`Course Code: 23BS2T01

BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & SCIENCE

(AUTONOMOUS)

I-B. Tech II-Semester Supplementary Examinations (BR23), Sep/Oct - 2024

ENGINEERING PHYSICS

(CSE, CSE-AI&DS, AI&ML)

Time: 3 hours | Max. Marks: 70

Question Paper consists of Part-A and Part-B
*Answer **ALL** the question in **Part-A and Part-B***

PART–A (10X2 = 20M)

		Marks	CO	BL
1. a)	Explain interference.	(2M)	CO1	L2
b)	Mention various types of polarizations.	(2M)	CO1	L2
c)	What are the differences between crystalline and amorphous materials?	(2M)	CO2	L1
d)	State Bragg's law of X-ray diffraction.	(2M)	CO2	L2
e)	Define the terms i) Electric Dipole ii) Electric Susceptibility.	(2M)	CO3	L1
f)	What is magnetic Susceptibility.	(2M)	CO3	L1
g)	An electron is accelerated by a potential of 100 V. Calculate the associated wave length.	(2M)	CO4	L3
h)	Explain the terms (i) mean free path, (ii) relaxation time.	(2M)	CO4	L2
i)	Differentiate p-type and n-type semiconductors.	(2M)	CO5	L4
j)	Define Hall effect.	(2M)	CO5	L1

PART–B (5X10 = 50M)

2a.	With neat ray diagram obtain the conditions for constructive and destructive interference for a thin film in reflected light system.	(7M)	CO1	L3
b.	A thin layer of colorless oil is spread over water in a container ($\mu = 1.35$). If the light of wavelength 520 nm is absent in the reflected light, what is the minimum thickness of oil layer? (angle of refraction is $r = 0$).	(3M)	CO1	L3
	(OR)			
3a.	Describe the construction and working of Nicol Prism.	(7M)	CO1	L2
b.	Calculate the thickness of half wave plate of quartz for a wave length 500nm here $\mu e = 1.553$ and $\mu o = 1.544$.	(3M)	CO1	L3

4a.	Describe the seven crystal systems with diagrams.	(10M)	CO2	L2
	(OR)			
5a.	Discuss powder method with the necessary diagrams.	(7M)	CO2	L2
b.	Monochromatic X-rays of wavelength $1.5A^0$ are incident on a crystal face having an interplanar spacing of $1.6A^0$. Find the highest order for which Bragg's reflection maximum can be seen.	(3M)	CO2	L3
6a.	Show that electronic polarization of an atom varies as its volume.	(6M)	CO3	L2
b.	Derive an expression for ionic polarization.	(4M)	CO3	L4
	(OR)			
7a.	. What is the origin of magnetism? Derive the expression for magnetic moment due to orbital motion and spin motion of charged particles.	(7M)	CO3	L1, L4
b.	In a magnetic material the field strength is found to be 10^6 A m^{-1}. If the magnetic susceptibility of the material is 0.5×10^{-5}, calculate the intensity of magnetization	(3M)	CO3	L3
8a.	Derive expressions for wave functions energies for a particle in one dimensional infinite potential well.	(10M)	CO4	L4
	(OR)			
9a.	What is the success and failures of quantum free electron theory.	(6M)	CO4	L1
b.	Calculate the fermi function for an energy k_BT above the Fermi energy.	(4M)	CO4	L3
10a	Derive an expression for concentration of electrons in conduction band.	(7M)	CO5	L4
b.	For intrinsic semiconductor with Band gap of E_g =0.78ev, calculate intrinsic carrier at 37^0c, if $m_e^* = m_p^* = m_0$=rest mass of electron.	(3M)	CO5	L3
	(OR)			
11a	Derive the expression for Hall coefficient and list the applications of Hall effect.	(7M)	CO5	L4
b.	The R_H is $33.66\times10^{-4}m^3c^{-1}$ and e = 1.6 x 10^{-19} C. Find the concentration of electrons.	(3M)	CO5	L3

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