

## Physics 142 - Fall 2010 - Problem Set 10

- ① Is it possible to magnetize an iron needle by pointing it North and giving it a few blows with a hammer? Explain
- ② A current of 25 A flows in a long solenoid of 1500 turns per meter.
  - (a) if interior of solenoid is a vacuum, what is the strength of the magnetic field?
  - (b) if the interior of the solenoid is filled w/ liquid oxygen while the current stays constant, what will be the percentage change of the magnetic field?
- ③ Show that the self-inductance per unit length of a very long solenoid filled w/ a paramagnetic material is  $k_m \mu_0 n^2 \pi R^2$ , where  $n$  is the number of turns of wire per unit length and  $R$  is the radius of the solenoid.
- ④ 32-1
- ⑤ 32-34
- ⑥ 32-77

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- ⑪ 33-13
  
- ⑫ 33-29
- ⑬ 33-84
- ⑭ 33-86
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