

## Answers to selected questions

### Chapter 14

- Q6** The Earth's magnetic pole near the geographic North Pole is actually a south magnetic pole. The Earth's magnetic north pole is near the south geographic pole. The North Pole of a bar magnet or compass comes from the expression "north-seeking" when freely suspended.
- Q12** There is no magnetic force on a charge when there is no component of velocity perpendicular to the magnetic field.
- Q18** Yes. The forces combine to rotate the loop until its plane is perpendicular to the field, at which time the net torque is zero.
- Q24** No. Magnetic flux is the product of magnetic field times an area perpendicular to the field direction. If one draws magnetic field lines such that the field strength is the number of lines crossing unit area, then the flux across a surface is simply the number of lines.
- Q30** Yes. Although the magnetic field is constant, because the coil is rotating, the flux through the coil is continuously changing. Flux is the product of the area times the component of the field perpendicular to it. It is easier to visualize in terms of lines of force. The field lines are constant, and as the generator coil rotates the number of lines crossing the coil goes from zero to a maximum and back.