

THE KAVERY ENGINEERING COLLEGE
(An Autonomous Institution)

B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, NOV /DEC 2024

Second Semester

Computer Science and Engineering

PH3256-Physics for Information Science

(Common to *Artificial Intelligence and Data Science & Information Technology*)

Regulations - 2021

Duration : 3 Hrs

Maximum : 100 Marks

PART - A (ANSWER ALL QUESTIONS) (Marks 10*2=20)

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
1.	Define mobility of electrons.	RE	1	2
2.	State Bloch theorem.	RE	1	2
3.	Why do we prefer silicon for transistor and GaAs for LASER diodes?	UN	2	2
4.	Differentiate between drift and diffusion transport.	AN	2	2
5.	Give Curie-Weiss law and its importance.	UN	3	2
6.	Draw hysteresis loop and show the retentivity and coercivity in it.	AN	3	2
7.	Define carrier generation and recombination.	RE	4	2
8.	What is the principle of compact disc (CD)?	RE	4	2
9.	Define nanomaterials?	RE	5	2
10.	How coulomb blockade prevent unwanted tunneling?	UN	5	2

PART - B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
11.	a Deduce mathematical expression for electrical conductivity and thermal conductivity of a metal and hence obtain Wiedemann-Franz law.	UN	1	16
	Or			
	b Derive an expression for the density of states in metals. Also calculate the carrier concentration and the Fermi energy of an electron at 0 K.	AN	1	16
12.	a Derive an expression for the density of electrons in the conduction band of n-type semiconductors.	AN	2	16
	Or			
	b What is hall effect? Derive an expression of hall coefficient R_H for p, n-type semiconductor. Give the experimental determination of Hall Effect. Write its applications	AN	2	16

13.	a	Describe the ferromagnetic domain theory in detail. Briefly explain different types of energy involved in domain growth.	UN	3	16
Or					
	b i	Explain magnetic principle in data storage.	UN	3	8
	ii	Describe working of magnetic hard disc based on GMR sensors.	AP	3	8
14.	a i	Explain carrier generation and recombination in semiconductor.	UN	4	8
	ii	Describe absorption and emission of light in metals, insulators and semiconductor.	UN	4	8
Or					
	b	What is a Laser diode? Describe the principle, construction and working of a semiconductor laser diode with a neat diagram. Mention its advantages, disadvantages and applications.	AN	4	16
15.	a i	Explain in details about Bloch sphere.	UN	5	10
	ii	Explain quantum cellular automata.	AP	5	6
Or					
	b	Using single electron phenomena, explain the construction and working of single electron transistors. Mention its advantages, disadvantages and applications.	AP	5	16