Name: ______________________________________ Period: ___________________

Electric Currents & Electromagnets Review (50 points)

Use the word bank below (and your notes!) to answer the following questions. Each is only used once.

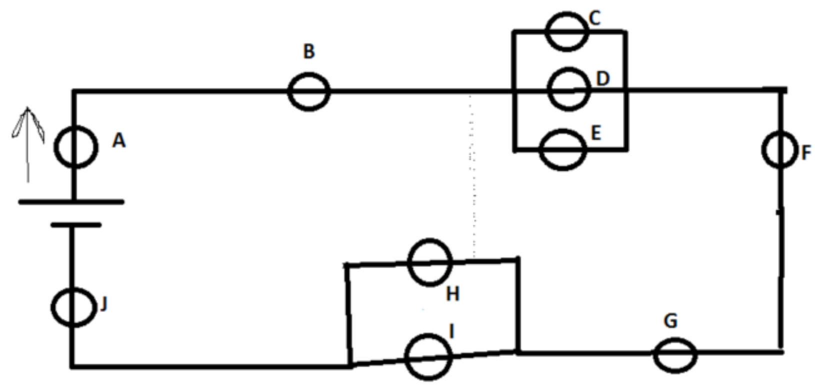
Alternating Current	Parallel Circuit	Circuit Breaker	Series Circuit
Direct Current	Short Circuit	Kirchhoff's current law	Kirchhoff's voltage law
Voltage drop	Right-hand rule	Electromagnet	Magnetic field
Permanent magnet	Magnetic declination	Ohm's Law	Amps
Volts	Ohm	Magnetosphere	Iron

1. A region around a magnet. You can see it if you pour iron fillings overtop of a magnet. ______________
2. States that the current entering a circuit branch must exit again. ______________
3. States that the total of all voltage drops in a series must equal the voltage supplied by battery ______________
4. The difference between geographic north and magnetic north. ______________
5. These magnets do not lose their magnetism, like a refrigerator magnet or a bar magnet. ______________
6. The difference in voltage across an electrical device that has current flowing through it. ______________
7. This device can be made by wrapping a piece of wire (coil) around a piece of iron or steel ______________
8. This is a type of circuit with one path. If one bulb goes out, they all do! ______________
9. This is a type of circuit with more than one path. If one bulb goes out, the rest stay on! ______________
10. This is the area around the earth that protects us from the sun's deadly particles (solar wind). ______________
11. Unit of current ______________
12. Unit of voltage ______________
13. Unit of resistance ______________
14. This is the mathematical relationship between current (I), voltage (C), and resistance (R) ______________
15. This current only flows in one direction, like in a battery. ______________
16. This current can actually switch direction. This type of current is what is found in your house. ______________
17. This is a path of least resistance that can cut off current to other bulbs in the circuit. ______________
18. This "rule" when applied can tell you the direction of electron flow & the magnetic spin ______________
19. This device automatically "trips" like a switch when it's overloaded with too much current ______________
20. This is a type of metal that is very commonly seen to have magnetic capabilities. ______________

Write <u>parallel</u> or <u>series</u> for the following:

21. This type of circuit can be seen in cheap Christmas lights ______________
22. A type of circuit most often seen in your home and in buildings ______________
23. If all bulbs are identical, they will have the full voltage of the battery when the circuit is closed. ______________
24. If all bulbs are identical, all voltages will add up to total voltage in this circuit. ______________
25. In this circuit, current can be different depending on where you measure. ______________

Use the following circuit to answer the questions below. Assume all wires have <u>zero</u> resistance. Assume <u>all light bulbs are identical with a resistance of **1Ω**</u>. Remember, current only flows one way!



26. In the circuit above, identify all bulbs that are in series and all bulbs that are in parallel?
    - Series: ______________________________________
    - Parallel: ______________________________________
27. For the series bulbs, calculate the resistance. In the box to the left, write the formula for calculating total resistance in a series circuit. In the middle box, write the equation with the resistances. In the box to the right, show the correct total resistance for the series bulbs only. Remember, all the bulbs are equal to 1Ω!

Formula:	Plug in #'s to formula:	Final total series resistance:

28. For the parallel bulbs, calculate the resistance. In the box to the left, write the formula for calculating total resistance in a series circuit. In the middle box, write the equation with the resistances. In the box to the right, show the correct total resistance for the series bulbs only.

Formula:	Plug in #'s to formula:	Final total parallel resistance:

29. Now add up the total series resistance and the total parallel resistance to get the total resistance of the circuit.
    _________Ω

30. If you add a short circuit where the dotted line is after bulb B, what bulb, which was parallel before will now become series? ____________

31. If the short circuit happened to be added, what would the new resistance be? ____________