Conceptual Questions

1. You have two electrically neutral metal cylinders that exert strong attractive forces on each other. You have no other metal objects. Can you determine if both of the cylinders are magnets, or if one of them is a magnet and the other just a piece of iron? If so, how? If not, why not?

2. A current-carrying rectangular loop of wire is placed in a magnetic field with the direction of the current and field as shown. In what direction will this look tend to rotate as a result of the magnetic torque exerted on it? Explain.

3. Wires carry current into and out of the page as indicated. Draw an arrow representing the direction that a compass needle would point due to the magnetic field at the indicated points (small dots).

4. A horizontal wire is oriented along an east-west line, and a compass is placed above it. Will the needle deflect when a current flows through the wire from east to west, and if so, in what direction? Explain.

5. A positively charged particle is at rest in a uniform magnetic field. Is there a magnetic force acting on the particle? Explain.

6. Why does a DC motor require a split-ring commutator to work?

7. What is the basic similarity between a generator and an electric motor?

8. What is the basic difference between a generator and an electric motor?