

--	--	--	--	--	--	--	--	--	--

**GIET UNIVERSITY, GUNUPUR – 765022**

M. Sc (Third Semester) Examinations, December' 2020

PHPE 304 – CONDENSED MATTER AND MATERIALS PHYSICS - I
(Physics)

Time: 2 hrs

Maximum: 50 Marks

(The figures in the right hand margin indicate marks.)

- Q.1. Answer **ALL** the questions (2 x 10 = 20)
- Define creation operator.
 - What is meant by quantisation of lattice vibrations?
 - What is density functional theory?
 - Name any two phenomena which arise due to electron-electron scattering.
 - State Meissner effect.
 - What is isotope effect?
 - What are quasi particles?
 - What are the two most important characteristics of superconducting state?
 - What are high temperature superconductors?
 - Explain Type I and Type II superconductors.

PART – B (6 x 5 = 30 Marks)Answer ANY FIVE questions

Marks

- Describe the method of orthogonalised plane wave for band structure calculation (6)
- Derive Boltzman equation of transport theory of solids (6)
- Describe Hartree approximation method of N electron system in a solid with necessary theory (6)
- Discuss the theory of Hartree Fock approximation for the jellium model. (6)
- Give the qualitative description of BCS theory. (6)
- Obtain an expression for frequency of oscillation in AC Josephson effect. (6)
- Describe the energy band formulation of electron - phonon interaction (6)
- Give a brief account of microscopic theory of superconductivity. (6)

--- End of Paper ---