

55. (a) From $\mu = iA = i\pi R_e^2$ we get

$$i = \frac{\mu}{\pi R_e^2} = \frac{8.0 \times 10^{22} \text{ J/T}}{\pi (6.37 \times 10^6 \text{ m})^2} = 6.3 \times 10^8 \text{ A} .$$

- (b) Yes, because far away from the Earth the fields of both the Earth itself and the current loop are dipole fields. If these two dipoles cancel each other out, then the net field will be zero.
- (c) No, because the field of the current loop is not that of a magnetic dipole in the region close to the loop.