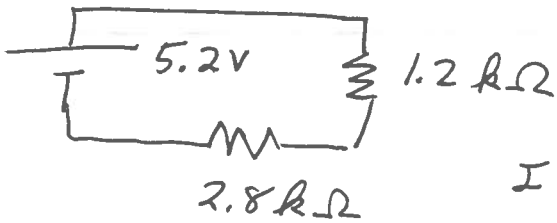


21-Circuits Version A Physics Equations

①



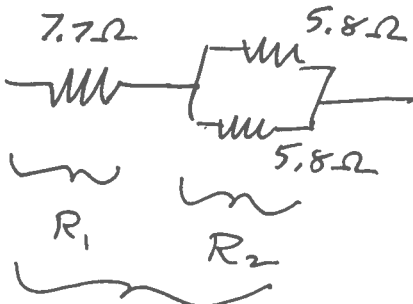
$V = I R_{Net}$ want I

$R_{Net} = 1.2 + 2.8 = 4.0 \text{ k}\Omega$

$I = \frac{V}{R_{Net}} = \frac{5.2 \text{ V}}{4.0 \text{ k}\Omega} = \boxed{1.3 \text{ mA}}$

Note: $\frac{1}{\text{k}} = \frac{1}{\text{ki}10} = \frac{1}{10^3} = 10^{-3} = \text{milli}$

②

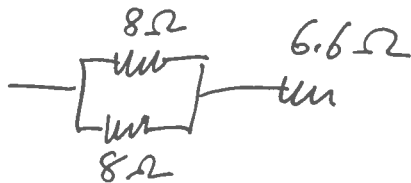


$\frac{1}{R_2} = \frac{1}{5.8} + \frac{1}{5.2} = \frac{2}{5.8} \frac{1}{\Omega}$

$R_2 = \frac{5.8}{2} \Omega$

$R_T = R_1 + R_2 = 7.7 + \frac{1}{2}(5.8) = \boxed{10.6 \Omega}$

③

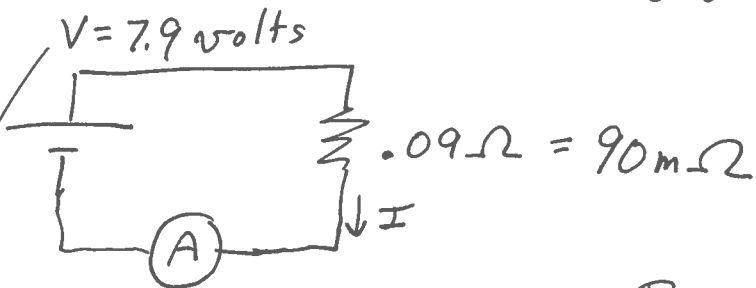


$R_T = 6.8 + \frac{1}{2}8$

$= 6.6 + 4 = \boxed{10.6 \Omega}$

↳ Pure coincidence!

④



$R_{int} = 20 \text{ m}\Omega$

$R_{Net} = 90 + 20 = 110 \text{ m}\Omega$

Want I

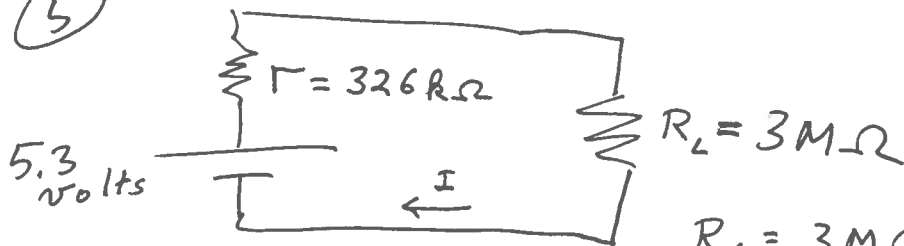
When I do electronics $V = \text{symbol}$ } $V = 7.9 \text{ V}$
 volts = units } is confusing to me!

Next page

$V = IR$ where $V = 7.9$ volts and $I = 110 \text{ m}\Omega$

$$I = \frac{V}{R} = \frac{7.9 \text{ volt}}{110 \text{ m}\Omega} = .0718 \text{ KA} = \boxed{71.8 \text{ A}} \text{ (amps)}$$

⑤



BE CAREFUL
With #5. See
bottom of page

(note: $326 \text{ k}\Omega = .326 \text{ mega}$)

$$R_N = 3 \text{ M}\Omega + 326 \text{ k}\Omega \\ = 3 \text{ M}\Omega + .326 \text{ M}\Omega$$

$$R_N = 3.326 \text{ M}\Omega$$

$$V = IR_N \rightarrow I = \frac{V}{R_N} = \frac{5.3 \text{ volts}}{3.326 \text{ M}\Omega} = 1.59 \mu\text{A}$$

note $\frac{1}{\text{Mega}} = \text{micro} = \mu$

$$\text{Power in load } (R_L) = P = IV = \underbrace{I^2 R_L}_{\leftarrow \text{most convenient here.}} = \frac{V^2}{R_L}$$

$$P = (1.59 \mu\text{A})^2 (3 \text{ M}\Omega) = \boxed{7.58 \mu\text{W}} \quad \text{roundoff error}$$

$$\text{note } \mu^2 \cdot \text{M} = (10^{-6})^2 (10^6) = 10^{-6} = \mu = \text{micro.}$$

$$\leftarrow \text{Note roundoff error: } \frac{5.3}{3.326} = 1.5935$$

$$\text{and } (1.5935)^2 (3) = 7.61$$

Warning: $(1.5935 \text{ Amp})(5.3 \text{ volts}) = IV$ is the WRONG ANSWER because the voltage dropped across the $3 \text{ M}\Omega$ resistor is ~~is~~ less than 5.3 volts