GIET UNIVERSITY, GUNUPUR – 765022

RN19MSC026

Roll No: | | | | | | |

Total Number of Pages : 2 AR-18 M. Sc

M.Sc 3rd SEMESTER REGULAR EXAMINATIONS, NOV/DEC 2019-20

Subject code: CEC-PHY-304

Subject: Condensed Matter and Materials Physics - I

Time: 3 Hours Max Marks: 80

The figures in the right hand margin indicate marks.

SECTION A

Q.1 Answer any four of the following: [4 X4 =16]

a Explain creation and annihilation operators.

b State the de Hass-van Alphen effect transport theory.

c Explain the local density approximation.

d Write about Hartree –Fock approximation.

e Explain the various thermodynamics effects of superconducting states.

f What are (i) Quasi electrons (ii) Cooper pairs

Or

2. Answer all questions from the following [8 x 2 =16]

a What are Phonons? Write down its significance. 2

b Name some methods of band calculation 2

c What is Hartree approximation? 2

d Give the phenomenon of superconductivity. 2

e What is Meissner effect? 2

f What is A.C. Josephson effect? 2

g How does electron phonon interacts? 2

h What is BCS theory? 2

SECTION-B

3. Answer all Questions: [4 x 16 =64]

a Explain (i) Tight binding method (ii) Pseudo potential method of band calculation 16

OR

b Explain the Boltzman transport equation. Discuss the Relaxation time approximation. 16

4.

a Describe the Hartree-Fock approximation theory for jellium. 16

OR

b Explain the Density functional theory. 16

5.

a Explain in detail Type-I and Type-II superconductors. 16

OR

b Derive the London equation and explain its significance. 16

6.

a Describe the Ground state of superconducting electron gas. 16

OR

b Explain the fundamentals of High T_c superconductors. 16