

THE KAVERY ENGINEERING COLLEGE*(An Autonomous Institution)***B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL-MAY 2025***Second Semester**Electronics and Communication Engineering***PH3254 / UPHT24204 - Physics for Electronics 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.	List out the types of crystal systems.	L1	1	2
2.	State wafer flats and notches.	L1	1	2
3.	List out three main theories developed for understanding the properties of metals.	L1	2	2
4.	The thermal and electrical conductivities of copper at 20°C are 390 Wm ⁻¹ K ⁻¹ and 5.587 X 10 ⁷ Ω ⁻¹ m ⁻¹ respectively. Calculate the Lorentz number.	L2	2	2
5.	Distinguish between direct and indirect band gap semiconductors.	L2	3	2
6.	Hole is a positively charged particle - Justify.	L2	3	2
7.	How are optical materials classified?	L2	4	2
8.	Name two optoelectronic devices where electrical energy is converted to optical energy.	L1	4	2
9.	What is meant by quantum confinement?	L1	5	2
10.	Define spintronics.	L1	5	2

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

Q.No	Questions	BLT	CO	Marks
11.	a Describe and calculate the atomic radius, number of atoms, coordination number and packing factor for SC and FCC structures.	L2	1	16
	Or			
	b Explain the various types of crystal imperfections with neat diagrams.	L2	1	16
12.	a Derive mathematical expressions for electrical conductivity and thermal conductivity of a conducting material based on classical free electron theory.	L3	2	16
	Or			
	b On the basis of spin, how are magnetic materials classified? Discuss their properties in detail.	L3	2	16

13.	a	i	Derive an expression for the concentration of electrons per unit volume in the conduction band of an intrinsic semiconductor.	L2	3	8
		ii	Derive an expression for the density of holes in the valence band of an intrinsic semiconductor.	L2	3	8
			Or			
	b		Describe a theory and experimental procedure for the measurement of the Hall coefficient of a semiconductor and discuss its applications.	L2	3	16
14.	a		Describe optical process in quantum well with necessary diagram.	L2	4	16
			Or			
	b		Explain the principle, construction and working of LED with a neat sketch and mention its advantages and disadvantages.	L2	4	16
15.	a		Explain the necessary conditions for single electron phenomena and the working of single electron transistor.	L2	5	16
			Or			
	b		Describe the properties and applications of CNTs with neat diagrams.	L2	5	16