

Register No : _____

THE KAVERY ENGINEERING COLLEGE

(An Autonomous Institution)

B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, NOV/DEC 2025

Second Semester

Electrical and Electronics Engineering

PH3202 / UPHT24203 – Physics for Electrical Engineering

Regulations – 2021 & 2024

Duration : 3 Hrs

Maximum : 100 Marks

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

Q.No	Questions	BLT	CO	Marks
1.	If a NaCl crystal is subjected to an electrical field of 1000 V/m and the resulting polarisation is 4.3×10^{-8} C/m ² , evaluate the relative permittivity of NaCl.	L3	1	2
2.	Compare piezoelectricity and pyroelectricity.	L2	1	2
3.	What are degenerate states?	L1	2	2
4.	State Curie – Weiss law and give its importance.	L1	2	2
5.	Outline the energy band diagram of semiconductors.	L2	3	2
6.	What is Hall effect?	L1	3	2
7.	How are optical materials classified?	L1	4	2
8.	What is electro optic effect?	L1	4	2
9.	Define Coulomb – Blockade effect.	L1	5	2
10.	What is a Carbon nano tube?	L1	5	2

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

Q.No	Questions	BLT	CO	Marks
11.	a Describe the diverse types of polarisation mechanisms involved in a dielectric material. Or	L2	1	16
	b What is meant by local field in a dielectric and how is it calculated for a cubic structure. Deduce the claussius – mossotti relation.	L2	1	16
12.	a Derive the mathematical expression for electrical and thermal conductivity of a metal. Also prove Wiedemann- Franz law. Or	L3	2	16
	b Develop an expression for density of states. Using that, obtain an expression for carrier concentration of metals.	L3	2	16

13.	a	Explain carrier concentration in an n – type semiconductor and discuss how it is varying with temperature.	L2	3	16
		Or			
	b i	Organize the main features of Ohmic contact.	L2	3	6
	ii	Develop the construction, working, advantages and applications of Schottky diode.	L2	3	10
14.	a i	Explain the structure and function of light detectors.	L2	4	8
	ii	Describe the construction and working of Solar cell with suitable band diagram.	L2	4	8
		Or			
	b	Describe the principle, construction, working and limitations of Light Emitting Diode.	L2	4	16
15.	a	Derive expressions for density of states for quantum well, quantum wire and quantum dot structures.	L2	5	16
		Or			
	b	Describe using a schematic how a Quantum Well Laser is fabricated, and explain why this is a Quantum Well Laser.	L2	5	16