22PHP102N / 22PHP102

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MSc DEGREE EXAMINATION DECEMEBR 2023
(First Semester)

Branch- **PHYSICS**

SOLID STATE PHYSICS

Time: Three Hours Maximum: 75 Marks

SECTION-A (10 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** marks (10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	Most Bravais lattices are the type: (a) Primitive unit cell (b) Body centred unit cell (c) End centered unit cell (d) Face centered unit cell	K1	CO1
	2	The coordination number of body centered cubic crystal is.... (a) 6 (b) 8 (c) 12 (d) 10	K2	CO1
2	3	Bloch's theorem is about the wave function of an electron in a .... (a) Non periodic (b) Periodic (c) Irregular (d) randomly varying	K1	CO2
	4	Dielectric material are those which are used to store.....energy. (a) Potential (b) Kinetic (c) Total (d) electrical	K2	CO2
3	5	The displacement of the two atoms in a diatomic linear lattice are in opposite direction in .... (a) Accoustic mode (b) Optical mode (c) Both (d) none of these	K1	CO3
	6	If the Debye's temperature of the metal is 450K,Debye's frequency is..... (a) 10^{13} Hz (b) 10^{2} Hz (c) 10^{23} Hz (d) 10 Hz	K2	CO3
4	7	Gold is an example for a.....magnetic material. (a) Dia (b) Para (c) Ferro (d) Ferri	K1	CO4
	8	At Curie temperature, the spontaneous magnetization for ferro magnetic material is..... (a) One (b) Infinity (c) Zero (d) None of these	K2	CO4
5	9	Phenomenon of superconductivity was discovered by .... (a) K.Onnes (b) Meissner (c) Silsbee (d) Josephon	K1	CO5
	10	Which of the following is Type I superconductor? (a) Vanadium (b) Gold (c) Niobium (d) Lead	K2	CO5

Cont...

SECTION - B (35 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Explain the construction of Brillouin zone in two Dimension and three Dimension.	K2	CO1
	(OR)			
	11.b.	Discuss in details the point imperfections.		
2	12.a.	Mention the applications of hall effect.	K1	CO2
	(OR)			
	12.b.	Derive the Clausius – Mossotti relation.		
3	13.a.	Explain the thermal conductivity of solids.	K1	CO3
	(OR)			
	13.b.	State and Explain the Dulong and Petit's law.		
4	14.a.	List out the properties of paramagnetism.	K2	CO4
	(OR)			
	14.b.	Discuss the Weiss theory of ferromagnmetism.		
5	15.a.	Explain the Meissner effect in superconductivity.	K2	CO5
	(OR)			
	15.b.	Describes the AC Jopephon effect.		

SECTION -C (30 Marks)

Answer **ANY THREE** questions

ALL questions carry **EQUAL** Marks (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Describe the structure of BCC crystal and calculate the atomic packing factor of BCC crystal lattice.	K2	CO1
2	17	Discuss the Kronig Penny model. Using the model show that ther energy spectrum of electron consists of a number of allowed energy bands separated by forbidden regions.	K2	CO2
3	18	Discuss the salient features of Debye's theory of specific heat of solids.	K2	CO3
4	19	Explain the Langevin's classical theory of diamagnetism.	K2	CO4
5	20	Explain Qualitative ideas BCS theory and derive the expression for Londons equation.	K2	CO5

Z-Z-Z END