

Assignment 4: Weiss molecular fields

1. Iron has a density 7873 kg m^{-3} , molar mass $55.847 \text{ g mol}^{-1}$ and a $T_C = 1043 \text{ K}$. The magnetic moment per atom is 2.2. Find the (a) effective molecular field, (b) saturation magnetization and the (c) field required to saturate the spins. How do the answers (a) and (c) compare?
2. The molecular fields experienced by two sublattices in an antiferromagnet are described by:

$$B_+ = B + |\alpha|M_+ - |\lambda|M_- \quad (1)$$

$$B_- = B + |\alpha|M_- - |\lambda|M_+. \quad (2)$$

What is the high temperature susceptibility? What is the critical temperature? Note that if $\alpha = 0$ in the molecular fields given above, we should recover $\chi = 2\mu_o T_N / (T + T_N)$.

3. Attempt Q 5.9 from Blundell.