

**MALINENI LAKSHMAIAH WOMEN'S ENGINEERING COLLEGE**  
(AUTONOMOUS)

**I-B.Tech I-Semester Regular Examinations (MR23), February - 2024**  
**ENGINEERING PHYSICS**

**(COMMON TO ECE, CSE (AI&ML), CSE (DS), and AI&DS BRANCHES)**

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**

Q.No.	<b>PART-A (10 X 2M = 20M)</b>		CO	BTL	Marks
1	a	What are coherent sources?	CO1	L1	2M
	b	Differentiate between Fraunhofer and Fresnel diffractions.	CO1	L2	2M
	c	Draw the crystal planes for the Miller indices (100) and (111)	CO2	L3	2M
	d	Why the crystal can act as space grating?	CO2	L1	2M
	e	What is meant by dielectric constant?	CO3	L1	2M
	f	Define soft and hard magnetic materials?	CO3	L1	2M
	g	Explain the physical significance of wave function ( $\psi$ ).	CO4	L2	2M
	h	Determine the wave length of an electron accelerated from rest through a potential difference of 100 V.	CO4	L3	2M
	i	Define drift and diffusion currents in Semiconductors	CO5	L1	2M
	j	Write any two applications of Hall effect?	CO5	L3	2M
<b>PART-B( 5 X 10M = 50M)</b>					
2	a	Explain how Newton's rings are formed in the reflected light and derive the expression for the diameter of bright rings.	CO1	L3	6M
	b	Newton's rings are observed in the reflected light of wavelength 5900 Å. The diameter of 10 <sup>th</sup> dark ring is 0.5 cm. Find the radius of curvature of lens used.	CO1	L3	4M
<b>Or</b>					
3	a	Derive an expression for resolving power of a grating.	CO1	L3	5M
	b	Explain construction and working of Nicol's prism with neat diagrams.	CO1	L3	5M
4	a	Explain the terms (i) Space lattice (ii) Basis (iii) Unit cell and (iv) Bravais lattice	CO2	L3	6M
	b	Estimate the Atomic packing fraction of FCC in a cubic crystal	CO2	L3	4M
<b>Or</b>					
5	a	State and explain Bragg's law	CO2	L1	5M
	b	Explain the Laue's X-ray diffraction method.	CO2	L3	5M

6	a	What is an internal field? Derive the expression for internal field in a dielectric material.	CO3	L3	10M
		<b>Or</b>			
7	a	What is magnetic moment? Explain the origin of magnetic moment of an atom in magnetic materials.	CO3	L1	5M
	b	Explain the Hysteresis loop in magnetic materials	CO3	L3	5M
		<b>Or</b>			
8	a	What is a matter wave? Derive the expression for de-Broglie wavelength of a matter wave	CO4	L1	4M
	b	Derive the expression for Schrodinger time independent wave equation.	CO4	L3	6M
		<b>Or</b>			
9	a	Write the merits and demerits of the classical free electron theory	CO4	L1	4M
	b	What is Fermi-Dirac distribution function? Explain effect of temperature on it with neat diagrams.	CO4	L3	6M
		<b>Or</b>			
10	a	Distinguish between conductors, semiconductors and insulators based on band structure of solids.	CO5	L2	5M
	b	Derive an expression for the carrier concentration in a intrinsic semiconductor.	CO5	L3	5M
		<b>Or</b>			
11	a	Derive the expression for Einstein's relation	CO5	L3	5M
	b	State and explain Hall effect. Derive an expression of Hall coefficient for an n-type semiconductor.	CO5	L1	5M

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