LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

SIXTH SEMESTER – **APRIL 2023**

16/17/18UPH6MC03 – SOLID STATE PHYSICS

Date: 05-05-2023 Dept. No. Max. : 100 Marks

Time: 09:00 AM - 12:00 NOON

	PART – A	**(10 x 2 = 20 Marks)**
Q. No.	**Answer ALL questions**	
1	Define a unit cell.	
2	State Bragg's law.	
3	What are phonons?	
4	What is Debye temperature?	
5	State the law of mass action.	
6	Draw a diagram to show the Fermi level in a p-type semiconductor.	
7	State Curie's law.	
8	What is meant by retentivity?	
9	Enumerate two applications of HTS.	
10	What is meant by Josephson effect?	
	PART – B	**(4 x 7.5 = 30 Marks)**
	Answer any FOUR questions	
11	Describe the powder method of 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	With a neat diagram, discuss the variation of energy gap with temperature in superconductors.	
16	Give an account on type 1 superconductors.	
	PART – C	**(4 x 12.5 = 50 Marks)**
	Answer any FOUR questions	
17	Discuss about Bravais lattice in three dimensions.	
18	Deduce the dispersion relation of a linear mono-atomic molecule.	
19	With a neat diagram, describe the working of n-type and p-type semiconductors.	
20	Discuss Langevin's theory of paramagnetism.	
21	Obtain London equations and discuss its significance. Deduce the expression for penetration depth.	
22	Give an account on Debye's theory of lattice heat capacity.	

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