Physics 116b Practice Test 2 Due October 9, 2005 7pm

Put answers in Webassign

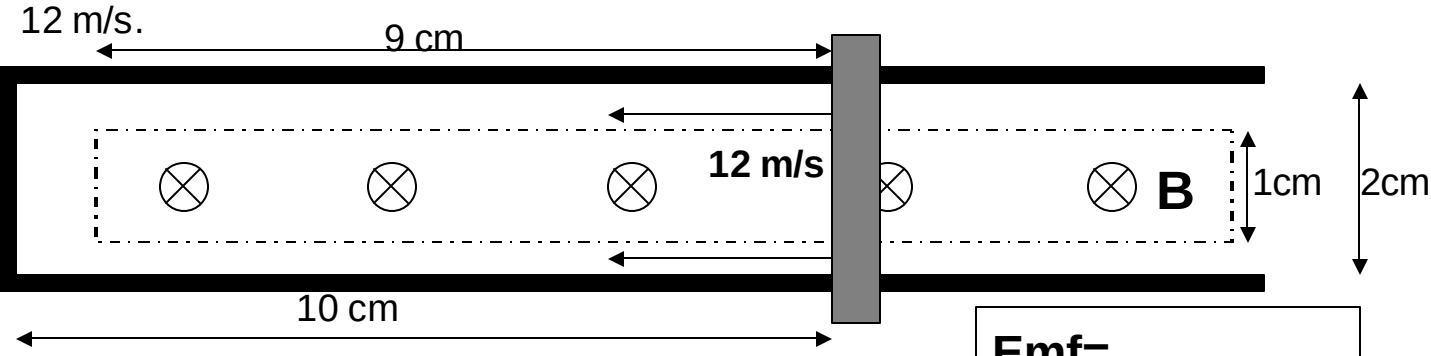
Problem	Description	Max Score	Score
1	Short Answer		
2	Magnetic Fields		
Total			

1) Short Answer cont'd (Show Your Work!)

a) What is the magnitude of the force on a proton moving at a velocity of 100 m/s if the proton is moving at an angle of 97 degrees with respect to a B field iof strength 10 mT?

|F|=

The B Field inside the dashed area shown below has a magnitude of 0.150T.
A conducting bar is moving on conducting rails as shown with a constant velocity of 12 m/s.



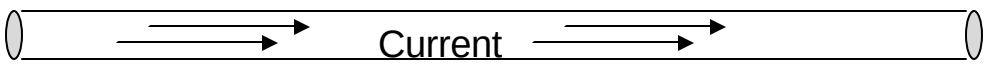
b) What is the EMF induced across the bar? (5 pts)

Emf=

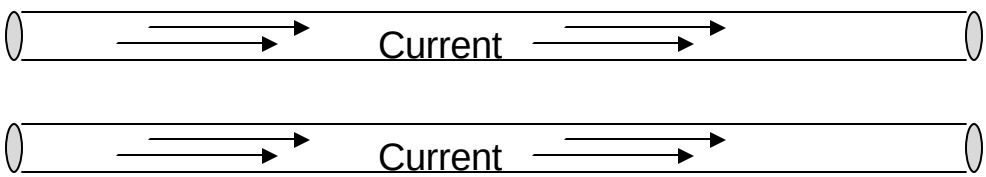
c) Indicate the direction current flows in the bar due to the induced emf.

1) Short Answer cont'd (don't forget to justify your answer!)

d) What does the B field around a wire carrying current look like?(Not in Webassign)



e) Are the wires below attracted to each other or repelled?(Not in Webassign)

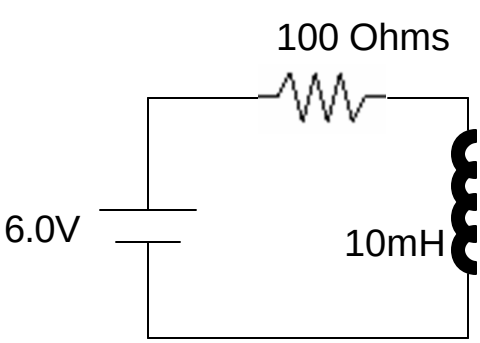


f) If I make a solenoid of length 1.0 m length of thin (~1 mm diameter) wire wrapped in a single layer around a plastic pipe, which pipe is likely to give me the bigger total magnetic flux inside the solenoid?

1cm diameter pipe 2cm diameter pipe

g) For L = 10mH, how fast is energy being stored in the inductor if the current in the circuit is 10mA?

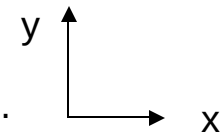
P_{IND}=



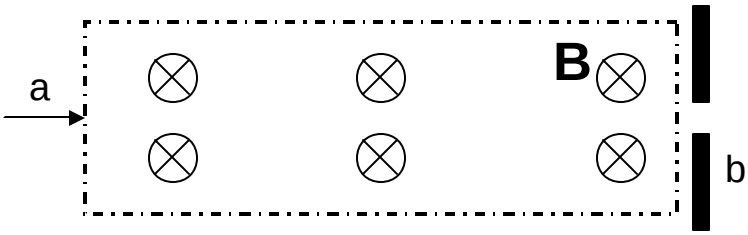
g) If Current was 0 at t = 0s how long till the power being dissipated by the resistor is greater than the power being stored in the inductor?

t =

2) Spectroscopy



A B field of magnitude 0.030 T points into the page as shown.



(With the proper choice of an E field, a charged particle can pass straight through the B Field.)

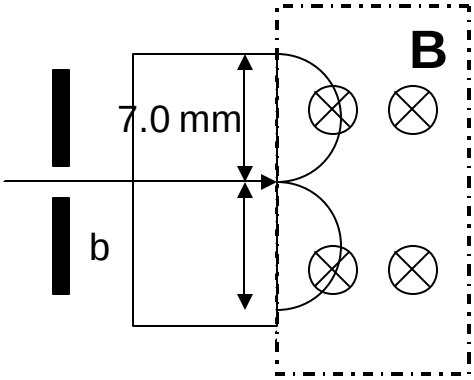
(note: B=0 outside the shaded boxes)

A charged particle, moving in the x direction, is incident on this B field at "a" (as shown). Indicate on the figure how the particle moves in the B field if it has a negative charge. (2 pts)

We want to force the particle to move straight along the x direction in the magnetic field by using an electric field to counteract the force on the particle due to the magnetic field. If the particle is moving at 10,000 m/s and has a charge of -1e, what is the magnitude of the E field needed, and which direction should it point? Is it different for a positively charged particle? (explain) (8 pts)

|E|=

show direction on figure



After the 10,000 m/s negatively (-1e) charged particle passes through the slit at b, it enters another area of magnetic field of magnitude 0.030 T, and the particle moves in a half circle of diameter 7.0 mm. What is the mass of this particle? (10 points)

Mass=