**Assignment-1**

**BBS01T1002 Semiconductor Physics**

**Note:** All the students of section-2 (AIML), B.Tech. (sem-II ) have given assignment-1 and advised to submit the Answer of the following questions **on or before 07.04.2022** to me and also upload scanned copy **on LMS/ Moodle.**

1. Write the formula for Fermi-Dirac distribution function and plot it for two different temperatures (T2 > T1).
2. Write the expression of Eigen value and wave function for a free particle moving one dimensionally (1-D) in a potential well.
3. Explain the idea of wave function for a quantum particle. What are the basic characteristics of well-behaved wave function?
4. Define Fermi Energy. Write its expression.
5. If the Fermi energy is 10eV, what is the mean energy of electron at 0K.
6. What would be the band structure if the barrier strength is extremely negligible? Justify your answer with diagram.
7. What would be the band structure if the barrier strength is extremely high? Justify your answer with diagram.
8. Based on band theory of solids, distinguish between conductors, semiconductors, and insulators.
9. Define the density of energy state in a solid. Find the expression for density of states.
10. A particle is in motion along a line between x=0 and x=L with zero potential energy. At points for which x ≤ 0 and x ≥ L, the potential energy is infinite. Solving Schrodinger’s equation, obtain energy Eigen values and normalized wave function for he particle.