M R

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فيزياء	استاتيكا
دوائر كهربية	الكـــترونيات
ميكانيكا الانشائات	هيدروليكا

مدرس خصوصي

اونلاين حضوري

يحصل الطالب علي

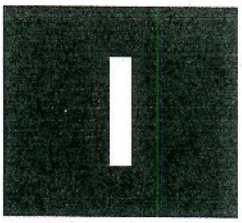
- مقاطع فيديوهات لشرح المقرر بشكل وافي
- ملخص للمادة Pdf للمذكرة والمراجعة
- محاضرات مباشرة علي برنامج زووم
- لمناقشة الأجزاء الغير مفهومة
- تواصل مستمر مع معلم المادة

للتواصل

0567630097

0565657741

BASIC CIRCUIT ANALYSIS



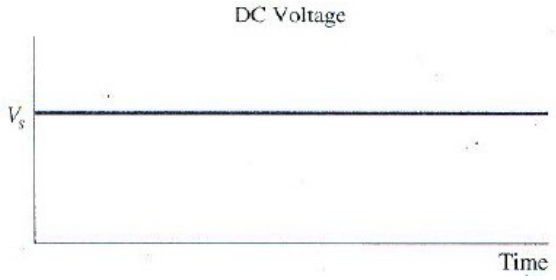
1 Basic DC Circuits

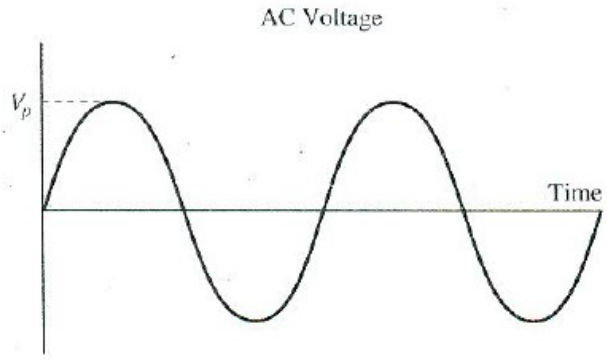
2 General DC Circuit Analysis

3 Transient Circuits

تيار ـ مستمر
Direct current
D.C

تيار ـ متردد
alternating current
A.C





Units and Prefixes

We will introduce many units throughout the text for describing the values of various electrical variables and components. Table 1-1 shows a compilation of some of the most basic

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.

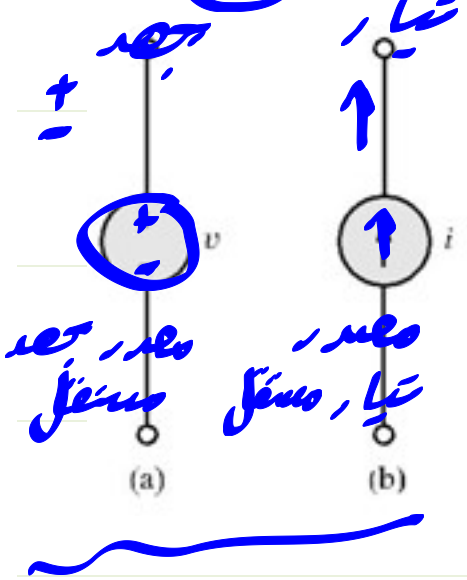
Value	Prefix	Abbreviation
10^{-12}	pico	p
10^{-9}	nano	n
10^{-6}	micro	μ
10^{-3}	milli	m
10^{3}	kilo	k
10^{6}	mega	M
10^{9}	giga	G

