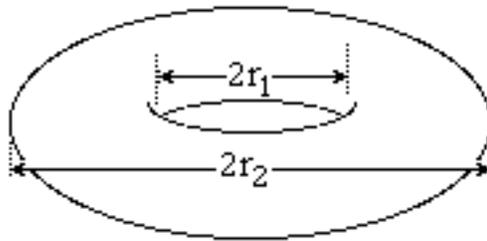


CHAPTER 1 PROBLEMS

1.1 What is the field in the middle and at the end of a 20 cm long solenoid (2 cm in diameter) uniformly wound with 200 turns of wire carrying 0.5 amperes. Give fields B and H in SI and cgs/emu units.

1.2 Consider the magnetic field inside a toroid of circular cross section with inner radius $r_1 = 3$ cm and outer radius $r_2 = 4$ cm wound uniformly with 100 turns of wire carrying a current of 1.0 Ampere. Calculate the field at $r = 3.5$ cm and plot the field as a function of r for $3.1 \leq r \leq 3.9$ cm.

1.3



1.3 For what values of $\Delta r = r_2 - r_1$ and $r_{ave} = (r_1 + r_2)/2$ is the variation of the field less than 10% across the inside of a toroid?

1.4 Carry out the steps described after Fig. 1.9 to estimate the magnetic moment of a hydrogenic orbit in the Bohr model.

1.5 Use Eq. 1.14 to sketch the vector components of the magnetic field along the axis, 45° off the axis and on the plane of a current loop at a distance of twice the radius of the loop.