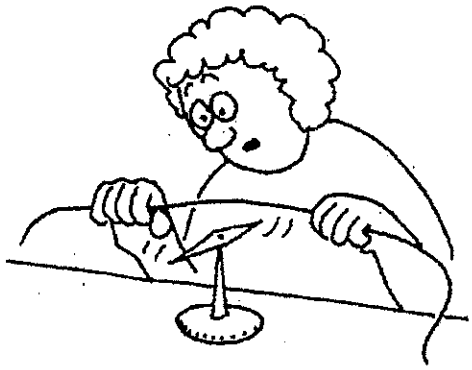
Name _____ Date _____

CONCEPTUAL Physics PRACTICE PAGE

Chapter 25 Electromagnetic Induction

Faraday's Law



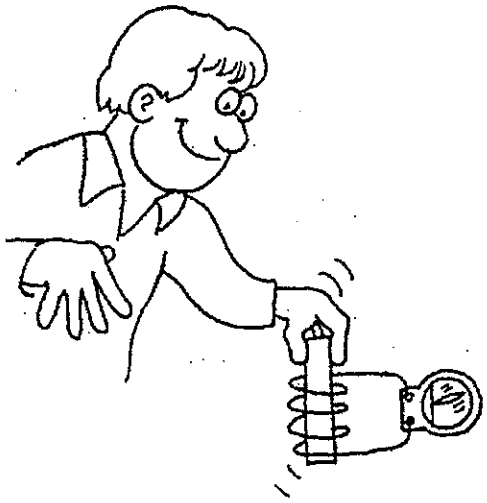
Circle the correct answers.

1. Hans Christian Oersted discovered that magnetism and electricity are

   [related] [independent of each other].

   Magnetism is produced by

   [batteries] [motion of electric charges].



Faraday and Henry discovered that electric current can be produced by

[batteries] [motion of a magnet].

More specifically, voltage is induced in a loop of wire if there is a change in

[batteries] [magnetic field in the loop].

This phenomenon is called

[electromagnetism] [electromagnetic induction].

2. When a magnet is plunged in and out of a coil of wire, voltage is induced in the coil. If the rate of the in-and-out motion of the magnet is doubled, the induced voltage

   [doubles] [halves] [remains the same].

   If, instead, the number of loops in the coil is doubled, the induced voltage

   [doubles] [halves] [remains the same].

3. A rapidly changing magnetic field in any region of space induces a rapidly changing

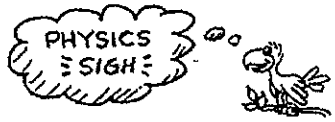
   [electric field] [magnetic field] [gravitational field]

   which in turn induces a rapidly changing

   [magnetic field] [electric field] [baseball field].

   This generation and regeneration of electric and magnetic fields make up

   [electromagnetic waves] [sound waves] [both of these].



Hewitt Drew It!

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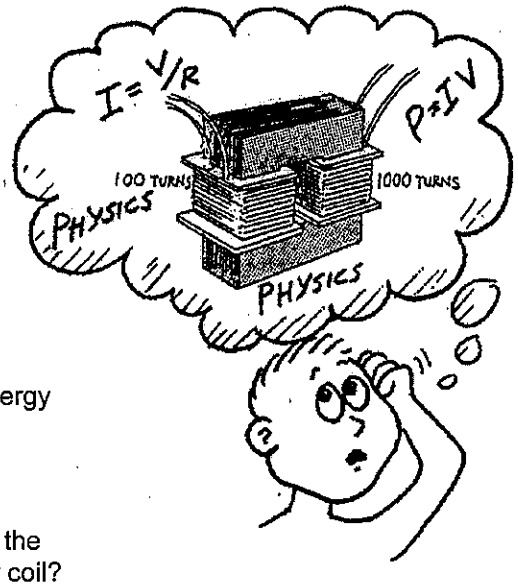
Chapter 25 Electromagnetic Induction

Transformers

Consider a simple transformer that has a 100-turn primary coil and a 1000-turn secondary coil. The primary is connected to a 120-V AC source and the secondary is connected to an electrical device with a resistance of 1000 ohms.



1. What will be the voltage output of the secondary?

   _____ V.

2. What current flows in the secondary circuit?

   _____ A.

3. Now that you know the voltage and the current, what is the power in the secondary coil?

   _____ W.

4. Neglecting small heating losses, and knowing that energy is conserved, what is the power in the primary coil?

   _____ W.

5. Now that you know the power and the voltage across the primary coil, what is the current drawn by the primary coil?

   _____ A.

6. The results show voltage is stepped [up] [down] from primary to secondary, and that current is correspondingly stepped [up] [down].

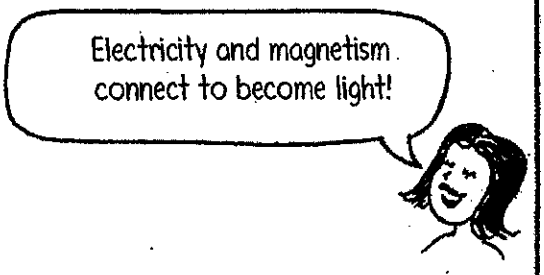
7. For a step-up transformer there are [more] [fewer] turns in the secondary coil than in the primary.

   For such a transformer there is [more] [less] current in the secondary than in the primary.

8. A transformer can step up [voltage] [energy and power], but in no way can it step up [voltage] [energy and power].

9. If 120 V is used to power a toy electric train that operates on 6 V, then a [step up] [step down] transformer should be used that has a primary to secondary turns ratio of [1/20] [20/1].

10. A transformer operates on [dc] [ac] because the magnetic field within the iron core must [continually change] [remain steady].



Hewitt Drew it!