

## Answers to selected questions

### Chapter 14

**Q6.** No, the two poles do not coincide. The geographic north pole lies on the Earth's axis of rotation. The magnetic poles are determined by the magnetic field of the earth. The south pole of the imaginary magnet inside the earth is pointing approximately northward, but it is not aligned with the axis of rotation.

**Q12.** No. The charged particle must be moving with a component of its velocity perpendicular to the field in order for a magnetic force to be exerted on the particle.

**Q18.** Yes. The forces acting on the two long sides of the wire loop will both tend to rotate the loop in the same direction thus producing a net torque.

**Q24.** The induced current will be clockwise viewed from above. By Lenz's law, the induced current opposes the change producing it. A clockwise current produces a downward magnetic field thus opposing the increase in the upward external field.

**Q30.** No. The diagram shows a battery in the primary coil, which produces a steady direct current. A transformer requires an alternating current to produce the changes in magnetic flux that are the basis of its operation.