


Name:			
Enrolment No:			
<b>UPES</b> <b>End Semester Examination, December 2023</b>			
<b>Course: Condensed matter physics I</b> <b>Program: Integrated B.Sc – M .Sc Physics</b> <b>Course Code: PHYS3032</b>		<b>Semester: V</b> <b>Time : 03 hrs.</b> <b>Max. Marks: 100</b>	
<b>Instructions:</b>			
<b>SECTION A</b> <b>(5Qx4M=20Marks)</b>			
S. No.		Marks	CO
Q 1	Explain the effect of entropy on superconductivity.	4	CO5
Q 2	How piezoelectricity can be used for sensor applications?	4	CO2
Q 3	Obtain the atomic radius of body centered cubic structure.	4	CO1
Q 4	What is type -II superconductors?	4	CO5
Q 5	Distinguish mass and effective mass of an electron.	4	CO1
<b>SECTION B</b> <b>(4Qx10M= 40 Marks)</b>			
Q 6	Obtain the dielectric constant of mono atomic gas.	10	CO1
Q 7	Explain Josephson tunneling effect and what are its applications.	10	CO5
Q 8	Differentiate magnetic materials on at least six parameters with examples.	10	CO3
Q 9	Derive Bragg's law and explain any one method of structural analysis of solids.  Or  Discuss quantization of lattice vibrations and explain in detail how it leads to high resistivity in metals.	10	CO2
<b>SECTION C</b> <b>(2Qx20M=40 Marks)</b>			
Q 10	Explain the effect of followings on superconductivity i. Magnetic field ii. Entropy iii. Critical current	5*4 = 20	CO5

	iv. Meissner effect		
Q 11	<p>Explain Kronig Penney model and explain the significance of Bloch theorem. (Hint: The resultant varies as a function of <math>\alpha a</math>)</p> <p>Or</p> <p>Derive an expression for drift velocity, conductivity, and mobility of electron in a metal</p>	<b>20</b>	<b>CO3</b>