Elec 2400 Tutorial

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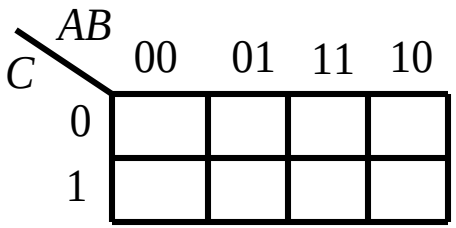
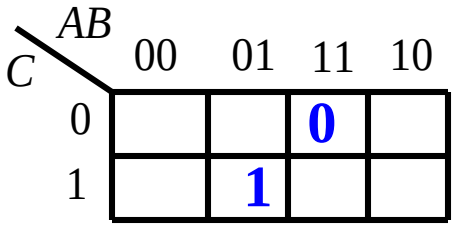
Office Hours : by appointments

- Tutorial Style



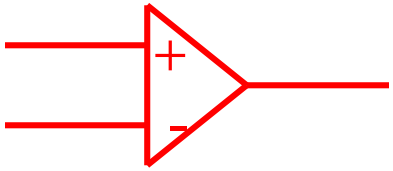
Tutorial Notes



PowerPoint

- DC circuits

- Operational Amplifier circuits



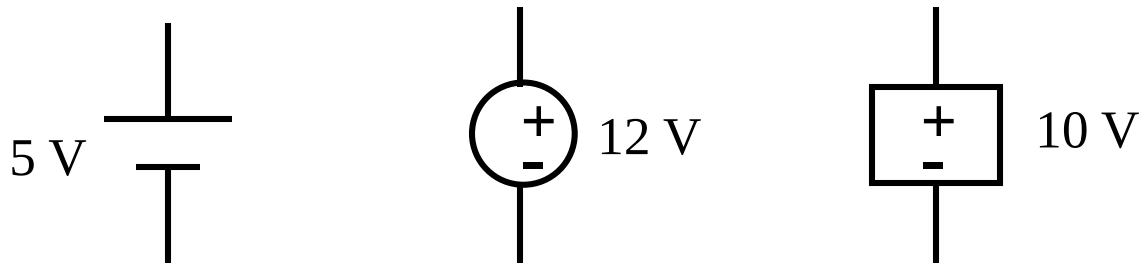
Voltage, Current, Resistor

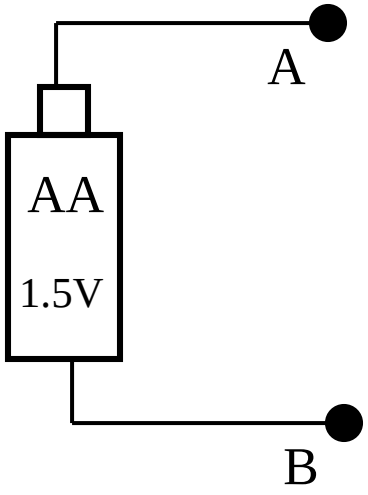
How to measure voltage ?

