## S.Y.M.SC.(Physics) Fourth Semester Old

## MSC241010-Paper-VIII (Elective) : Condensed Matter Physics-I

P. Pages: 1

Time : Three Hours

\* 1 8 9 8 \*

Max. Marks : 80

GUG/W/18/2428

1.		Either	
	a)	Derive on expression for binding energy for an ionic crystal.	8
	b)	Discuss Anharmonicity of lattice specific heat of solid. OR	8
	e)	Derive an expression for interaction of electrons and phonons with photons in a solid.	8
	f)	What is absorption in insulators? Explain direct & Indirect transition in a metal.	8
2.		Either	
	a)	Derive expression for interactions of electron with acoustic phenons.	8
	b)	Write a short note on optical properties of metal & Explain its Anomalous skin effect. OR	8
	e)	What is Messner effect? Explain Macroscopic quantum interference.	8
	f)	Derive Ginzburg- Landau theory.	8
3.		Either	
	a)	Explain Bragg's Law. Find the correction for Bragg's Equation.	8
	b)	Calculate the glancing on the plane (110) of a cubie rock salle ( $a=2.81A^{\circ}$ ) corresponding.	4
	c)	Explain Barger's precession in crystal dislocation.	4
		OR	
	e)	Explain Analytical indexing & its applications.	8
	f)	Explain Fourier representation of electron density.	8
4.	a)	What is aperiodic solids? Explain Penrose lattices and their extension to three dimensions.	8
	b)	Write a short note on tubules and fullerenes.	8
		OR Discuss the application of CNT in electronics	Q
	e) f)	Write a short note on electronic properties of tubules and carbon nano tubules	0 8
	1)	white a short note on electronic properties of tubules and carbon hand tubules.	0
5.		All question are compulsory.	
		a) Write a short note on lattice dynamics.	4
		b) What is critical field & critical temperature of superconductor?	4
		c) Explain Patterson function.	4
		d) Explain the mechanical properties of CNT in chiral form.	4

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