

CRM08

Rev 1.11

<BS(PHY)>

<31/03/2022>

**CONTINUOUS INTERNAL EVALUATION - 3**

Dept: BS(PHY)	Sem / Div: I/A,B,C	Sub: Engineering Physics	S Code:21PHY12
06/04/2022	Time: 3-4:30 pm	Max Marks: 40	Elective: N

Note: Answer any 2 full questions, choosing one full question from each part.

QN	Questions	Mark s	RBT	CO's
<b>PART A</b>				
1 a	Mention any four assumptions of Drude-Lorentz model and discuss any two success of Quantum free electron theory	8	L1& L2	CO4
b	What is Hall effect. Obtain the expression for the Hall coefficient <i><math>9.53 \times 10^{-3} \text{ J or } 3.5405 \times 10^{-3}</math></i>	8	L1& L2	CO4
c	Calculate the probability that an energy level at 0.2eV below Fermi level is occupied at temperature 500K.	4	L3	CO4
<b>OR</b>				
2 a	Deduce the expression for electrical conductivity of a conductor using the quantum free electron theory of metals.	8	L2	CO4
b	Describe in brief the various types of polarization mechanisms	8	L2	CO4
c	An elemental solid dielectric material has polarizability $7 \times 10^{-40} \text{ Fm}^{-2}$ . Assuming the internal field to be Lorentz, calculate the dielectric constant for the material if the material has $3 \times 10^{28} \text{ atoms/m}^3$	4	L3	CO4
<b>PART B</b>				

3	a	With neat diagram, explain the principle, construction and working of Atomic Force Microscope.	8	L2	CO5
	b	With neat diagram, explain the principle, construction and working of X-ray photoelectron spectroscopy	8	L2	CO5
	c	The first order Bragg reflection occurs when a monochromatic beam of X-rays of wavelength $0.675\text{\AA}$ is incident on a crystal at a glancing angle of $4^\circ$ . What is the glancing angle for third order Bragg's reflection to occur?	4	L3	CO5

OR

4	a	Explain the construction and working of X-Ray diffractometer.	8	L2	CO5
	b	Describe the construction and working of Scanning Electron Microscope with the help of a neat diagram.	8	L2	CO5
	c	Determine the wave length of X-rays for crystal size of $1.188 \times 10^{-6}$ m, peak width is $0.5^\circ$ and peak position $30^\circ$ , for a cubic crystal. Given Scherrer's constant $k=0.92$ .	4	L3	CO5

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