(+) red

(-) black

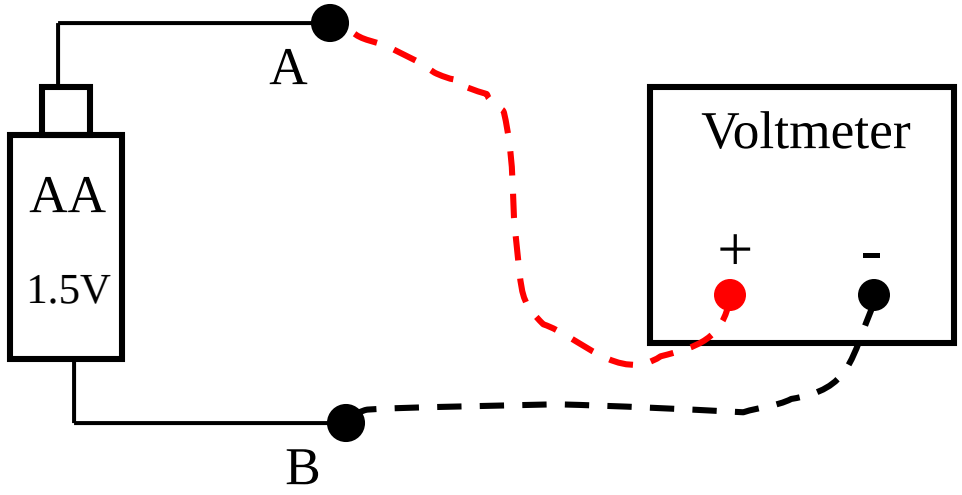
Voltage Source





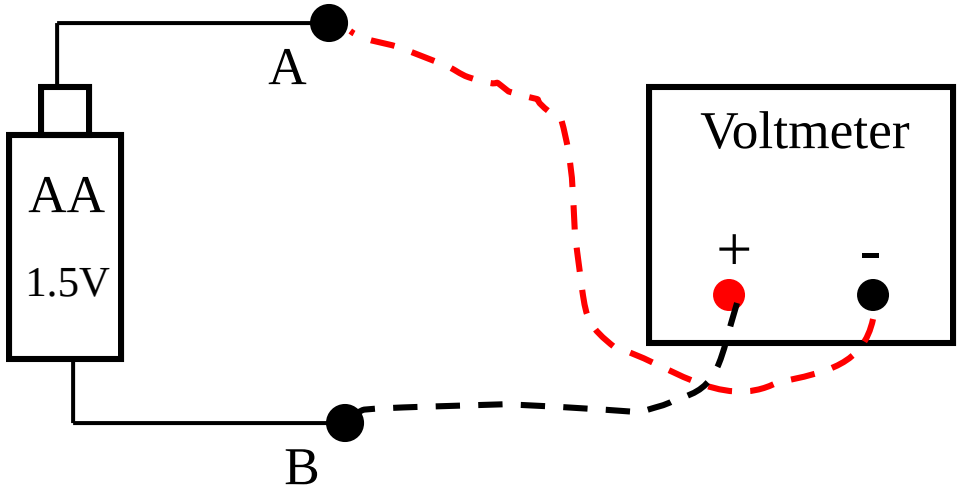
Voltage @ A = **?**

Voltage @ B = **?**



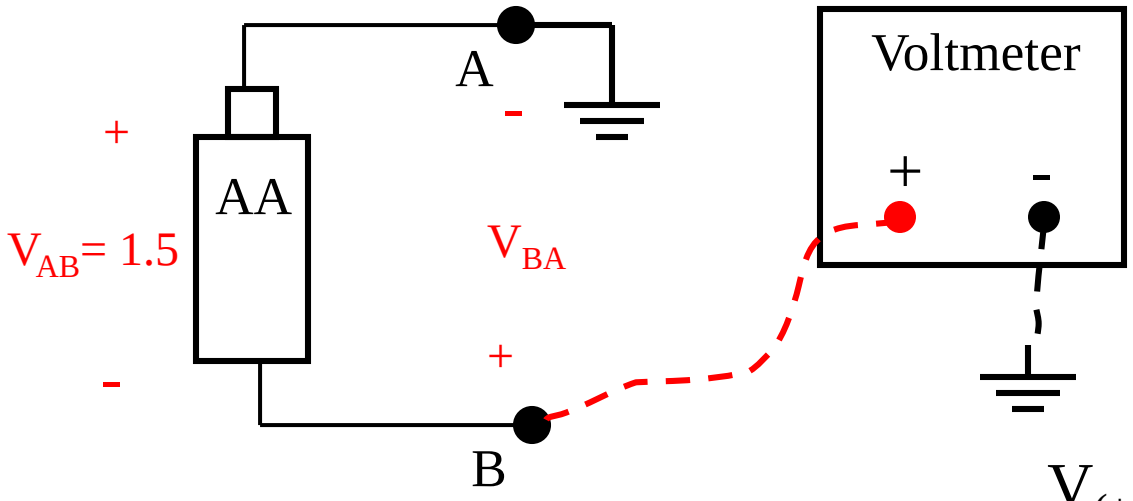
Voltmeter = Reading ?