$R = 1000\,\Omega = 1\,k\Omega$

$V = 0.005\,V = 5\,mV$

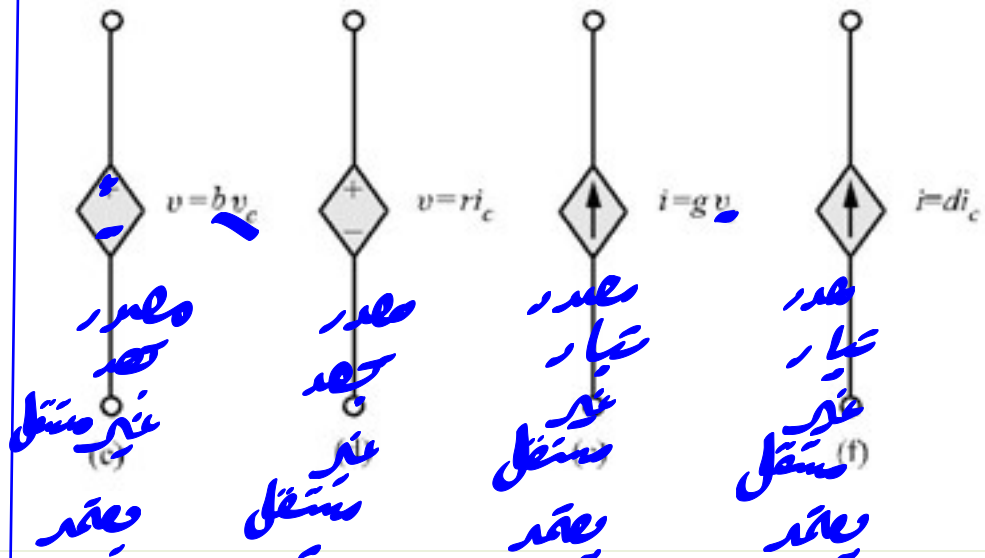
Ideal sources

Independent (مستقل)



- (a) مصدر جهد مستقل
- (b) مصدر تيار مستقل

Dependent (غير مستقل)



- (c) مصدر جهد غير مستقل يعتمد على الجهد
- (d) مصدر جهد غير مستقل يعتمد على التيار
- (e) مصدر تيار غير مستقل يعتمد على الجهد
- (f) مصدر تيار غير مستقل يعتمد على التيار

Ohm's law قانون اوم

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

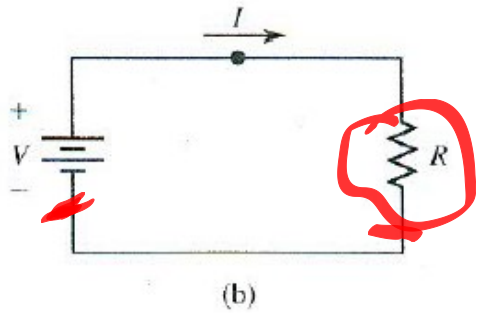
Power القدرة

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

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

$$P = I(IR) = I^2 R \rightarrow (3)$$

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



(b)

$V = 12\,V$

$R = 4.7 * 1000\ \Omega$

$$I = \frac{V}{R} = \frac{12}{4.7 * 1000} = 0.0025\ A$$

$$= 2.5 * 10^{-3}\ A = 2.5\,mA$$

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.

المستهلكة

$$P = I \cdot V = 2.5 * 10^{-3} * 12 = 30.658\ mW$$

$$\frac{V^2}{R}$$

$$I^2 R$$

EXAMPLE 1-3 The output current of a certain integrated circuit is 6 mA and it is flowing into a resistance of value 5 kΩ. Determine the voltage across the resistance.

I

$I = 6 * 10^{-3}\ A$, $R = 5 * 10^{3}\ \Omega$

$$I = \frac{V}{R} \Rightarrow V = IR = 6 * 10^{-3} * 5 * 10^{3}$$

$V = 30\,V$

EXAMPLE 1-4 Determine the "hot" resistance of a 60-W bulb operated from an ac effective voltage of 120 V.

$P = 60\,W$, $V = 120\,V$

$I = \frac{V}{R}$ ✗

$P = I \cdot V = \frac{V^2}{R} = I^2 R$

$P = \frac{V^2}{R}$

$\frac{60}{1} = \frac{120^2}{R} \Rightarrow R = \frac{120^2}{60} = 240\,\Omega$

EXAMPLE 1-5 The power dissipated in a certain resistance is 100 W and the current is 4 A. Determine the resistance.

$P = I^2 R$

$100 = 16\,R \Rightarrow R = 6.25\,\Omega$

EXAMPLE 1-6 We determine the resistance of a device under operating conditions by measuring the voltage across the device and the current through it. The voltmeter reads 120.0 V and the ammeter reads 2.012 A. Determine the resistance.

$I = \frac{V}{R} \Rightarrow R = \frac{V}{I} = \frac{120}{2.012} = 59.64\,\Omega$