Answers and Grading for HWA #4

4-1. $H_{iron} = (NI) / (3000d + 2\pi R{-}d)$; $H_{air} = 3000\ H_{iron}$
(3 points)

4-2. (B) $F_{iron} = 2\ F_{copper}$
(4 points)

4-3. (2 points)

4-4. (A) I_{image} parallel to I
(B) I_{image} antiparallel to I
(4 points)

4-5. The Meissner effect: B = 0;
B = μ H means μ = 0 (perfect diamagnet).
(2 points)

4-6. $X_M = -\ 2.03 \times 10^{-9}$
(2 points)

4-7. (4 points)

4-8.
$F_z = -\ 1/2\ \mu_0\ M_0{}^2\ a^2\ \{ 2G(L{+}\delta) - G(\delta) - G(2L{+}\delta) \}$
$G(\Delta) = 1/2\ \Delta^2\ [K - E] + 2\ a^2\ K$
elliptic integrals evaluated at $-4\ a^2\ /\Delta^2$
(5 points)