1. What is a distribution function?
2. Write a brief review of Maxwell Boltzman distribution function.
3. Plot the density of states for 1D and 2D systems.
4. Relate DoS to nanomaterials' special properties.
5. Create a table of 6 metals comparing valency, conductivity, free electron density and relaxation time.
6. Derive an expression for thermal conductivity of a metal.
7. Discuss how the idea of Band structure emerges from the Kronig Penney model.
8. What are Brillouin zones and what is their significance?
9. Derive an expression for effective mass using the concept of group velocity.
10. Show that a solenoid with a current produces a magnetic field which resmbles that of a bar magnet.
11. Write a note on how diamagnetism and paramgnetism were discussed in the classical theory of magnetism.
12. List the failures of the classical theory of magnetism.
13. List the Maxwell's equations which involve magnetic field and explain them.
14. Discuss the ideas of the classical theory of magnetism and outline the limitations
15. Give an outline of the Langevin's theory of paramagnetism.
16. What is the significance of Order -Disorder phase transitions?
17. Give examples of first order and second order phase transitions.
18. Write a note on Magnetoresistance and GMR.
19. Briefly write about a Josephson junction and its application in a SQUID magnetometer.