LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **PHYSICS**

SIXTH SEMESTER – **NOVEMBER 2022**

UPH 6501 – SOLID STATE PHYSICS

Date: 29-11-2022 Dept. No. Max. : 100 Marks

Time: 01:00 PM - 04:00 PM

	PART – A
Answer ALL questions	**(10 x 2 = 20 Marks)**
1	What are crystalline solids? Give an example.
2	State Bragg's law.
3	What are phonons?
4	What is Debye temperature?
5	Define doping in semiconductors.
6	Draw a diagram to show the Fermi level in an n-type semiconductor.
7	State Curie's law.
8	What do you mean by hysteresis?
9	Define Meissner effect.
10	What are high temperature superconductors?
	PART – B
Answer any FOUR questions	**(4 x 7.5 = 30 Marks)**
11	Describe the rotating crystal method for X-ray diffraction.
12	Write a note on the momentum of phonons.
13	Give an account on band theory of solids.
14	Distinguish between dia, para and ferromagnetic materials.
15	Discuss about thermodynamic superconducting phase transition.
16	Distinguish between type 1 and type 2 superconductors.
	PART – C
Answer any FOUR questions	**(4 x 12.5 = 50 Marks)**
17	With suitable diagrams describe Bravais lattice in three dimensions.
18	Deduce the dispersion relation of a linear diatomic molecule.
19	With a neat diagram, describe the working of n-type and p-type semiconductors.
20	Discuss Langevin's theory of diamagnetism.
21	Obtain London equations and discuss its significance. Deduce the expression for penetration depth.
22	Give an account on Einstein's theory of lattice heat capacity. Show that it reduces to Dulong-Petit's law at high temperature.

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