= 1.5 volt



Voltmeter = Reading ?

= - 1.5 volt



Voltmeter = Reading ?

$V_{(+ \text{ voltmeter})(- \text{ voltmeter})}$ = ?

$V_{(B)(- \text{ voltmeter})}$ = ?

$V_{(B)(0)}$ = ?

$V_{(B)(A)}$ = ?

V_{BA} = ?

V_{BA} = - V_{AB}

= - (1.5) volt

$V_{CB} = V_C - V_B$

$= V_{C0} - V_{B0}$ where 0 = gnd (reference pt)

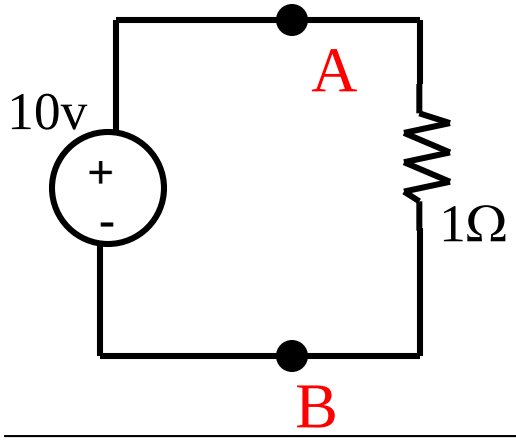
pick any reference point

$V_{CB} = V_{CA} - V_{BA}$

$= (V_C - V_A) - (V_B - V_A)$

$= V_C - V_A - V_B + V_A$

$= V_C - V_B$

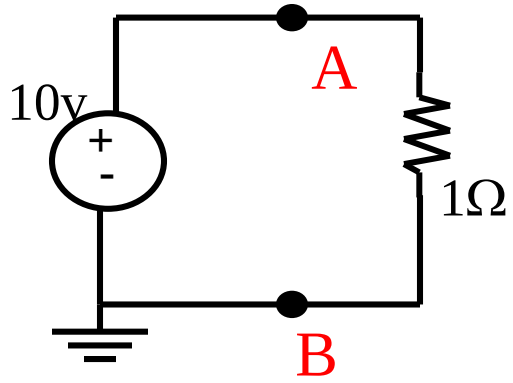


V_A = ? V_{A0}

V_B = ? V_{B0}

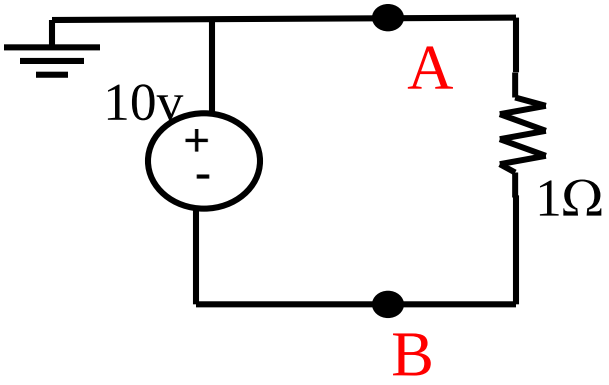
?

