Name

Magnetism Practice Problems

Magnetic Forces & Fields

1. A proton speeding through a synchrotron at 3.0×10^7 m/s experiences a magnetic field of 4.0 T that is produced by the steering magnets indie the synchrotron. What is the magnetic force pulling on the proton? $(1.9 \times 10^{-11} N)$

2. A 10.0 m long high tension power line carries a current of 20.0 A perpendicular to the earth's magnetic field of 5.5×10^{-5}T. What is the magnetic force experienced by the power line? (.011 N)

3. A wasp accumulates 1.0x10-12 C of charge while flying perpendicular to the earth's magnetic field of 5.0x10-5 T. How fast is the wasp flying if the magnetic force acting on it is 6.0×10^{-16}N? (12 m/s)

Electromagnetic Induction

Flux: The number of magnetic field lines passing through a given area.
Flux Unit: weber(Wb), which equals one tesla meter squared (Tm^2)
Lenz's Law: An induced voltage always produces a magnetic field that opposes the field that originally produced it
Transformer: A device that produces a change in voltage in an alternating current circuit

4. Tyrone is pedaling his bike down the street perpendicular to the earth's magnetic field of 5.5×10^{-5}T. What is the flux through the metal rim of his bicycle wheel, if the wheel has an area of $1.13 m^2$? $(6.2 \times 10^{-5} Wb)$

5. A medical process called nuclear magnetic resonance imaging(MRI) replaces X-rays in some instances where pictures are required to study internal organs. Eleanor is undergoing an MRI procedure and is placed inside a chamber housing the coil of a large electromagnet that has a radius of 25.0 cm. A flux of 0.290 Wb passes through the coil opening. What is the magnetic field inside the coil? (1.48 T)

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