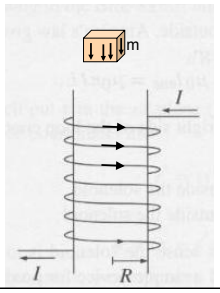
6.7 a A small chunk of material (the "tan cube") is placed above a solenoid. It magnetizes, weakly, as shown by small arrows inside. What kind of material must the cube be?

A) Dielectric
B) Conductor
C) Diamagnetic
D) Paramagnetic
E) Ferromagnetic



6.7 b Predict the results of the following experiment: a paramagnetic bar and a diamagnetic bar are pushed inside of a solenoid.

a) The paramagnet is pushed out, the diamagnet is sucked in
b) The diamagnet is pushed out, the paramagnet is sucked in
c) Both are sucked in, but with different force
d) Both are pushed out, but with different force

ERK6.1

Which type of magnetic material has the following properties:

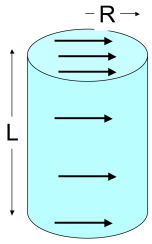
1) The atoms of the material have an odd number of electrons
2) The induced atomic magnetic dipoles align in the same direction as an applied magnetic field
3) Thermal energy tends to randomize the induced dipoles

A.Ferromagnetic
B.Diamagnetic
C.Paramagnetic

6.4

A solid cylinder has uniform magnetization **M** throughout the volume in the x direction as shown. What's the magnitude of the total magnetic dipole moment of the cylinder?

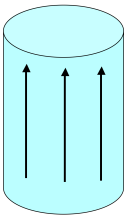
A) $\pi R^2 L M$
B) $2\pi R L M$
C) $2\pi R M$
D) $\pi R^2 M$
E) Something else/ it's complicated!



6.3

A solid cylinder has uniform magnetization **M** throughout the volume in the z direction as shown. Where do bound currents show up?

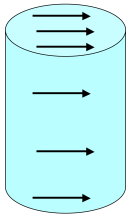
A) Everywhere: throughout the volume and on all surfaces
B) Volume only, not surface
C) Top/bottom surface only
D) Side (rounded) surface only
E) All surfaces, but not volume



6.5

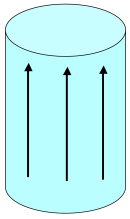
A solid cylinder has uniform magnetization **M** throughout the volume in the x direction as shown. Where do bound currents show up?

A) Top/bottom surface only
B) Side (rounded) surface only
C) Everywhere
D) Top/bottom, and parts of (but not all of) side surface (but not in the volume)
E) Something different/other combination!



To discuss:

A solid cylinder has uniform magnetization **M** throughout the volume in the z direction as shown. What will the B field look like? (Consider if the cylinder is tall and thin, or short and fat, separately)



6.21

A solid cylinder has uniform magnetization **M** throughout the volume in the φ direction as shown. In which direction does the bound surface current flow on the (curved) sides?

A. There is no bound surface current.
B. The current flows in the ±φ direction.
C. The current flows in the ±*s* direction.
D. The current flows in the ±*z* direction.
E. The direction is more complicated than the answers B, C, or D.