Do not know the answer, ground is not connected



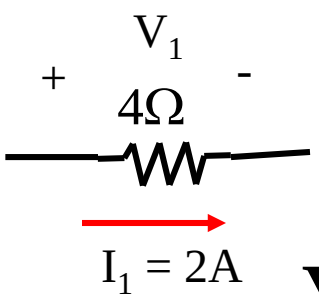
V_A = ? V_A = 10 volt

V_B = ? V_B = 0 volt



V_A = ? V_A = 0 volt

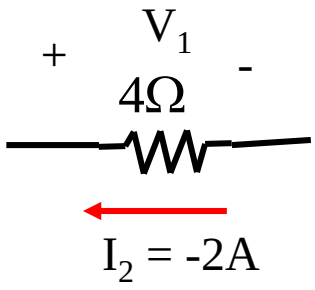
V_B = ? V_B = -10 volt



$$V_1 = +I_1 R$$

$$V_1 = +(2A)(4\Omega)$$

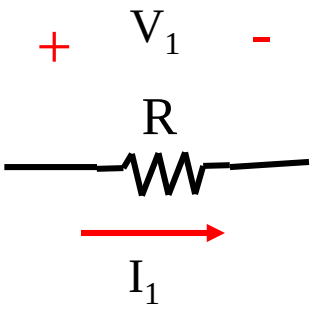
$$V_1 = 8V$$



$$V_1 = -I_2 R$$

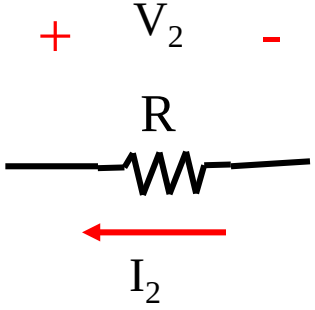
$$V_1 = -(-2A)(4\Omega)$$

$$V_1 = 8V$$



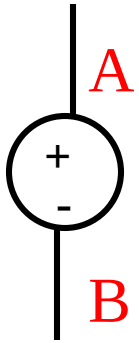
I_1 +ve or –ve ? Can not be determined.

$$V_1 = + I_1 R$$



I_2 +ve or –ve ? Can not be determined.

$$V_2 = - I_2 R$$



$V_A > V_B$ Yes / No ? Can not be determined.

$V_A < V_B$ Yes / No ? Can not be determined.

$V_A = V_B$ Yes / No ? Can not be determined.

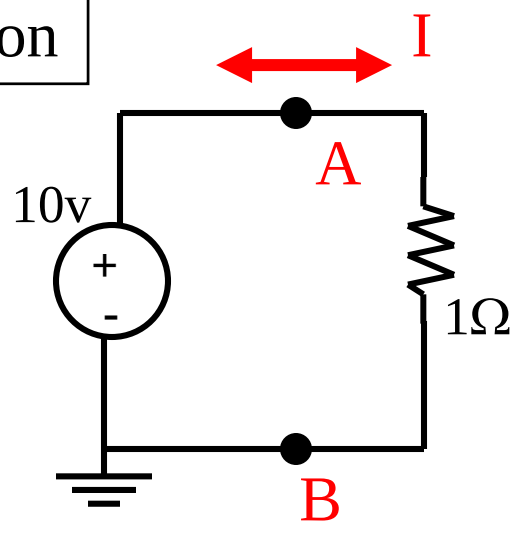
$V_A = 0$ Yes / No ? Can not be determined.

$V_A > 0$ Yes / No ? Can not be determined.

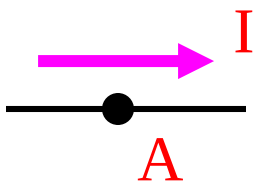
$V_B = 0$ Yes / No ? Can not be determined.

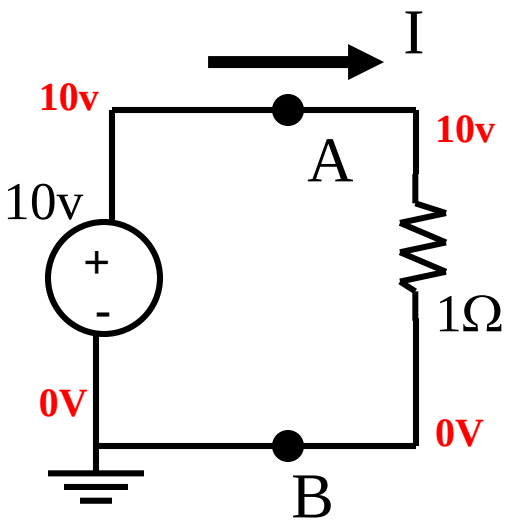
$V_B > 0$ Yes / No ? Can not be determined.

