CL27_Q1. Explain the concept of Fermi energy.

CL27_Q2. Obtain an expression for Fermi energy using the concept of density of states.

CL27_Q3. Determine the Fermi temperature and Fermi velocity in a metal with 18 x 10^{28} free electrons per unit volume.

CL27_Q4. Calculate th   e Fermi energy in eV for a metal at 0K, whose density is 10500 kg/m^3, atomic weight is 107.9, and it has one conduction electron per atom.

CL27_Q5. Using the expression of density of states, show that average energy of electrons in a metal at 0K is $\frac{3}{5} E_F$

CL27_Q6. A current of 5A can easily be carried in a copper wire of length 3m and resistance 20 mΩ at room temperature. Given: Density of copper = 8.95 x 10^3kg/m^3, mobility of charge carriers = 4.3 x 10^{-3} m^2/Vs and Fermi energy = 7eV. Estimate and compare the values of

a.   Drift velocity
b.   Thermal velocity
c.   Fermi velocity