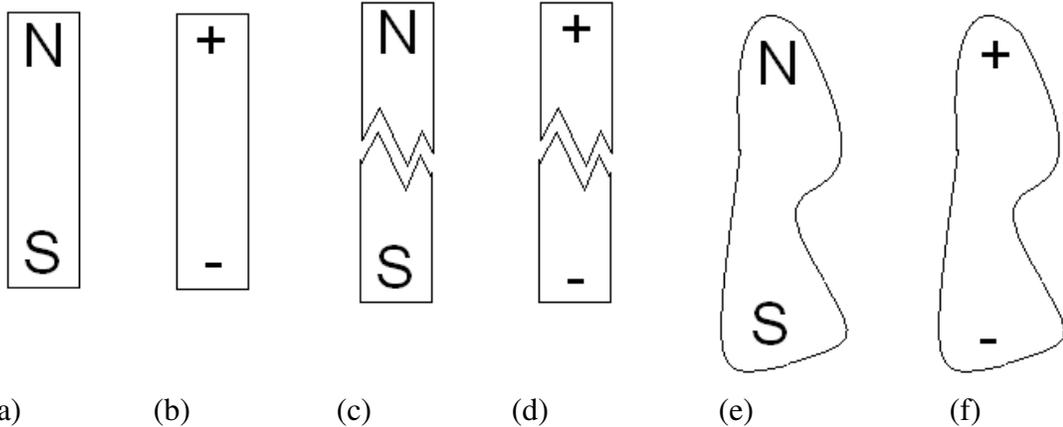1. If an electron is moving east in a uniform magnetic field which points south, what is the direction of the magnetic force on the electron?
   - (a) up
   - (b) west
   - (c) south
   - (d) down
   - (e) north

2. Which of the following is not possible?
   Note that N and S indicate opposite magnetic poles and + and – indicate a net concentration of positive and negative charges, respectively.

N	+	N	+	N	+
S	-	S	-	S	-
(a)	(b)	(c)	(d)	(e)	(f)

3. The SI unit for the magnetic field is the _____. This is equivalent to

   (a) $\dfrac{N}{A^* m}$

   (b) $\dfrac{m}{V}$

   (c) $\dfrac{N}{C^{2*} m^2}$

   (d) $\dfrac{J}{m^2}$

   (e) None of these

4. Describe the motion of a particle moving in a plane perpendicular to a uniform magnetic field.

5. A uniform magnetic field of magnitude 1.5 T points in the negative z-direction. An electron moves in the field with velocity $\mathbf{v} = 4.0\text{km/s } \mathbf{i} + 2.0 \text{ km/s } \mathbf{j}$.
   (a) Find the force vector generated by the magnetic field on the electron.

   (b) What is the magnitude of this force?

6. What rule is used to determine the direction of the magnetic field produced by a wire with current I? How do you use this rule?

7. A uniform magnetic field makes an angle of 30° with the axis of a circular coil of 300 turns and a radius of 4 cm. The magnitude of the magnetic field increases at a rate of 100 T/s with the direction remaining fixed.
   (a) Find the magnitude of the induced emf in the coil.

   (b) What is the sign of the emf?

8. State Lenz's Law.

9. What are Maxwell's equations?

10. The velocity of light in a substance is 2.1 x 10^8 m/s. What is the index of refraction for this material?

11. Light traveling in air enters water with an angle of incidence of 45°. If the index of refraction of water if 1.33, what is the angle of refraction?

12. Give a name to each labeled part of the following diagram:
    (a)   (f)
    (b)   (g)
    (c)   (h)
    (d)   (i)
    (e)   (j)
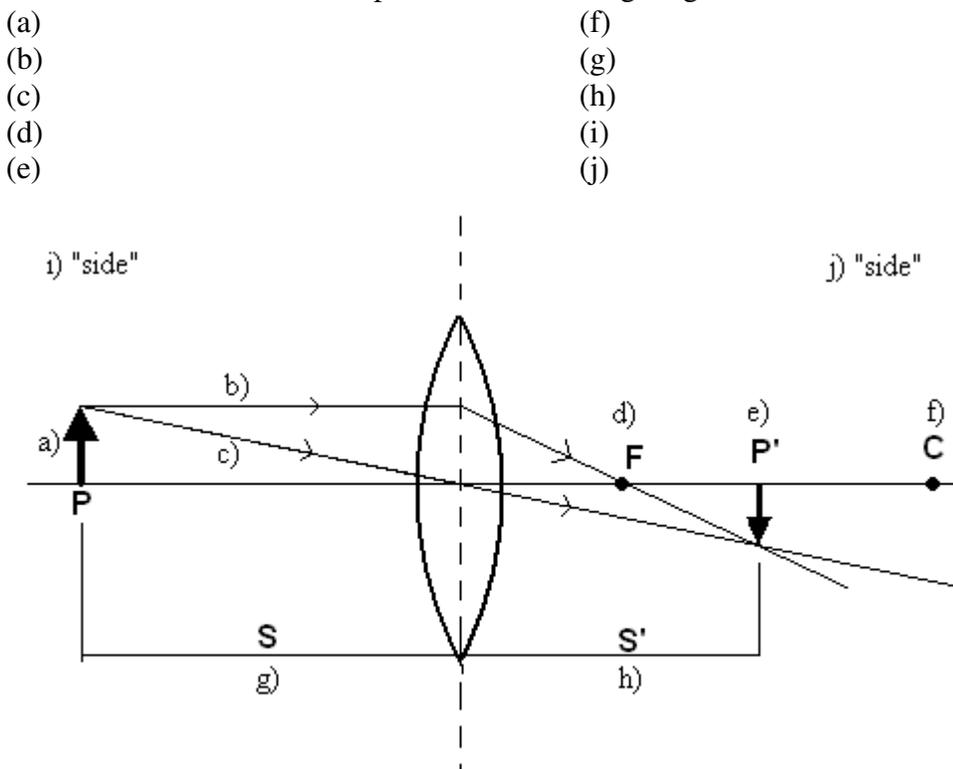
13. A thin converging lens of focal length 10cm is used to obtain an image that is twice as large as a small object placed in front of the lens. Find the object and image distances a) if the image is upright and b) if the image is inverted. What is the radius of the center of curvature in both cases for this lens, assuming it is not *double* convex?