Special Problem 8-3.5

A Solenoid of length L=0.1 meters and radius of 0.01 meters is made with N=1000 wire turns.

A current of 0.02 A is passing through the wire.

In the "core" (i.e., in the center) of the solenoid is a magnetic material with relative permeability $\mu_r = 2.0$ (In other words, the center of the solenoid is no longer filled with "free space"!).

1. Determine (in terms of μ_0) the **magnetic flux density** in the core of the solenoid.

2. Determine (in terms of μ_0) the **magnetic field** in the core of the solenoid.

3. Determine (in terms of μ_0) the total **magnetic flux** Φ flowing through the cross section S of the solenoid.