Code No.: AP102BS	R20	H.T.No.			8	R						

CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
I–B.TECH–I–Semester End Examinations (Supply) -June- 2025
APPLIED PHYSICS
(Common for CSE, IT, CSC, CSD)

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

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 20 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 **(20 Marks)**

1.	a)	What are the characteristics of matter waves?	[2M]
	b)	State Heisenberg's uncertainty principle.	[2M]
	c)	Distinguish between intrinsic and extrinsic semiconductors.	[2M]
	d)	Draw the V-I characteristics of the p-n junction diode.	[2M]
	e)	What are dipole moment and dielectric constant in dielectrics?	[2M]
	f)	Distinguish between paramagnetic and ferromagnetic materials.	[2M]
	g)	What is population inversion? How it is achieved.	[2M]
	h)	Draw the structure of an optical fiber.	[2M]
	i)	What is surface to volume ratio at the nano scale?	[2M]
	j)	Outline the various applications of nanomaterials.	[2M]

PART-B **(50 Marks)**

2.	Describe Davisson and Germer's experiment to verify the wave nature of matter.	[10M]
	OR	
3.	Explain the classification of solids based on band theory.	[10M]
4.	Derive an expression for the carrier concentration in an n-type extrinsic semiconductor.	[10M]
	OR	
5.	Explain how a p-n junction diode formed. Draw and explain the energy band diagram for a p-n junction diode in an unbiased condition.	[10M]
6.	Deduce the expression for the Classius-Mossotti equation in the case of solid dielectrics.	[10M]
	OR	
7.	Classify magnetic materials into dia, para, and ferro materials based on their magnetic moment.	[10M]
8.	With a neat diagram, describe the construction and working of the He-Ne laser.	[10M]
	OR	
9.	Derive an expression for the acceptance angle and numerical aperture of an optical fiber.	[10M]
10.	Describe the fabrication of nanomaterials by the Physical Vapor Deposition (PVD) mechanism with a neat sketch.	[10M]
	OR	
11.	Explain how X-ray diffraction can be used to characterize nanoparticles.	[10M]

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