
M R
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فيزياء
استاتيكا
دوائر كهربية
الكترونيات
ميكانيكا الانشائات
هيدروليكا
مدرس خصوصي
اونلاين
حضوري
يحصل الطالب علي
. مقاطع فيديوهات لشرح المقرر بشكل وافي
. ملخص للمادة Pdf للمذكرة والمراجعة
. محاضرات مباشرة علي برنامج زووم
لمناقشة الأجزاء الغير مفهومة
. تواصل مستمر مع معلم المادة
للتواصل
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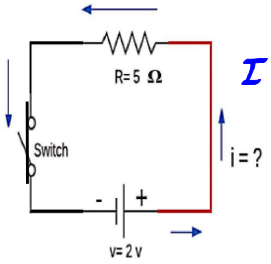
MRAHMEDMAHDY
ONLINE COURSES

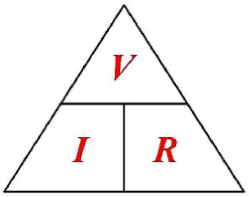
I , V , R , P

Ohm's Law



$I = \frac{V}{R} = \frac{2}{5} = 0.4A$

$V = I\,R$



$I = \frac{V}{R}$ $\quad R = \frac{V}{I}$

Power

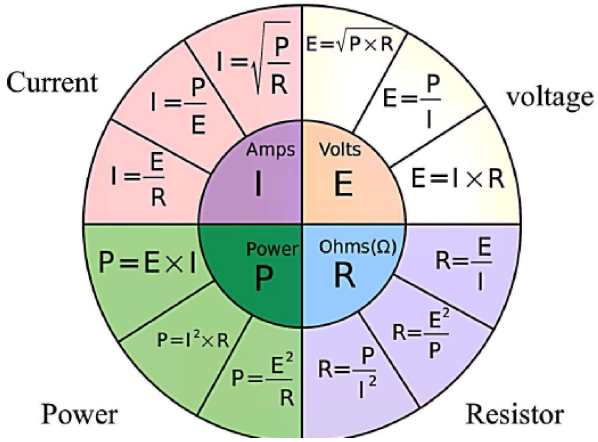
$P = V\,I \rightarrow (1)$

$P = I R \quad I = I^2 R \rightarrow (2)$

$P = V \cdot \frac{V}{R} = \frac{V^2}{R} \rightarrow (3)$

$\sqrt{\frac{P}{R}} = \sqrt{I^2} = I$

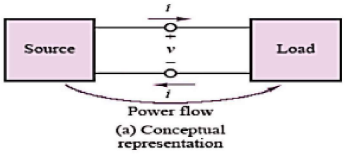
Power and Ohm's Laws

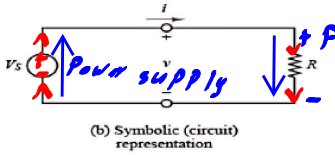


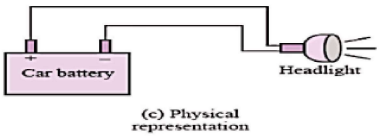
Sign Convention

Voltage:

By convention the direction of positive current flow out of a voltage source is *out of the positive terminal.*

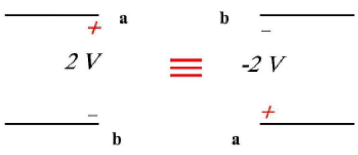






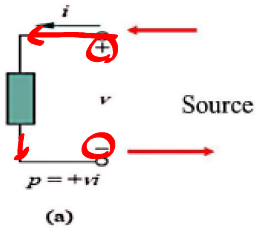
Positive versus negative current

Positive versus negative voltage

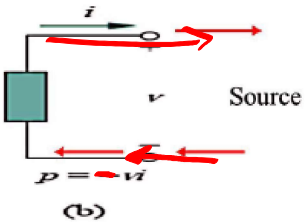


Electric Power and sign Convention

Passive sign convention is satisfied when the current enters through the positive terminal of an element and $p = +vi$. If the current enters through the negative terminal, $p = -vi$.



(a) absorbing power,

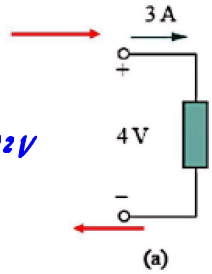


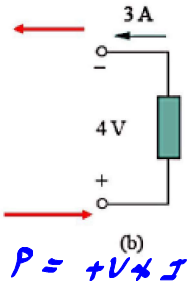
(b) supplying power.

- For example, the element in both circuits of Fig. a and b has an absorbing power of +12 W because a positive current enters through the positive terminal in both cases.

P = +V.I

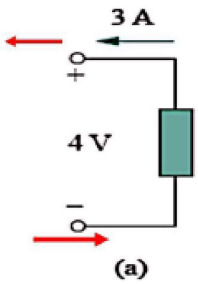
+ 4 * 3 = 12V

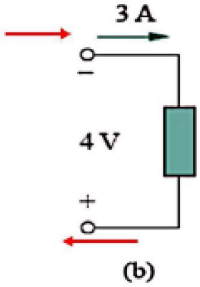




P = +V * I = 4 * 3 = 12V

- In Fig. a and b the element is supplying power of −12W because a positive current enters through the negative terminal.





P = - 4 * 3 = -12V

P = - V I = - 4 * 3 = -12V

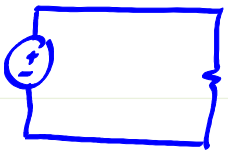
قانون حفظ الطاقة
law of conservation of energy

- The law of conservation of energy must be obeyed in any electric circuit. For this reason, the algebraic sum of power in a circuit, at any instant of time, must be zero:

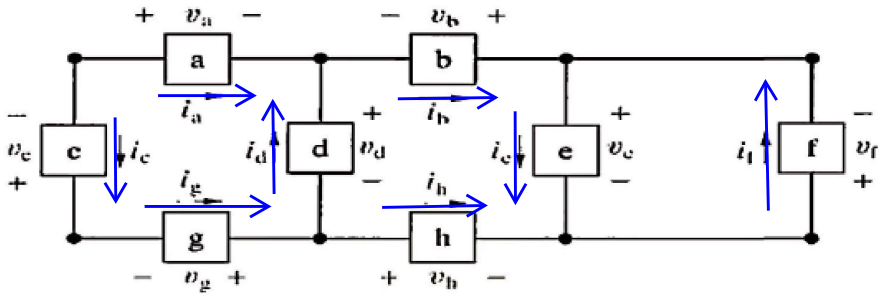
$$\sum P = 0$$

- In other words, in any electric circuit, the total power supplied equals the total power dissipated:

$$\sum P_{sup} = \sum P_{dis}$$



Example



Element	Voltage (V)	Current (mA)
a	5	2
b	1	3
c	7	-2
d	-9	1
e	-20	5
f	20	2
g	-3	-2
h	-12	-3

Elements	Type of Elements	Calculation	Supply or Absorbs Power
a	passive	$P_a = v_a I_a = (5)(2m)$	+10 mW (absorbs)
b	active	$P_b = v_b I_b = -(1)(3m)$	-3 mW (supply)
c	active	$P_c = -7 * (-2)$	14 mW absorb
d	active	$P_d = -(-9)(1)$	9 mW absorb
e	passive	$P_e = -20 * 5$	-100mW supply
f	passive	$P = 20 * 2$	40 mW absorb
g	active	$P = -(-3)(-2)$	-6 mW supply
h	passive	$P = (-12)(-3)$	= 36mW absorb

$P_{supply} = 109mW$, $P_{dis} = 109mW$