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Lab 3.2.1.3

Four basic units of electricity

1. ***Voltage (V)*** → *Variable:* ***V****, Unit:* ***volt (V)***
2. ***Current (I)*** → *Variable:* ***I****, Unit:* ***ampere (A)***
3. ***Resistance (R)*** → *Variable:* ***R****, Unit:* ***ohm (Ω)***
4. ***Power (P)*** → *Variable:* ***P****, Unit:* ***watt (W)***

B. Equation for Ohm's Law

V=I×RV = I \times RV=I×R

C. Rearranged Ohm's Law equations

- *To solve for current: I=VRI = \frac{V}{R}I=RV*
- *To solve for resistance: R=VIR = \frac{V}{I}R=IV*

D. Power equations

Power is P=V×IP = V \times IP=V×I. Rearranging with Ohm's Law gives:

- *P = V \times 1*
- *Substitute V=I×RV = I \times RV=I×R:*
  P=I2×RP = I^2 \times RP=I2×R
- *Substitute I=VRI = \frac{V}{R}I=RV: P= V2RP = \frac{V^2}{R}P=RV2*

E. Yellow wire problem

Given:

- *V=12 VV = 12 \, VV=12V*
- *P=60 WP = 60 \, WP=60W*
- *Formula: P=V×IP = V \times IP=V×I*
  I=PV=6012=5 AI = \frac{P}{V} = \frac{60}{12} = 5 \, AI=VP=1260=5A

Answer: 5 A

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F. Orange wire problem

Given:

- *V=3.3 VV = 3.3 \, VV=3.3V*
- *R=0.25 ΩR = 0.25 \, \OmegaR=0.25Ω*
- *Formula: P=V2RP = \frac{V^2}{R}P=RV2*
  P=3.320.25=10.890.25=43.56 WP = \frac{3.3^2}{0.25} = \frac{10.89}{0.25} = 43.56 \, WP=0.253.32=0.2510.89=43.56W

Answer: 43.56 W

G. Power supply wire problem

Given:

- *P=120 WP = 120 \, WP=120W*
- *I=24 AI = 24 \, AI=24A*
- *Formula: P=V×IP = V \times IP=V×I*

V=PI=12024=5 VV = \frac{P}{I} = \frac{120}{24} = 5 \, VV=IP=24120=5V

Answer: 5 V