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

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

[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)	Explain de-Broglie hypothesis.	[2M]
b)	Draw the energy band structures of conductor, insulator and semiconductor.	[2M]
c)	What is an extrinsic semiconductor?	[2M]
d)	Draw the I-V characteristics of a p-n junction diode.	[2M]
e)	What is ionic polarization?	[2M]
f)	Write the properties of paramagnetic materials.	[2M]
g)	Distinguish between spontaneous and stimulated emission.	[2M]
h)	Explain scattering loss in optical fiber.	[2M]
i)	What is surface to volume ratio?	[2M]
j)	Mention the various applications of nanomaterials.	[2M]

PART-B **(50 Marks)**

2.	Describe Davisson and Germer's experiment and explain how it enabled the verification of wave nature of matter.	[10M]
	OR	
3.	Discuss the draw backs of classical free electron theory of metals and explain the concept of effective mass of electron.	[10M]
4.	What is Hall effect? Derive an expression for Hall coefficient and mention its applications.	[10M]
	OR	
5.	Explain the principle, working and I-V characteristics of Solar cell.	[10M]
6.	Give a brief account on Piezo-electricity, Pyro-electricity and Ferro-electricity.	[10M]
	OR	
7.	Discuss domain theory of ferro magnetism on the basis of hysteresis curve.	[10M]
8.	Explain with a neat diagrams (i) absorption (ii) spontaneous emission and (iii) stimulated emission of radiation.	[10M]
	OR	
9.	Describe the principle of an optical fiber and derive an expression for numerical aperture of an optical fiber.	[10M]
10.	What is top-down fabrication? Explain the fabrication of nanomaterials using Chemical Vapour Deposition (CVD) method.	[10M]
	OR	
11.	Explain the principle, construction and working of X-ray Diffraction (XRD) and give its limitations.	[10M]

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