Jashore University of Science and Technology
Department of Physics
Masters of Science in Physics
1st semester, 2021

Course code.: PHY 5111   Course title: Condensed Matter Physics

Class test no.: 01   Date: April 04, 2021

Name:

1. What are the assumptions made in constructing the Hamiltonian for free Fermi gas?   [4]

2. Define Fermi energy. Write down the characteristics of Fermi Function.   [5]

3. Why is the derivative of Fermi function only nonzero over an energy range of order $k_B T$ (k_B is Boltzmann constant) around the Fermi energy?   [2]

4. State and explain the Bloch's Theorem.   [5]

5. For gold the conduction band electron density is 5.90×10^{28} m^{-3}. What are the values of Fermi velocity and Fermi temperature?   [4]