IB Physics
FA 18.2 - Resistivity and Electron Drift

Name_____

Best Snow Day Activity_____

Show your work, and bark like a yappy dog to receive full credit.

1. What is the resistance of an Aluminium wire that is 2.59 mm in diameter (10 gauge) and 12.0 m long? The resistivity of Aluminium is 2.65×10^{-8} Ωm. (0.0604 Ω)

2. A 25.0 m long copper wire (resistivity = 1.68×10^{-8} Ωm) has a resistance of 0.127 ohms. What is its diameter? (2.05 mm)

3. A film resistor is made of a thin film of material that is 1.01×10^{-8} m thick, 3.50 cm wide, and 15.0 cm long. What is its resistivity if it has a resistance of 221 ohms? (The current flows a distance of 15.0 cm through the film) (52.1×10^{-8} Ωm)

4. With what speed do electrons travel down a 0.240 mm diameter copper wire that is carrying 140. mA of current. (n for Cu is 8.50×10^{28} electrons m^{-3}) (2.27×10^{-4} m/s)

5. A 85.0 cm long copper (resistivity = 1.68×10^{-8} Ωm, n = 8.50×10^{28} electrons m^{-3}) wire is 2.10 mm in diameter, and has a potential of 0.0150 V across it. What time does it take an electron to travel the length of the wire? (hint - find R, then I, then v, then t) (1.10×10^{4} s or 3.06 hours)