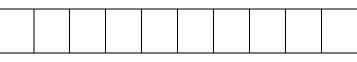
Reg. No



Time: 2 hrs

GIET UNIVERSITY, GUNUPUR – 765022

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

(Physics)

PHPE 304 – CONDENSED MATTER AND MATERIALS PHYSICS - I

Maximum: 50 Marks

 $(2 \times 10 = 20)$

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

- Q.1. Answer ALL the questions
 - a. Define creation operator.
 - b. What is meant by quantisation of lattice vibrations?
 - c. What is density functional theory?
 - d. Name any two phenomena which arise due to electron-electron scattering.
 - e. State Meissner effect.
 - f. What is isotope effect?
 - g. What are quasi particles?
 - h. What are the two most important characteristics of superconducting state?
 - i. What are high temperature superconductors?
 - j. Explain Type I and Type II superconductors.

PART - B (6 x 5 = 30 Marks)

Marks Answer ANY FIVE questions 2. Describe the method of orthogonalised plane wave for band structure calculation (6)Derive Boltzman equation of transport theory of solids (6)3. 4. Describe Hartree approximation method of N electron system in a solid with necessary (6)theory 5. Discuss the theory of Hartree Fock approximation for the jellium model. (6)6. Give the qualitative description of BCS theory. (6)Obtain an expression for frequency of oscillation in AC Josephson effect. 7. (6)Describe the energy band formulation of electron - phonon interaction 8. (6)Give a brief account of microscopic theory of superconductivity. 9. (6)

--- End of Paper ---