Make sure your name and social security number are legible. It is your responsibility to make sure you understand the test question thoroughly before attempting to answer it. "Cheating" is unfair to those who work for their grade, so if you work for your grade I encourage you to let me know if you see anyone cheating. Be sure to look on the back of the test. Each one of the numbered items counts the same (5 points).

CLEARLY INDICATE THE SINGLE BEST ANSWER BY CIRCLING THE APPROPRIATE LETTER. If you think a typo has been made and the answer is not a, b, c, or d, select e for typo.

1) A hair dryer which is plugged into a 110 volt electrical outlet draws a current of 18.18 amps. What is the power rating of the hair dryer?
   a) 0.16 Joules 
   b) 6.0 ohms 
   c) 128 BTUs 
   d) 2000 Watts

2) If you break a bar magnet in half ...
   a) one end will only be a north pole and the other end will only be a south pole. 
   b) each piece will contain both a north and a south pole. 
   c) it destroys the magnet. 
   d) it doubles the strength of the magnet.

3) If you push the north end of a magnet into a coil of wire which is connected to a galvanometer and the needle goes to the right, which direction would you expect the needle to go when you push the south end in?
   a) left 
   b) right 
   c) no movement 
   d) the galvanometer blows up

4) Which of the following is most true about a diverging (or negative -) lens?
   a) It corrects for farsightedness. 
   b) It corrects for nearsightedness. 
   c) It is used in microscopes. 
   d) It is thicker in the middle than on the edges.

5) Which of the following best explains why the hand generator is easier to turn when not connected to a light bulb than when it is?
   a) When it is not connected to the light bulb the electrical resistance is zero. 
   b) When it is connected to the light bulb the light bulb is consuming electrical power which is produced by the generator. 
   c) When it is not connected to the light bulb the electrical current is very large. 
   d) When it is not connected to the light bulb the voltage is very large.
6) Which of the following does not have a magnetic field associated with it?  
   a) the earth  
   b) a magnet  
   c) a direct current  
   d) a stationary electric charge  

7) Which of the following is not attracted by the north pole of a magnet?  
   a) the south pole of another magnet  
   b) a brass bolt  
   c) the iron core of a transformer  
   d) a compass needle  

8) A semi-circular piece of glass acts most like a ...  
   a) converging lens  
   b) diverging lens  
   c) diverging mirror  
   d) flat mirror  

9) Which of the following would make the best telescope?  
   a) two diverging lenses  
   b) one diverging lens  
   c) two converging lenses  
   d) one converging lens  

10) Suppose you look at someone’s eyes through their glasses and notice that their eyes look smaller than they would if you were not looking through their glasses. What are the glasses correcting for?  
    a) nearsightedness  
    b) farsightedness  
    c) neither nearsightedness or farsightedness  
    d) both nearsightedness and farsightedness  

11) If an incident beam of light makes a 30 degree angle with a curved mirror, as measured from the normal of the mirror, what would be the angle of reflection, as measured from the normal?  
    a) 30 degrees  
    b) 60 degrees  
    c) 90 degrees  
    d) 180 degrees  

12) Which of the following best explains why a drinking straw in a clear glass of water appears to bend at the air-water interface?  
    a) magic  
    b) It really is bent.  
    c) reflection  
    d) refraction
The following figures apply to problems 13 and 14.

13) Which of the figures best represents a short circuit?
   a) b) c) or d)

14) Which of the figures best represents a series circuit?
   a) b) c) or d)

15) One wishes to measure the voltage across and the current through a light bulb. Which of the following figures below shows the correct way to connect the voltmeter and an ammeter?
YOU MUST SHOW ALL OF YOUR WORK AND/OR REASONING ON THE FOLLOWING PROBLEMS OR THEY ARE WRONG !!!!!!!!

16) When a light bulb is connected to a 1.5 volt battery a voltage of 1.5 volts is measured across the light bulb and a current of 0.003 amps is measured through the light bulb. What is the resistance of the light bulb?

17) Two light bulbs identical to the one above are connected in series. The voltage across the two light bulbs is 1.5 volts. The current through them is 0.0015 amps. What is the combined resistance of the two light bulbs?

18) A battery is used to supply 12 Volts DC to the primary of a transformer which has 2 turns. If the secondary of the transformer has 10 turns, what is the voltage of the output of the transformer?

19) A beam of light is incident upon a semi-circular piece of glass like the one you used in lab at an angle of 60 degrees. The refracted beam of light is measured to be 30 degrees. What is the index of refraction of the glass?

20) Briefly and concisely respond to the following. What does a transformer do?