Name _____

CONCEPTUAL Physics PRACTICE PAGE

Hewitt
Chapter 24 Electromagnetic Induction

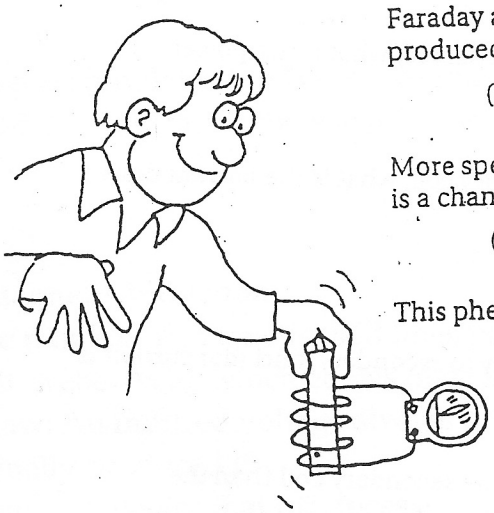
Faraday's Law

1. Hans Christian Oersted discovered that magnetism and electricity are

   (related) (independent of each other).

   Magnetism is produced by

   (batteries) (the 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 the

(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).

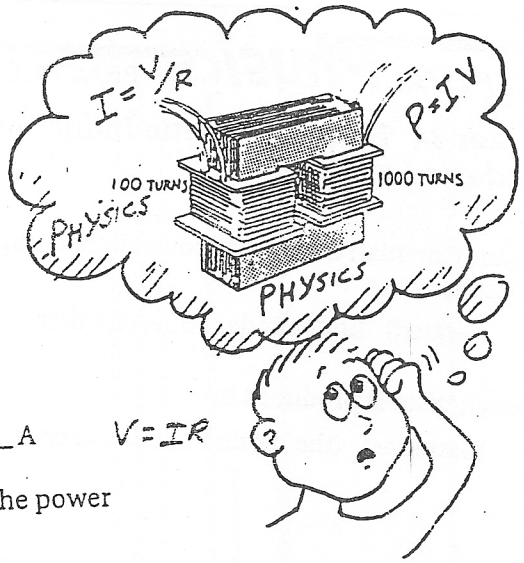
   This generation and regeneration of electric and magnetic fields makes up

   (electromagnetic waves) (sound waves) (both of these).

Hewitt Drew it!

CONCEPTUAL **Physics** PRACTICE PAGE

Transformers

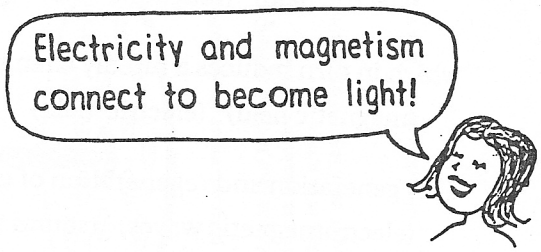


Consider a simple transformer that has a 100-turn primary coil and a 1000-turn secondary coil. The primary is connected to a 120-V AC source and the secondary is connected to an electrical device with a resistance of 1000 ohms.

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

Circle the correct answers:

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 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).



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Hewitt Drew It!