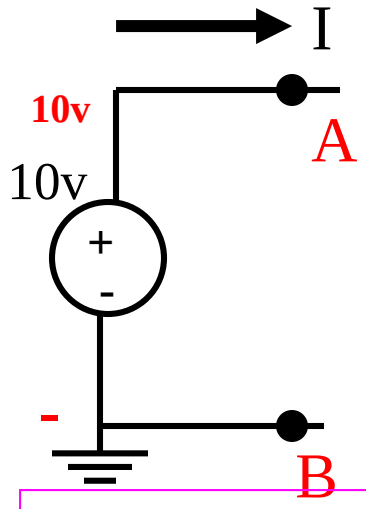
Current Direction



Direction of I = ?

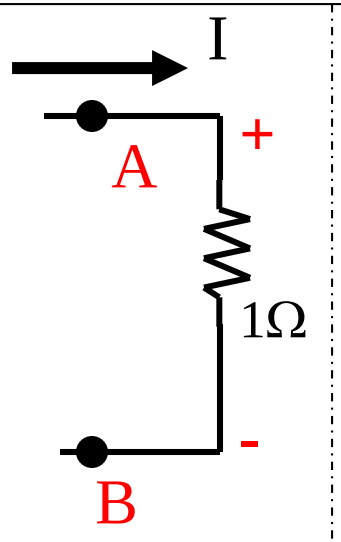






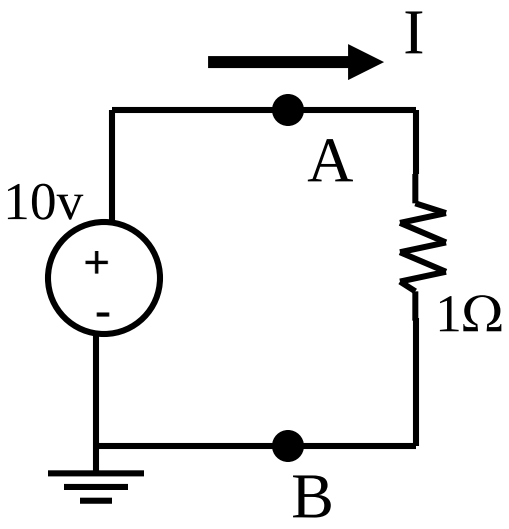
Energy Source

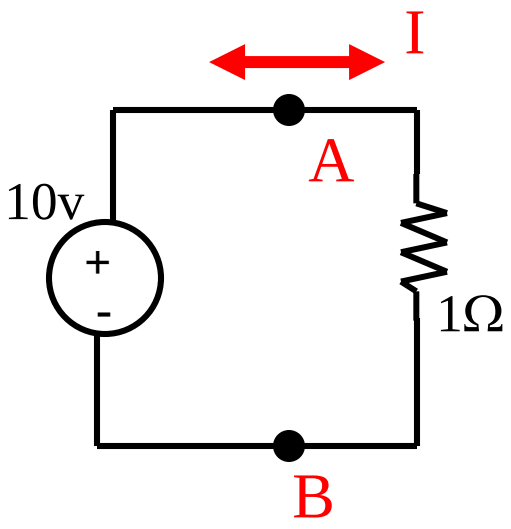
Deliver Energy



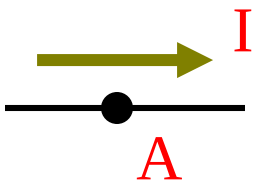
Absorb Energy / Energy Dissipated

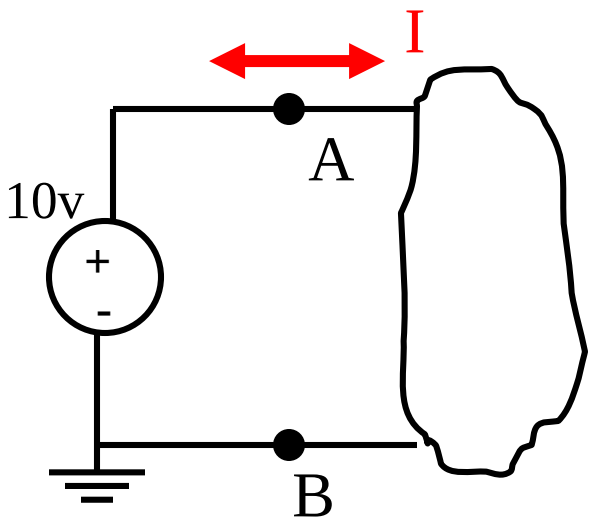
?

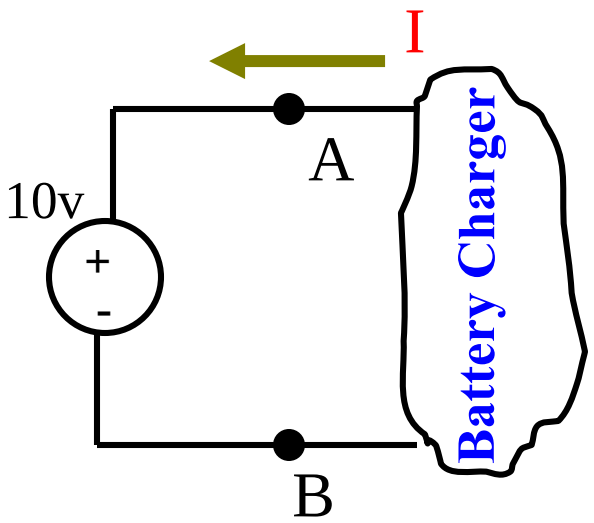


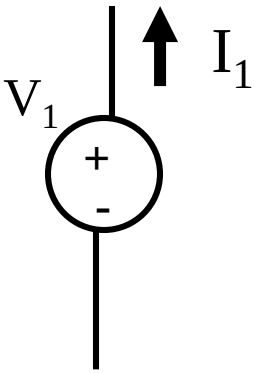


Direction of I = ?







