

THE KAVERY ENGINEERING COLLEGE*(An Autonomous Institution)***B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, NOV/DEC 2025***Second Semester**Artificial Intelligence and Data Science***PH3256 / UPHT24202 – Physics for Information Science****(Common to Computer Science and Engineering & Information Technology)***Regulations – 2021 & 2024**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.	What is relaxation time?	L1	1	2
2.	The thermal conductivity of copper at 300 K is 470 W/m/K. Calculate the electrical conductivity. Given Lorentz number, $L = 2.45 \times 10^{-8} \text{ W}\Omega\text{K}^{-2}$.	L3	1	2
3.	Why elemental semiconductors are called as indirect band gap semiconductors?	L2	2	2
4.	Define doping.	L1	2	2
5.	Magnetic field intensity of a paramagnetic material is 10^4 ampere/metre. At room temperature its susceptibility is 3.7×10^{-3} . Calculate the magnetization of the material.	L3	3	2
6.	Why soft magnetic materials are used in electromagnets?	L2	3	2
7.	What is dark current?	L2	4	2
8.	Classify the optical materials based on their interaction with visible light.	L2	4	2
9.	What are nanomaterials?	L1	5	2
10.	What is Bloch sphere?	L1	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 an expression for the electrical conductivity of a conducting material using classical free electron theory and list its merits and demerits.	L3	1	16
	Or			
	b i Define Fermi energy. Explain the Fermi Dirac distribution function for electrons in a metal and discuss the effect of temperature on Fermi function.	L3	1	12
	ii Calculate Fermi distribution function $F(E)$ for the energy level lying 0.01 eV above the Fermi level at 270 K.	L3	1	4
12.	a Deduce an expression for density of electrons in a conduction band of an intrinsic semiconductor.	L2	2	16
	Or			
	b What is hall effect? Derive an expression of Hall Coefficient. Give the experimental determination of Hall Effect. Write its applications and importance.	L2	2	16

13.	a	Classify the different types of magnetic materials based on their spins.	L2	3	16
		Or			
	b i	Explain the hysteresis curve based on domain theory.	L2	3	12
	ii	Distinguish soft and hard magnetic materials.	L2	3	4
14.	a	Construct a solar cell circuit and explain the principle, construction and working of it, when it is exposed to sunlight along with its advantages and disadvantages.	L3	4	16
		Or			
	b	List out the different types of optical data storage techniques and describe any one technique.	L3	4	16
15.	a	Explain in detail what is quantum confinement and how quantum structures, in nanomaterial are classified.	L2	5	16
		Or			
	b	Explain the principle and working of single electron transistor.	L2	5	16