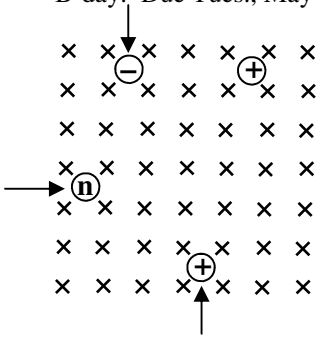
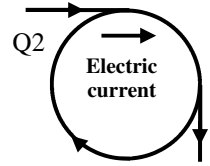


2009 Magnetism 4

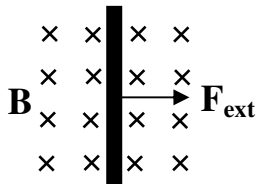
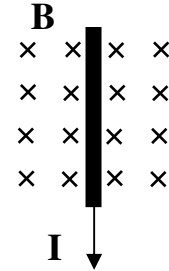


- In the diagram at the left show the initial velocities of four objects. The x's show the direction of the magnetic field. No arrow = no motion. The "n" stands for a neutron. On the diagram draw the path that each object will follow.
- Find the north pole for the loop of electricity at the left.
 - Is the part facing you a N or a S pole?
 - A compass brought close will point towards the loop or away from the loop?

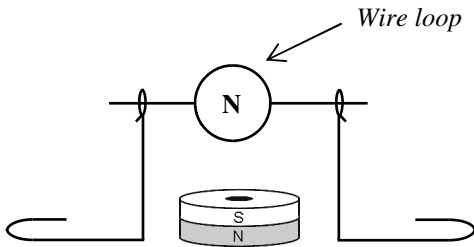


- Fingers, Thumb, Palm? Notes: "Magnetic Induction" (middle of page, right side)
 - _____ The direction of a moving proton.
 - _____ The direction of the magnetic force.
 - _____ The direction of the magnetic field.
 - _____ The direction of positive current moving in a wire.
 - _____ Direction of a wire moved by hand.

- A wire is placed between two magnets, then the battery is turned on. The current flows thru the wire as shown at the right. Which direction will the magnetic force deflect (move) the wire?

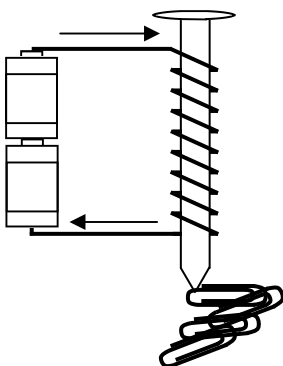
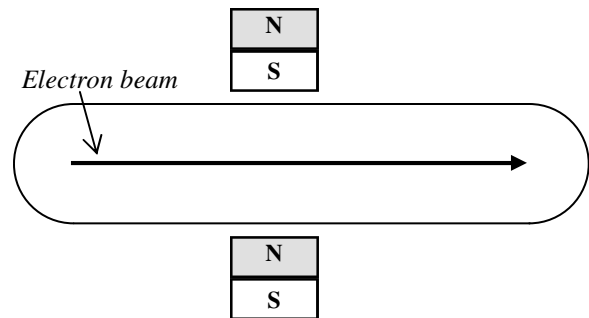


- A wire is pushed thru a magnetic field as shown at the right.
 - Is the magnet moving the wire?
 - So, the moving wire is what part of the right hand rule?
 - What direction will the induced current flow in the wire?



- The wire loop has current flowing around it, making it an electromagnet. The N pole of the electromagnet faces out of the page.
 - Which direction is the current flowing around the loop: CCW or CW?
 - Will the front of the loop move toward or away from the donut magnet beneath it?

- An electron beam is produced in a vacuum tube, as shown at the right. Two magnets are placed around the tube.
 - What is the direction of B?
 - Which direction will the electron beam deflect?

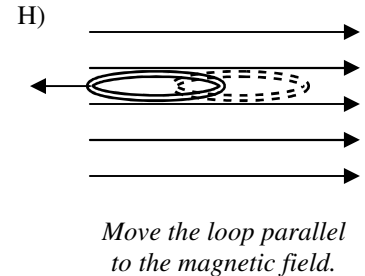
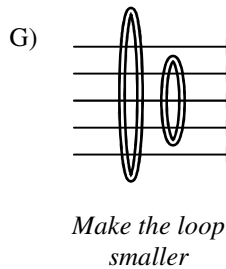
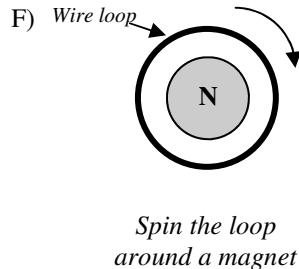
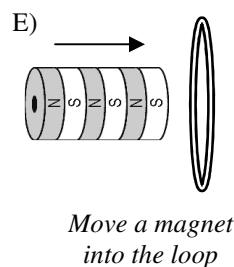
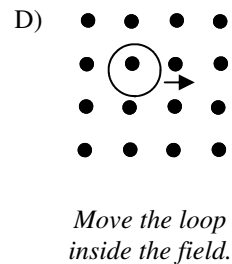
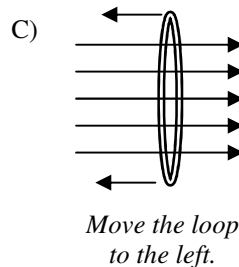
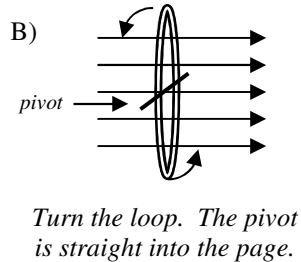
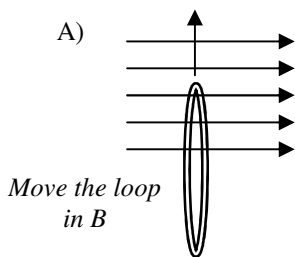


- The diagram at the left shows a simple e_____.
 - If the nail is replaced by a pencil, will it pick up more or less paperclips?
 - Explain.

