



مدرس خصوصى



اونلاين

يحصل الطالب على ...

* مقاطع فيديو هات لشرح المقرر بشكل وافي

* ملخص للمادة للمراجعة النهائية

* محاضرات مباشرة على برنامج Zoom

* تواصل مستمر مع معلم المادة للمناقشة

للتواصل



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Mrahmedmahdy.com

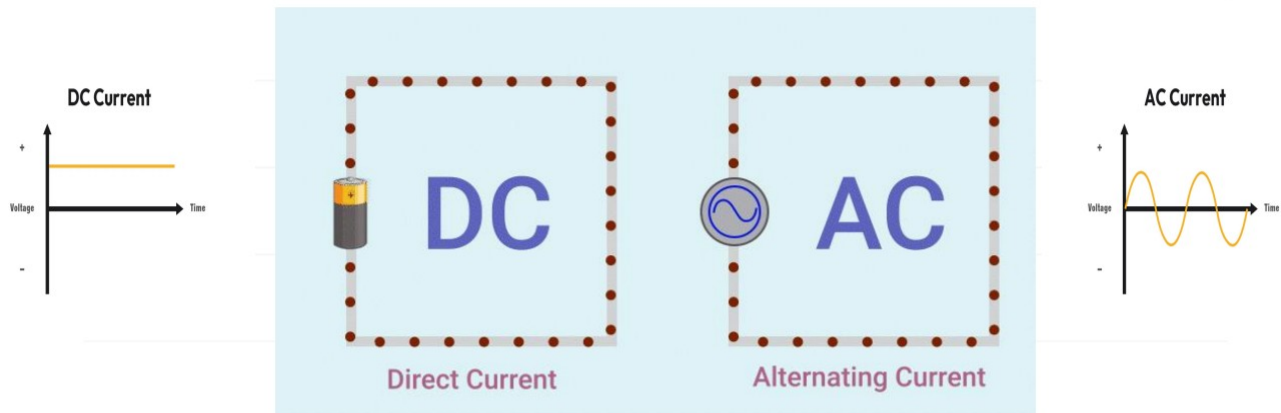
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1- Basic DC Circuits

- Overview and Objectives

1. Distinguish between dc and ac and discuss some of the basic properties of each.
2. State and describe the basic circuit variables including charge, voltage, current, power, and energy.

- DC versus AC



- Units and Prefixes

Table 1-1 Basic electric variables used in dc circuit analysis.

Variable	Symbol	Unit	Unit Abbreviation
Time	t	second	s
Charge	Q	coulomb	C
Current	I	ampere	A
Voltage	V (or E)	volt	V
Energy	W	joule	J
Power	P	watt	W
Resistance	R	ohm	Ω
Conductance	G	siemens	S

Table 1-2 Prefixes in SI units.

Value	Prefix	Abbreviation
10^{-12}	pico	p
10^{-9}	nano	n
10^{-6}	micro	μ
10^{-3}	milli	m
10^3	kilo	k
10^6	mega	M
10^9	giga	G

$$2000\text{ m} = 2\text{ km}$$

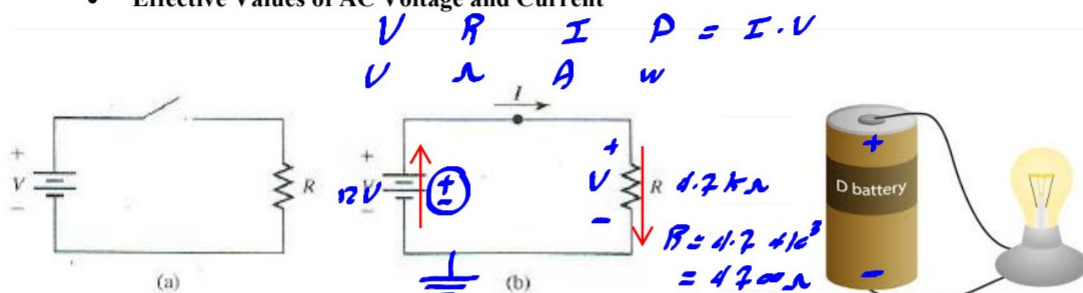
$$0.002\text{ m} = 2\text{ mm}$$

- Charge
- Voltage and Current Forms

$$I = \frac{Q}{t}$$

2- A Very Simple DC Circuit

- Ohm's Law $V = I \cdot R \Rightarrow I = \frac{V}{R} , R = \frac{V}{I}$
- Power Relationships $P = I \cdot V$
- Alternate Expressions for Power $P = \frac{V^2}{R} , P = I^2 R$
- Ground
- Effective Values of AC Voltage and Current



EXAMPLE 1-1

A simple circuit of the form shown in Figure 1-8(b) has $V = 12V$ and $R = 4.7k\Omega$. Determine the current I .

$$I = \frac{12V}{4700\Omega} = 2.553 \times 10^{-3} A = 2.553 mA$$

EXAMPLE 1-2

For the simple circuit of Example 1-1, determine the power delivered by the source and the power dissipated by the resistance. $P_s = -2.553 \times 10^{-3} \times 12 = -30.64 mW$

$$P_R = (2.553 \times 10^{-3})^2 \times 4700 = 30.64 mW$$

EXAMPLE 1-3

The output current of a certain integrated circuit is $6mA$ and it is flowing into a resistance of value $5k\Omega$. Determine the voltage across the resistance. $I = 6 \times 10^{-3} \rightarrow R = 5 \times 10^3 \Omega$

$$V = 6 \times 10^{-3} \times 5 \times 10^3 = 30V$$

EXAMPLE 1-4

Determine the "hot" resistance of a 60-W bulb operated from an ac effective voltage of 120 V.

$$P = \frac{V^2}{R} \Rightarrow 60 = \frac{120^2}{R} \Rightarrow \frac{60}{R} = \frac{120^2}{R} = 240\Omega$$

EXAMPLE 1-5

The power dissipated in a certain resistance is 100 W and the current is 4 A. Determine the resistance.

$$P = I^2 R \Rightarrow 100 = 4^2 R \Rightarrow R = \frac{100}{16} = 6.25\Omega$$