

## Assignment 3:

- 20.1 *A coil of wire 0.20 m long and having 200 turns carries a current of 10 A.*
- (a) What is the magnitude of the magnetic field strength  $H$ ?*
  - (b) Compute the flux density  $B$  if the coil is in a vacuum.*
  - (c) Compute the flux density inside a bar of titanium that is positioned within the coil. The susceptibility for titanium is found in Table 20.2.  $1.81 \times 10^{-4}$*
  - (d) Compute the magnitude of the magnetization  $M$ .*

2. a) Compare between Piezoelectric and Magnetostrictive materials?  
b) Compare between Soft and Hard magnetic materials?

3. **Paramagnetic and diamagnetic materials** Consider bismuth with  $\chi_m = -16.5 \times 10^{-5}$  and aluminum with  $\chi_m = 2.1 \times 10^{-5}$ . Suppose that we subject each sample to an applied magnetic field  $B_0$  of 1T applied in the  $+x$  direction. What are the magnetization  $\mathbf{M}$  and the equivalent magnetic field  $\mu_0 M$  in each sample? Which is paramagnetic, and which is diamagnetic?

4. Define each of the following Term

- Curie Temperature.
- Bohr Magneton
- Magnetoresistance.

5. Based on your knowledge of magnetic materials. Discuss some of their application in Data storage and advanced technology?