



SNS COLLEGE OF TECHNOLOGY

Saravanampatti, Coimbatore – 641 035

Approved by AICTE, Recognized by UGC & Affiliated to Anna University, Chennai



23PYT102- PHYSICS FOR ENGINEERS

QUESTIONBANK

UNIT- II- Conductors and superconducting materials

PART-A-2 Marks

Q.No	Question	Bloom Level	Company/Source
1	Define electrical conductivity and mention its SI unit.	L1	Siemens
2	What is drift velocity? Give its mathematical expression.	L1	ISRO
3	State the postulates of classical free electron theory.	L1	GATE
4	Give any two failures of classical free electron theory.	L1	TATA Steel
5	Define Fermi energy and Fermi level.	L1	Intel
6	Write the expression for density of energy states in metals.	L2	Samsung
7	What is meant by carrier concentration in metals?	L2	TSMC
8	State Meissner effect with a neat sketch.	L2	NASA
9	Differentiate Type-I and Type-II superconductors.	L2	GE
10	Define critical magnetic field and critical temperature.	L2	Hitachi
11	What is a Cooper pair?	L2	Bell Labs
12	Mention two important applications of superconductors.	L1	Maglev
13	Write the expression for electrical conductivity in free electron theory.	L2	Siemens
14	What is relaxation time? Explain its significance.	L2	Boeing
15	Define persistent current in a superconductor.	L2	CERN

PART-B-13 Marks

Q.No	Question	Bloom Level	Company/Source
1	Derive expression for electrical conductivity and explain temperature dependence.	L3	GATE
2	Explain limitations of classical theory vs quantum theory of metals.	L3	Intel
3	Derive density of states in a metal and relate with Fermi energy.	L3	AMD
4	Explain Fermi distribution function with graph for $T=0$ & $T>0$.	L3	NPTEL
5	Illustrate Meissner effect and discuss perfect diamagnetism.	L3	NASA
6	Classify superconductors using Type-I & II diagrams.	L3	GE
7	Describe BCS theory and Cooper pair formation.	L3	Bell Labs
8	Explain SQUID operation and detection of weak magnetic fields.	L3	IIT
9	Discuss applications in Maglev & power systems.	L3	Indian Rail
10	Derive carrier concentration from Fermi energy.	L3	Samsung

PART- C- 14 Marks

Q.No	Question	Bloom Level	Company/Source
1	GE is developing loss-free power cables. Design and analyze using Type-II SC.	L4	GE
2	Explain Maglev using Meissner effect and evaluate role of high- T_c ceramics.	L4	JR Central
3	Analyze thermal conduction in chips using free electron theory and impurity effects.	L4	Intel
4	Design SQUID and evaluate flux quantization sensitivity.	L4	CERN

5	Explain MRI magnets using SC materials and compare with resistive magnets.	L4	Philips
---	--	----	---------

Bloom's Level (BL)			
L1- Remember	L2- Understand	L3-Apply	L4-Analyse