Code No.: R22AP202BS | R22 | H.T.No. | | | 8 | R | | | | | |

CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
I–B.TECH–II–Semester End Examinations (Supply) - February- 2024
APPLIED PHYSICS
(Common for ECE, CSE, IT)

[Time: 3 Hours] **[Max. Marks: 60]**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 10 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART-A **(10 Marks)**

1. a)	What is photoelectric effect?	[1M]
b)	State Heisenberg uncertainty principle.	[1M]
c)	What are direct band gap semiconductors?	[1M]
d)	Mention the applications of LED.	[1M]
e)	Define ferroelectricity.	[1M]
f)	What are solid electrolytes?	[1M]
g)	What is nano scale?	[1M]
h)	How TEM can be used to characterize nano particles?	[1M]
i)	What is a lasing action?	[1M]
j)	What is total internal reflection?	[1M]

PART-B **(50 Marks)**

2.a)	Derive Planck's radiation law.	[5M]
b)	Explain Davisson and Germer experiment with a neat schematic diagram to prove the wave nature of matter.	[5M]
	OR	
3.a)	What is Fermi-Dirac distribution? Explain the effect of temperature on the distribution.	[5M]
b)	Describe classification of solids on the basis of band theory.	[5M]
4.a)	Distinguish between intrinsic and extrinsic semiconductors.	[5M]
b)	Discuss working principle of p-n junction diode at various bias conditions.	[5M]
	OR	
5.a)	Distinguish between PIN diode and Avalanche photo diode.	[5M]
b)	Explain the structure, working principle and characteristics of solar cell.	[5M]
6.a)	Write a short note on liquid crystal displays.	[5M]
b)	What are soft and hard magnetic materials? Explain in detail.	[5M]
	OR	
7.a)	What do you mean by magnetostriction? Explain its working principle.	[5M]
b)	Give an account on rechargeable ion batteries.	[5M]
8.a)	Illustrate Quantum confinement.	[5M]
b)	Discuss the fabrication of nano materials using chemical vapor deposition (CVD) method.	[5M]
	OR	
9.a)	Describe how surface to volume ratio changes from bulk to nano.	[5M]
b)	Explain with a neat diagram SEM setup and its use in analyzing nanostructures.	[5M]

10.a) Explain the characteristics of laser. Derive the relations between Einstein coefficients of a laser. [5M]

b) With the help of suitable diagrams, explain the principle, construction and working of He-Ne laser. [5M]

OR

11.a) Derive an expression for acceptance angle and Numerical aperture of an optical fiber. [5M]

b) Distinguish between step-index and graded-index fibers. [5M]

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