO2	L1	5M

UNIT-III

6	a	Obtain Clausius-Mosotti equation and explain how it can be used to determine the dipole moment of a polar molecule.	CO4	L4	5M
	b	A solid elemental dielectric with $3x10^{28}$ atoms/ m^3 shows an electronic polarisability of 10^{-40} F-m^2 assuming the internal electric field to be a Lorenz field. Calculate a dielectric constant of the material.	CO4	L1	5M
		OR			
7	a	Explain the domain concept of ferromagnetism.	CO4	L4	7M
	b	A paramagnetic material has a magnetic field intensity of 10^4 A/m. If the susceptibility of the material at room temperature is 3.7×10^{-3}. Calculate the magnetization and flux density in the material.	CO4	L1	3M

UNIT-IV

8	a	Derive Schrödinger's time independent wave equation.	CO5	L3	
	b	Explain the physical significance of wave function.	CO5	L2	
		OR			
9	a	What are the advantages of quantum free electron theory over classical free electron theory?	CO5	L1	
	b	Derive an expression for electrical conductivity in a metal by quantum free electron theory.	CO5	L3	

UNIT-V

10	a	What is Fermi level? Prove that the Fermi level is lies exactly in between conduction band and valance band of intrinsic semiconductor.	CO6	L3	
	b	If RH of a specimen is 3.66×10^{-4} m^3 c^{-1}. Its resistivity is 8.93×10^{-3} Ω-m. Find mobility and electron concentration.	CO6	L2	
		OR			
11	a	Describe the Hall Effect in semiconductors.	CO6	L2	
	b	What are the applications of Hall Effect?	CO6	L1	

*** END ***