Joseph Hyatt
CSE 3100 - 01/02

① $R_1 = 100$ ohms $\quad R_2 = 500$ ohms

② $R_1 + R_2 = 100 + 500 = 600$ ohms

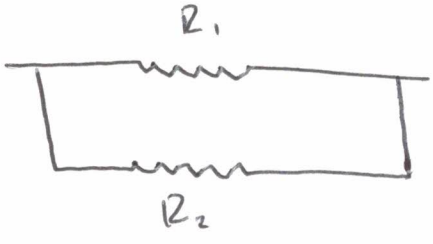
In Series

$R_1 + R_2$

$100 + 500$

$= 600$ ohms

③ In Parallel



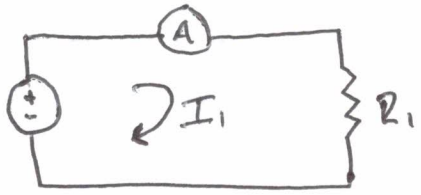
$$\frac{1}{R_1} + \frac{1}{R_2}$$

$$\frac{1}{100} + \frac{1}{500} = \frac{6}{500}$$

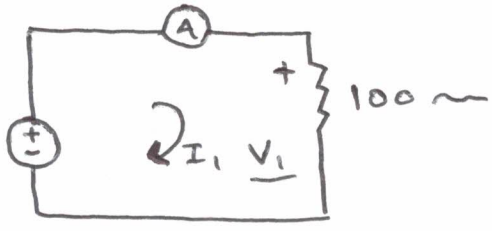
$$= \frac{500}{6}$$

$= 83.33$ ohms

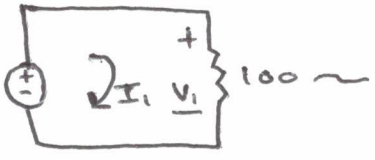
4)



The internal resistance of an multimeter is Φ.
This means it is short circuited.
A multimeter is used for calculating current and can act like an ammeter.



A ammeter is used to measure current



KVL: The sum of all potential drops in a loop is equal to zero.

As current is entering into the negative terminal of 5V. Negative convention is used.

$-5 + V_1 = 0$ $\quad (V = IR)$

$V_1 = I_1 \times 100$

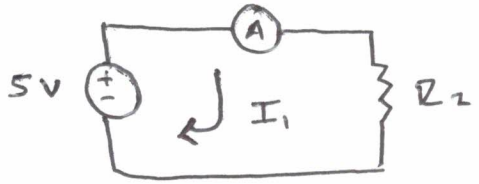
$V_1 = 5$

$V_1 = \frac{5}{100}$

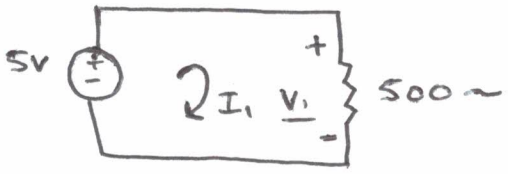
$= 5 \times 10^{-2}$ $\quad A = 50 \times 10^{-3} A$

$I_1 = 50\,mA$

5)



Multimeter is short circuited.



KVL: The sum of all potential drops in a loop is equal to zero.

Current is entering into a positive terminal of 500Ω and negative terminal of 5V. So positive sign for V_1 and an negative sign ∅ for 5

$$-5 + V_1 = 0$$

$$V_1 = 5$$

V_1 (drop across 500Ω)

$$V_1 = 500 \times I_1$$

$$5 = 500 \times I_1$$

$$I_1 = \frac{5}{500} \quad 100$$

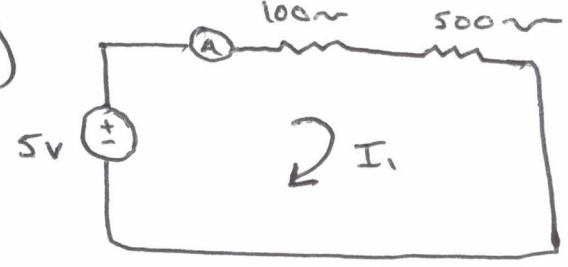
$$I_1 = \frac{1}{100}$$

$$= 1 \times 10^{-2}$$

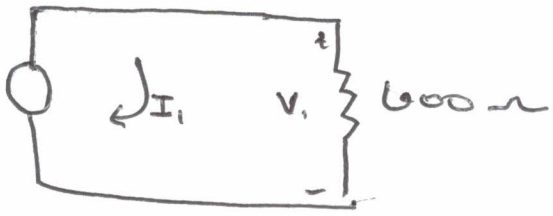
$$= 10 \times 10^{-3} A$$

$$= 10 mA$$

6)



Ammeter is short circuited
100Ω and 500Ω are in a
series equivalent series
resistance = $R_1 + R_2$
= 100 + 500
= 600Ω



Positive sign for V_1 and
negative sign for 5

$$-5 + V_1 = 0$$

$$V_1 = 5$$

$$V_1 = I_1 \times 600$$

$$I_1 = \frac{5}{600}$$

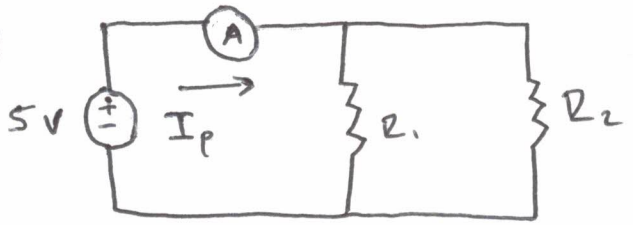
$$= \frac{5}{6} \times 10^{-2}$$

$$= 0.833 \times 10^{-2}$$

$$= 8.33 \times 10^{-3} A$$

$$= 8.33 mA$$

7)



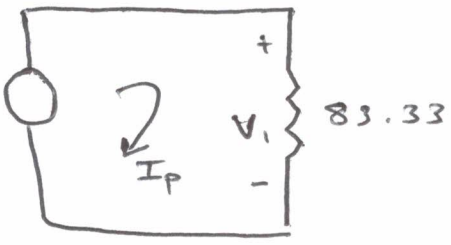
Ammeter is short circuited.
R_1 and R_2 are in parallel
Equivalent parallel resistance = $R_1 \| R_2$

$$= \frac{R_1 R_2}{R_1 + R_2}$$

$$= \frac{100 \times 500}{600}$$

$$R_{eq} = \frac{500}{6}$$

$$R_{eq} = 83.33\ \Omega$$



Positive sign for V_1 and negative sign for 5

$$-5 + V_1 = 0$$

$$V_1 = 5$$

$$V_1 = I_p \times 83.33$$

$$I_p = \frac{5}{83.33}$$

$$= \frac{1\ 5 \times 6}{500\ 100}$$

$$I_p = 6 \times 10^{-2} = 6 \times 10^{-3} A$$

$$I_p = 60mA$$