

**PHYSICS 132**

**Homework # 4 2nd. Semester 2015-16**

**NAME: STUDENT ID#:**

1. A coaxial cable consists of a 2.0-mm-diameter inner conductor and outer conductor with interior diameter 1.0 cm. A 100-mA current flows down the inner conductor. The thickness of the walls of the outer conductor is 0.5-mm. A200-mA current flows back along the outer conductor. Find the magnetic field strength (a) 0.50 mm, (b) 5.0 mm, (c) 1.2 cm, and (d) 2.0 cm from the cable axis.
2. (see figure1)

…………………...…………………………………………….(1)

Note: I take the + in the outward direction

The current density is constant (uniform current), thus

, where : the area enclosed by Amperian loop

substituting this in (1)

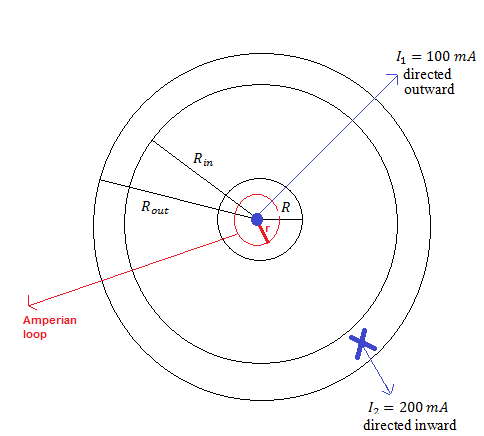


Figure1

1. (see Figure2)

Note here

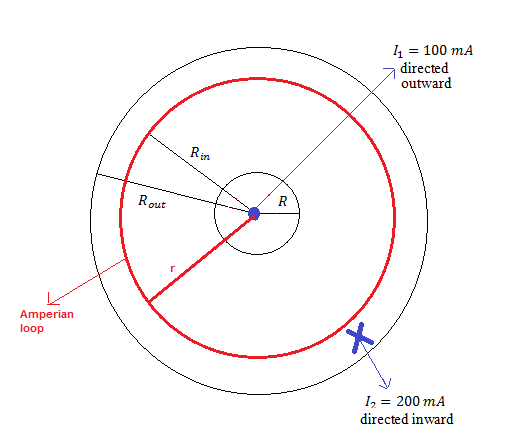


Figure2

1. (see Figure3)

Note here directed inward

Same as in ©

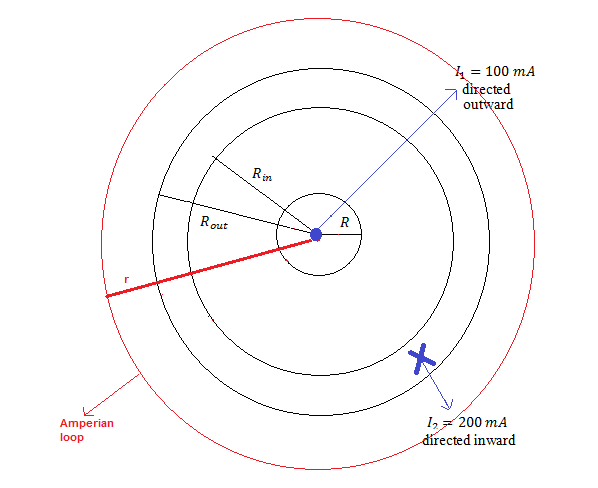
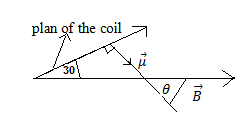


Figure3

1. An electric motor contains a 300-turn circular coil 5 cm in diameter in a uniform magnetic field . If a current passes through the coil, it rotates so that angle between the plan of the coil and the magnetic field is .



1. What’s the magnitude of the coil’s dipole moment?
2. What is the potential energy of the magnetic dipole?

perpendicular to the plan of the coil

Note that the angle between and :

1. What is the magnitude of the torque bone by the magnetic field on the coil?