O.P.Code:23HS0840a	R23	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech I Year I Semester Regular Examinations February-2024

ENGINEERING PHYSICS

(Common to EEE, ECE & CSIT)

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

PART-A

(Answer all the Questions **10 x 2 = 200** Marks)

1	**a**	Write any two differences between Fraunofer and Fresnel difraction	**CO1**	**L2**	**2M**
	b	Define Resolving Power of Grating.	**CO1**	**L1**	**2M**
	c	Define Lattice parameters.	**CO2**	**L1**	**2M**
	d	Define Bragg's condition for X-Ray diffraction.	**CO2**	**L1**	**2M**
	e	Define dielectric constant.	**CO3**	**L1**	**2M**
	f	Define magnetic susceptibility and magnetization.	**CO4**	**L1**	**2M**
	g	Define mean free path.	**CO5**	**L1**	**2M**
	h	Write any two merits of classical free electron theory.	**CO5**	**L2**	**2M**
	i	Define Intrinsic and Extrinsic semiconductors.	**CO6**	**L1**	**2M**
	j	What are the applications of Hall effect	**CO6**	**L1**	**2M**

PART-B

(Answer all Five Units 5 x 10 = 50 Marks)

UNIT-I

2	**a**	Describe the formation of Newton's ring with necessary theory with relevant diagrams.	**CO1**	**L3**	**7M**
	b	Calculate the thickness of Half-Wave plate, given that $\mu e = 1.533$, $\mu_o = 1.544$ and $\lambda = 5000$ Å.	**CO1**	**L4**	**3M**

OR

3	**a**	Define Diffraction and Explain about Fraunhofer diffraction due to a single slit,with intensity distribution curves.	**CO2**	**L3**	**10M**

UNIT-II

4	**a**	Show that Face centered cubic crystal structure has more closely packed structure than SC and BCC.	**CO2**	**L2**	**10M**

OR

5	**a**	Explain how crystal structure determined by Laue X-Ray diffraction method.	**CO2**	**L2**	**7M**
	b	What are the advantages of Laue X-Ray diffraction method?	**CO2**	**L1**	**3M**

UNIT-III

6	**a**	Explain the different types of polarizations.	**CO3**	**L3**	**4M**
	b	Derive the expression for electronic polarizabilty, **αe** in dielectrics.	**CO3**	**L4**	**6M**

OR

7	**a**	Describe the classification of magnetic materials based magnetic moments.	**CO4**	**L1**	**10M**

UNIT-IV

8	**a**	Derive the expression for de Broglie wavelength	**CO5**	**L3**	**6M**
	b	Explain the properties of matter waves.	**CO5**	**L2**	**4M**

OR

9	**a**	Derive an expression for electrical conductivity in a metal by quantum free electron theory.	**CO5**	**L3**	**7M**
	b	What are the advantages of quantum free electron theory over classical free electron theory?	**CO5**	**L1**	**3M**

UNIT-V

10	**a**	Derive Einstein's relation for charge carriers in semiconductor.	**CO6**	**L2**	**5M**
	b	Explain about intrinsic and extrinsic semiconductors.	**CO6**	**L2**	**5M**

OR

11	**a**	Explain Hall Effect in semiconductors.	**CO6**	**L2**	**6M**
	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**	**L3**	**4M**

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