

THE KAVERY ENGINEERING COLLEGE*(An Autonomous Institution)*

UG/PG DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL/MAY 2026

*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.	State Fermi distribution function.	L2	1	2
2.	The thermal conductivity of copper at 300 K is 470.4 W/m/K. Calculate the electrical conductivity of copper at 300K. Lorentz number $L = 2.45 \times 10^{-8}$.	L3	1	2
3.	Define Hall effect.	L1	2	2
4.	Compare direct and indirect band gap semiconductor.	L2	2	2
5.	Define magnetic permeability of magnetic materials.	L1	3	2
6.	State Bohr Magnetron.	L1	3	2
7.	Classify the different types of optical materials.	L2	4	2
8.	List any two advantages of solar cell.	L1	4	2
9.	Recall the principle of resonant tunneling diode?	L1	5	2
10.	What is Coulomb blockade effect?	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 Derive an expression for the density of states in a metal.	L2	1	16
	Or			
	b i Explain the Fermi distribution function with suitable diagram.	L2	1	8
	ii Explain effective mass of an electron and tight binding approximation with suitable diagrams.	L2	1	8
12.	a Derive a mathematical expression for the carrier concentration of charge carriers in an intrinsic semiconductor.	L2	2	16
	Or			
	b Derive an expression for density of holes in the valance band of P type semiconductor.	L2	2	16

13.	a	i	Compare hard and soft magnetic materials with examples.	L2	3	8
		ii	Explain the hysteresis in a ferromagnetic material.	L2	3	8
Or						
	b	i	Describe the principle and working of magneto resistance and GMR sensor.	L2	3	8
		ii	Explain the types of energy involved in the process of domain growth in detail.	L2	3	8
14.	a	i	Apply the concept of carrier generation and recombination, explain how the efficiency of a solar cell can be improved.	L3	4	8
		ii	Identify the key factors affecting the absorption and emission of light in metals, insulators, and semiconductors, and how these influences optical device performance.	L3	4	8
	Or					
	b		Make use of quantum mechanical principles, explain the principle, construction and working of LED. Mention its merits and demerits.	L3	4	16
15.	a		Analyze how quantum confinement affects the energy levels of quantum wells, wires, and dots.	L4	5	16
	Or					
	b	i	Survey how the size of nanomaterials influences their bandgap.	L4	5	8
		ii	Inspect the conditions required for quantum tunneling to occur and simplify its role in modern electronic devices.	L4	5	8
