Code No.: AP102BS | R22 | H.T.No. | | | 8 | R | | | | | |

CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
I–B.TECH–I–Semester End Examinations (Regular) - March- 2023
APPLIED PHYSICS
(Common for CSC, CSD, CSM)

[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 are the assumptions of quantum theory of radiation?	[1M]
b)	Give an account on effective mass of an electron.	[1M]
c)	Explain the process of formation of electron-hole pairs.	[1M]
d)	What is intrinsic and extrinsic semiconductor?	[1M]
e)	Define electric susceptibility and dielectric constant.	[1M]
f)	Define piezoelectricity and pyroelectricity.	[1M]
g)	Describe the quantum confinement effect in nanomaterials.	[1M]
h)	What are the applications of nanomaterials?	[1M]
i)	What is meant by optical resonator?	[1M]
j)	How will you classify the optical fibers.	[1M]

PART-B **(50 Marks)**

2.	Describe the Davisson and Germer experiment to prove that electrons possess wave nature.	[10M]
	OR	
3.	Explain the behavior of an electron moving in a field of periodic potential using kronig and Penny model.	[10M]
4.a)	What is Hall Effect? Explain it.	[6M]
b)	Distinguish between the direct band gap and indirect band gap semiconductor.	[4M]
	OR	
5.	Sketch the energy level diagram of PN junction diode and Explain the principle, construction and working of solar cell.	[10M]
6.a)	Explain the various kinds of polarization mechanisms in dielectrics.	[7M]
b)	What are applications of Dielectric materials?	[3M]
	OR	
7.	What is meant by Hysteresis loss? Describe the formation of hysteresis loop using domain wall movement.	[10M]
8.	How do you synthesize the nanomaterial using Physical Vapor Deposition (PVD) method?	[10M]
	OR	
9.	Explain in detail size and surface, morphological analysis of nanostructures using SEM.	[10M]
10.	Why the population inversion is necessary to achieve lasing action? Describe the construction and working of Helium-Neon laser?	[10M]
	OR	
11.	Derive an expression for the numerical aperture and acceptance angle of an optical fiber?	[10M]

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