Chapter 24 magnetism; 11th edition
Review questions, pg. 437

17. a) In what direction relative to a magnetic field does a charged particle move in order to experience maximum deflecting force?
Ans. The charged particle must move at right angles to the field.
b) In what direction relative to a magnetic field does a charged particle move in order to experience minimum deflecting force?
Ans. The charged particle must move parallel to the field.

25. What is the cause of the Aurora Borealis?
Ask in class.

Extra: What is the evidence for the Earth having a magnetic field?
Ans. Compass needle, which is actually a magnet that is free to rotate, lines up with the Earth's magnetic field.

Extra: An electric field surrounds an electric charge. What additional field surrounds an electric charge when it is moving?
Ans. A magnetic field.

Ch. 24 Exercises pg. 438

8. "An electron always experiences a force in an electric field but not always in a magnetic field." Defend this statement.
Ans. An electron always has its own electric field around it but only has a magnetic field when it is moving.

9. a) What surrounds a stationary electric charge?
Ans. An electric field.
b) What surrounds a moving electric charge?
Ans. A magnetic field and an electric field.

20. The north pole of a compass is attracted to the north pole of the Earth, yet like poles repel each other. Can you resolve this apparent dilemma?
Ans. Yes. The Earth's north magnetic pole is really the south pole of a magnet.

24. Magnet A has twice the magnetic field strength of magnet B (at equal distance) and at a certain distance pulls on magnet B with a force of 50 newtons. With how much force, then, does magnet B pull on magnet A?
Ans. 50 newtons of course. Newton's 3rd law never ails.

37. Two charged particles are projected into a magnetic field that is perpendicular to their velocities. If the charges are deflected in opposite directions, what does this tell you about them?