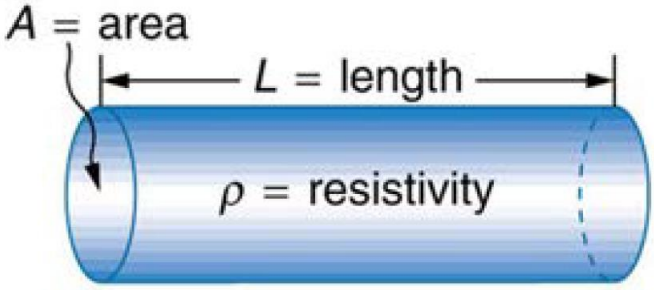
Physics 200 Name: _____

Notes: Chapter Sections 20.3, 20.4, and 21.1

Notes – 20.3 Resistance and Resistivity

1. The resistance of an object depends on its _____ and the _____ of which it is composed.

2. R =



3. Resistivity ρ is an _____ _____ of the material, independent of its shape or size.

4. In home wiring, currents are limited and minimum wire thicknesses are specified because, as current and resistance increase, more _____ is produced in the wires,

4.5 Example Problem: What is the resistance of a 20.0-m-long piece of 12-gauge copper wire having a 2.053-mm diameter? ($\rho_{Cu} = 1.72 \times 10^{-8}\ \Omega \cdot m$)

Notes – 20.4 Electric Power and Energy

5. Power (P) is the _____ of energy use or energy conversion.

6. Voltage (electric potential) can be expressed as J/C, and Current (Amperes) can be expressed as C/s. Therefore, P= _____

7. The unit for power is _____.

8. 1 W = 1 _____

9. Given that V = IR, alternate expressions for power include:

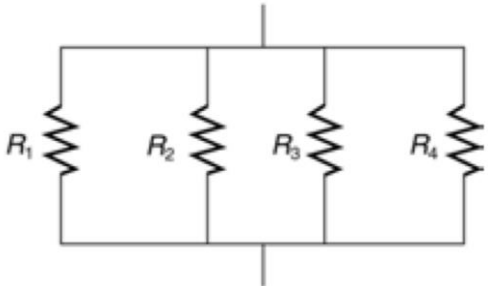
   P =

10. Power companies do not charge for power, they charge for _____, which is sold to you in units called kilowatt-hours. 1kWh = _____J.

Notes – 21.1 Resistors in Series and Parallel

11. Most circuits have more than one component, called a resistor that limits the flow of charge in the circuit. A measure of this limit on charge flow is called _____.

12. Label which resistors are in series and which are in parallel.



_____

_____

13. **Resistors in Series**:

A. Series resistances add. R_{series} = _____

B. The current flowing through resistors in series is

_____

C. Individual resistors _____ the overall voltage drop.

14. **Resistors in Parallel**:

A. Individual resistors' voltages _____

B. Resistors in parallel _____ the overall source current.

C. Parallel resistances are found from _____

15. Suppose the voltage output of a battery is 12.0 V, and the resistances for 3 resistors connected in **series** with the battery are R_1 = 1.00 Ω, R_2 = 6.00 Ω and R_3 = 13.0 Ω.

A. Draw a diagram of the circuit.

B. What is the total resistance?

C. Find the current.

D. Calculate the voltage drop in each resistor, and show these add to equal the voltage output of the source.

E. Calculate the power dissipated by each resistor.

F. Find the power output of the source, and show that it equals the total power dissipated by the resistors.

16. Suppose the voltage output of a battery is 12.0 V, and the resistances for 3 resistors connected in **parallel** with the battery are R_1 = 1.00 Ω, R_2 = 6.00 Ω and R_3 = 13.0 Ω.

A. Draw a diagram of the circuit.

B. What is the total resistance?

C. Find the total current.

D. Calculate the currents in each resistor, and show these add to equal the total current output of the source.

E. Calculate the power dissipated by each resistor.

F. Find the power output of the source, and show that it equals the total power dissipated by the resistors.