Unit Exam III: Problem #1 (Spring '11)

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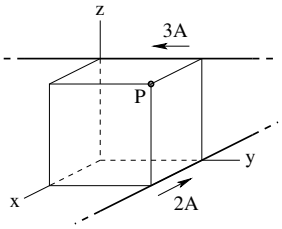

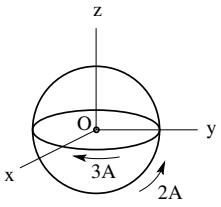

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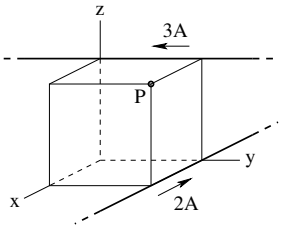

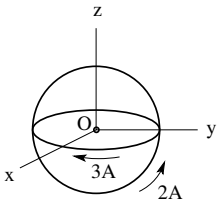

Solution:

(a) $B_x = 0, \quad B_y = \dfrac{\mu_0(2\text{A})}{2\pi(0.08\text{m})} = 5\mu\text{T}, \quad B_z = \dfrac{\mu_0(3\text{A})}{2\pi(0.08\text{m})} = 7.5\mu\text{T}.$

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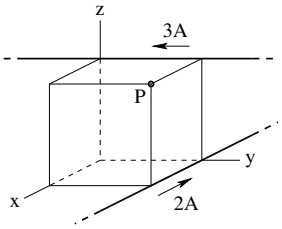

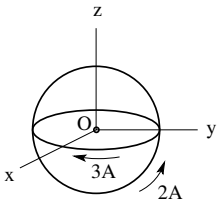

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(b) $B_x = \dfrac{\mu_0(2\text{A})}{2(0.05\text{m})} = 25.1\mu\text{T}, \quad B_y = 0, \quad B_z = -\dfrac{\mu_0(3\text{A})}{2(0.05\text{m})} = -37.7\mu\text{T}.$