

# 16 Magnetism / 17 Electromagnetism

## Unit 16: Magnetism

1. An iron bar is placed between two magnets as shown below, temporarily magnetizing the iron. Sketch the magnetic field (the lines of flux) between each magnet and the iron bar.

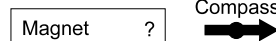


In the space to the left, write the letter of the answer to each question.

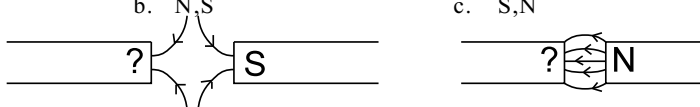
- \_\_\_\_\_ 2. Which phrase is a possible characteristic of a permanent magnet?  
 a. all electrons are paired with opposing spins  
 b. unpaired electrons with aligned spins  
 c. electron spins only align in the presence of a strong external field  
 d. repels temporary magnets

- \_\_\_\_\_ 3. Magnetic field lines by convention point from...  
 a. north to south.      b. south to north.      c. north to north.      d. south to south.

- \_\_\_\_\_ 4. What pole of the bar magnet below is nearest the compass?  
 a. north      b. south

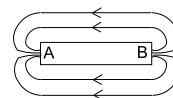


- \_\_\_\_\_ 5. In the cases below, the poles of the left magnets are \_\_\_\_\_ respectively.  
 a. N,N      b. N,S      c. S,N      d. S,S



- \_\_\_\_\_ 6. The south pole of a compass points towards what *physicists* consider the Earth's magnetic north pole in the...  
 a. center of Earth.      b. Arctic      c. Antarctic      d. upper atmosphere.

- \_\_\_\_\_ 7. Which pole of the bar magnet shown at right is the north pole?



Fill in each blank with the appropriate word.

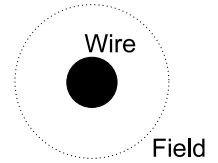
8. Attraction or repulsion of charges depends on their *signs*: positive or negative. Attraction or repulsion of magnets depends on their magnetic \_\_\_\_\_ : \_\_\_\_\_ or \_\_\_\_\_ .
9. Opposite poles \_\_\_\_\_ ; like poles \_\_\_\_\_ .
10. If you bang a magnet on something and it loses its field, you have destroyed the alignment of the electron \_\_\_\_\_ .

**Unit 17: Electromagnetism**

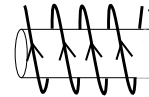
In the space to the left, write the letter of the answer to each question.

- \_\_\_\_\_ 11. Which factor does not affect the strength of an electromagnet?  
 a. the amount of current  
 b. the number of turns of wire  
 c. the material placed in the core of the magnet  
 d. the direction of the current

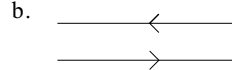
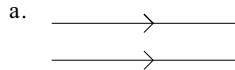
- \_\_\_\_\_ 12. In the diagram at right, the conventional electric current (+ charge flow) is going into the page through the wire shown in cross-section. The right-hand rule shows that the field around the wire is  
 a. clockwise                      b. counterclockwise



- \_\_\_\_\_ 13. Which end of the electromagnet drawn below is the south pole?  
 a. left end                      b. right end

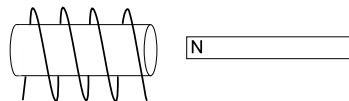


- \_\_\_\_\_ 14. Which pair of wires shown below will be pushed apart? The arrows indicate current direction. Remember to consider the magnetic fields coming into or out of the page between the two wires.

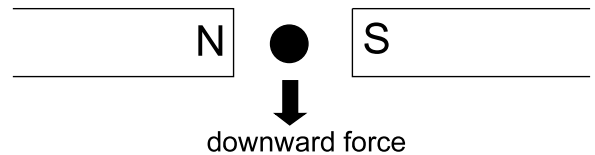


- \_\_\_\_\_ 15. An electric charge moving perpendicular to the magnetic flux is deflected in a direction that is \_\_\_\_\_ to its direction of travel.  
 a. opposite                      b. perpendicular                      c. at a 45° angle

16. When the north pole of a magnet is placed at the right end of the coil shown, it is repelled. Use arrows to show the direction of the conventional current flow in the coil.



17. The current flowing in the wire shown below creates a downward force on the wire. Show the direction of the conventional current flow. (Use a dot for out of the page and an X for into the page.)



18. What is the direction of the force on the current-carrying wire in the magnetic field shown in the diagram? (It is hooked to a dry cell and carries conventional current into the page.)



19. You have an electromagnet that is not quite strong enough. What are three changes you could make to increase the strength?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Fill in each blank with the appropriate word.**

20. A magnetic field is produced by the \_\_\_\_\_ of electric charge.
21. When a current-carrying wire is made to form a coil around a piece of iron, the result is an \_\_\_\_\_.
22. A charged particle moving in a magnetic field experiences a deflecting \_\_\_\_\_.
23. A current-carrying wire in a magnetic field experiences a \_\_\_\_\_.
24. \_\_\_\_\_ discovered that when a current-carrying wire is held near a compass, the needle moves.