LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

SIXTH SEMESTER – **APRIL 2023**

PH 6606 – SOLID STATE PHYSICS

Date: 15-05-2023   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	What are crystalline solids? Give an example.	
2	Find the Miller indices of the crystal plane which cut through the crystal axis at (2a,b,c).	
3	State Bragg's law.	
4	Write two properties of X-rays.	
5	What is Debye temperature?	
6	Write the principle of Hall effect.	
7	Define specific heat capacity. Give its unit.	
8	Mention two limitations of free electron theory.	
9	What is Meissner effect?	
10	Enumerate two applications of Josephson effect.	

	PART – B	(4 x 7.5 = 30 Marks)
	Answer any FOUR questions	
11	What are Miller indices? Write the steps involved in determining Miller indices with an example.	
12	With a neat diagram describe Von Laue method of X-ray diffraction studies.	
13	Give an account on Einstein's theory of lattice heat capacity and discuss the special cases.	
14	Elucidate about the free electron model of metals and write its assumptions.	
15	Give an account on Josephson effect.	
16	Distinguish between type 1 and type 2 superconductors.	

	PART – C	(4 x 12.5 = 50 Marks)
	Answer any FOUR questions	
17	Sketch the Bravais lattice in three dimensions and write the lattice specifications.	
18	Describe the rotating crystal method of X-ray diffraction.	
19	Discuss in detail the Debye theory of lattice heat capacity.	
20	Explain Sommerfeld theory of electrical conductivity.	

21	a) Discuss the implications of BCS theory.	(6)
	b) Draw a plot to show the mixed states in type 1 and type 2 superconductors.	(2)
	c) Write a short note on tunneling effect and levitation.	(4.5)
22	Describe powder method of X-ray diffraction.	

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