2009 Magnetism 4—p2

Remember how we moved a wire and a loop of wire between the giant horseshoe magnet. Current was induced (force into the wire) when the magnetic field lines were broken. Or when there is a change of magnetic field inside the loop. Notes: "Magnetic Induction".

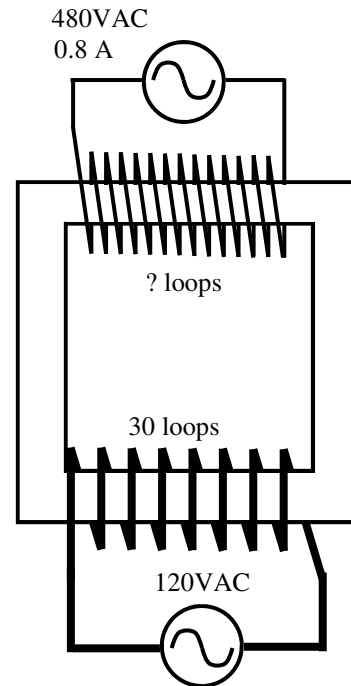
9. For each of the following instances decide if there will be an induced current in the loop.



10. Give two examples of transformers in everyday life.

11. Use the diagram at the right to answer the following.

- Voltage is put into the top. Is this a step-up or step-down transformer?
- Will the output current have more or less current?
- Calculate the number of loops in the secondary.
- Calculate the number of coils in the secondary.



12. A. Draw parallel light rays going thru a convex lens.

B. Draw parallel light rays going thru a concave lens.

13. A wave moves thru water. Do the water particles move with the wave?

14. A pendulum swings back and forth 4 times in 1 second.

- What is the period of the pendulum?
- What is the frequency of the pendulum?
- What will it do over time?
- What do we call the position at the very bottom?

2009 Magnetism 4—p2

15. What is the one thing that travels faster than light?

From the "Refraction" notes.

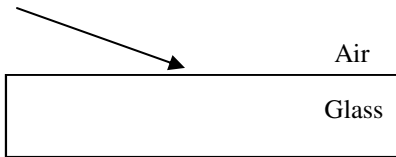
16. Why does light refract?

17. From the table at the right,

A. In which substance will light have the fastest speed?

B. In which substance will light refract the most?

Material	n
Cubic zirconia	2.2
Zircon	1.923
Quartz	1.458
Sodium Chloride	1.544



18. A light ray travels from air into glass.

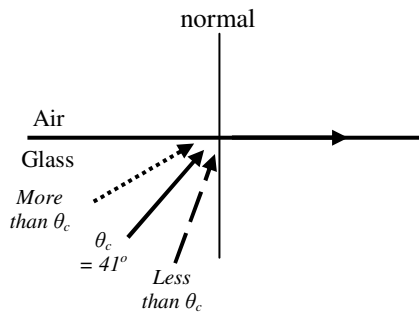
A. In which substance does light have the faster speed?

B. Draw a dotted line to show the normal.

C. Draw the path of the light ray into and out of the glass.

D. Did the light ray bend toward or away from the normal as it passed into the glass?

E. Did the light ray bend toward or away from the normal as it passes back into air?



19. The critical angle of light passing from glass to air is 41° .

A. At an angle less than 41° will the light ray reflect or refract?

B. At an angle greater than 41° will the light ray reflect or refract?

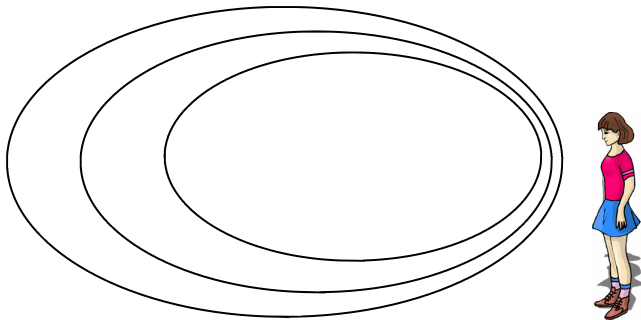
From "Miscellaneous Light Topics".

20. How do you position two polarizers to cancel out all light?

From "Ancillary Sound Topics"

21. A. What is the speed of sound in air for a stationary (at rest) object?

B. What is the speed of sound in air for a moving object?



22. The squished circles at the left represent sound waves moving toward the person. The sound waves are coming from a moving object.

A. Is the object moving toward or away from the girl?

B. Is the pitch of the sound higher or lower than if the object was not moving?