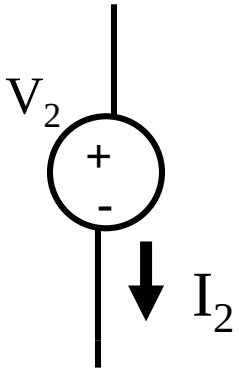


Absorbing / Delivering Power ? Can not be determined.

$$\mathbf{P_1 = -V_1 I_1}$$

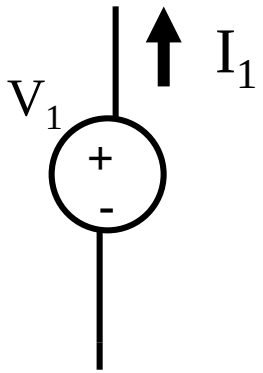
+ve → Absorbing Power
Dissipated Power
-ve → Delivering Power

Absorbing / Delivering Power ? Can not be determined.



$$\mathbf{P_2 = +V_2 I_2}$$

+ve → Absorbing Power
Dissipated Power
-ve → Delivering Power



$$\mathbf{P_1 = -V_1 I_1}$$

Information

$V_1 = 4$ V

$I_1 = -2$ A

$$P_1 = -(4)(-2)$$

$$P_1 = +8\ W$$ Absorbing Power