density "n" = # of charge carriers
Volume
In the figure above, charge carriers, each with charge, move past point P with a speed v.
a) In one second, the volume of charge VOLUMC=A·L
b) The total number of charge carriers in this volume is
$$n(A \cdot L)$$
 "n"
of charge carriers = "n" × VOLOMC
c) The total charge of the charge carriers in this volume is $(qnAL)$ "n"
 $I = \frac{q}{L}$
d) Therefore, the current is $I = \frac{qnA(L)}{L} = \frac{qnA(L)}{qnAV} = I$ (charge
arriers in each cubic meter of copper. Calculate the drift speed of the charge carriers.
A = ΠY^2 $V = \frac{I}{L}$ (2.25A)

9. If the drift velocity is so small, why does the light bulb light as soon as the battery is connected?



Conduction electrons already in the filament start to move as soon as the electric field is set up in the circuit by the battery. It is these electrons, not the electrons from the battery, that collide with the lattice ions in the filament immediately and transfer enough energy to them to make the filament glow.



Resistance of a Wire



A=TIV IB 11 Formula for a $R = \frac{PL}{A} = \frac{PL}{W \cdot h} = \frac{PL}{Tr^2}$ conducting wire at a constant temperature . . . 2. What are the properties of wire that is the best conductor (has the least resistance)? cold, short, wide 3. What are the properties of wire that is the worst conductor (has the most resistance)? Warm, long, thin 4. What material would you use to make a wire with the: b) most resistance = nichrome a) least resistance SIVWWhat is the resistance of a copper wire 2.0 meters long with a cross-sectional area of $6.4 \times 10^{-8} \text{ m}^2$? 5. $R = \frac{PL}{A} \left(\frac{1.7 \times 10^{-8} \text{mm}}{6.4 \times 10^{-8} \text{m}^2} \right) = 10.53 \text{m}^2$ 6. a) What is the resistance of a nichrome wire 12 meters long with a diameter of 2.7×10^{-4} meter? 1.5×10^{-6} 1.5×10^{-6} 1. $resistance would be <math>\frac{1}{4}$ as much 310 m **Simple Circuits** Schematic:

Draw a corresponding schematic diagram using appropriate Circuit Symbols.



5