

THE KAVERY ENGINEERING COLLEGE
(An Autonomous Institution)

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

Second Semester

Mechanical Engineering

PH3251 - Materials Science

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.	What are bravais lattices?	RE	1	2
2.	What is stacking fault?	RE	1	2
3.	Give the essential features of quantum free electron theory?	RE	2	2
4.	Define magnetic dipole moment.	RE	2	2
5.	Distinguish between direct band gap and indirect band gap semiconductors.	AN	3	2
6.	List out the applications of schottky diode.	RE	3	2
7.	Outline the features of opto-electronic devices.	UN	4	2
8.	Define plasmonics.	RE	4	2
9.	What is zener bloch oscillation?	RE	5	2
10.	What is spintronics?	RE	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 Explain the characteristics of Hexagonal Closely Packed crystal system (HCP) with a neat diagram.	UN	1	16
	Or			
	b Explain nucleation and growth and explain about (i) Homogeneous nucleation and (ii) Heterogeneous nucleation.	UN	1	16
12.	a i Derive an expression for thermal conductivity of conducting materials.	UN	2	7
	ii What is fermi distribution function? Explain how it is varied with temperature.	UN	2	9
	Or			
	b i Discuss the origin and exchange interaction of ferromagnetism.	AN	2	8
	ii Examine about quantum interference devices.	AN	2	8
13.	a Develop an expression for carrier concentration in intrinsic semiconductor.	AP	3	16
	Or			
	b Make use of hall effect, deduce an expression for hall coefficient in n-type and p-type semiconductor and give its experimental set up.	AP	3	16

14.	a	Explain the different types of optical absorption and recombination process in semiconducting materials.	UN	4	16
		Or			
	b	Inspect the light emitting diode and laser diode, using their construction in detail.	AN	4	16
15.	a	Categorize different states of quantum structures in nano material, using quantum confinement.	AN	5	16
		Or			
	b	Analyze different types, structures, properties and application of carbon nano tubes.	AN	5	16