Magnetic Quiz – Part 1

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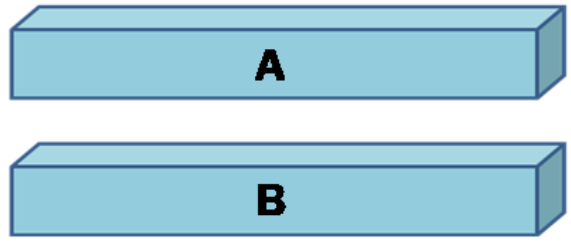
Please answer the following questions, and then send your answers directly to Vitalii. The best answer, received by midnight (Copenhagen time) on May 24, will receive a very magnetic and useful prize. It will be announced at Magmeet 2018 (http://magneticmicrosphere.com/meeting-twelfth). So don't hesitate, test your magnetic knowledge and try to answer all the following questions!

1. You have two identical looking ferromagnetic strips. Strip A is magnetized, while strip B is not. Without using any additional instruments, it is possible to determine which of the two strips is the magnet. Describe how you would do it.



2. Your mechanical watch appears to have become magnetized in your lab.

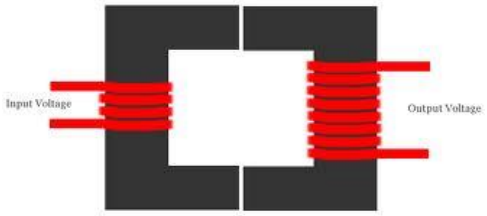
A) Will this watch go faster or slower? Explain why.

B) Also, how can you demagnetize your watch? Give at least 3 methods.

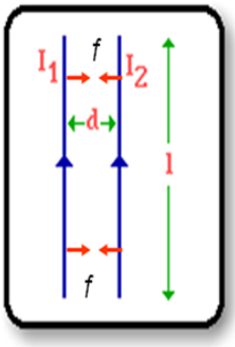
3. Your working transformer makes an unpleasant buzzing sound.

   A) What is the reason for this sound?

   B) And can you tell what the frequency of its sound is?



4. Two parallel currents attract each other with the force, *f* (see figure to the right). But two parallel beams of electrons repulse each other. What are the reasons?



$$f = \frac{F_A}{l} = k\frac{I_1 I_2}{d}$$

5. A thermo-magnetic motor, suggested by Stephan more than 100 years ago, is shown in the figure to the right.

A) How is it possible that this device rotates and produces mechanical work?

B) How could you increase the efficiency coefficient of this engine?

C) Will the ring turn a) clockwise (as indicated in the graph) or b) counter clockwise?