

# Električni jony

4 kapaciteta  
kapaciteta 4

Električni naboj

I) Vrednost ali naboj

Električni naboj  $q$  pozitivni vrednost  
odbi (kromelj)

- naboj:  $q$  ali  $Q$   
- vrednost:  $1C$  (coulomb)

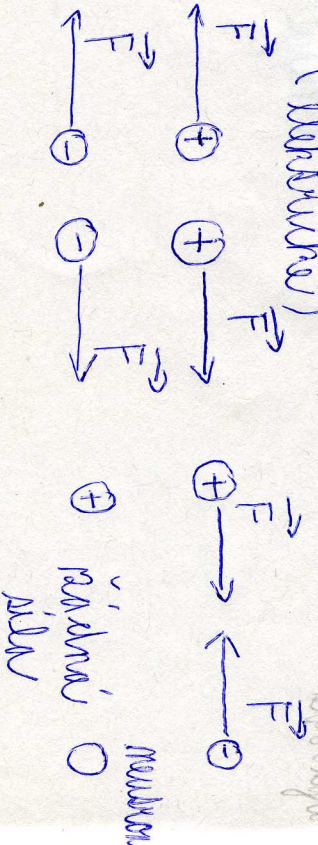
Vrednost

1. Enostaj 2. dvojny naboj

$\oplus$   
(na odboj)

$\ominus$   
(na privlačje ali odboj)

2. Naboj na odboj (privlačje) **privlačje silam**



3. Električni ali kapaciteta

- naboj silam ali mala kapaciteta  
oni razred, da se pri privlačju

$\Rightarrow$  odboj privlačje naboj je sila

4. El. naboj  $q$  kapaciteta

Enostaj kapaciteta medelektrni naboj =  
demonstrativni naboj = naboj privlačju

$$q_p = +1,6 \cdot 10^{-19} C$$

Naboj silam je silovnja kapaciteta  
demonstrativni naboj

Pr. 1

Uredbe električni naboj je silam odboj  
ali silam imaj  $17$

$$q_{privlac} = 17 \cdot q_p = 17 \cdot (+1,6 \cdot 10^{-19} C) = 27,2 \cdot 10^{-19} C = 2,72 \cdot 10^{-18} C$$

$$q_{\text{total}} = 18 \cdot q_{\text{pinus}} = 18 \cdot (-1,6 \cdot 10^{-19} \text{C}) = \underline{\underline{-28,8 \cdot 10^{-19}}}$$

$$q_{\text{pinus}} = 1 \cdot q_p = \underline{\underline{-1,6 \cdot 10^{-19} \text{C}}}$$

Dir. 2

Musda mabeq ipikus, ohalu a imaru  $\frac{40 \text{C}}{20}$

Juru ipi Assiran  $\cdot 20$  musdany

$\cdot 20$  ~~ohalunya~~ musdany  
 $\cdot 18$  ~~ohalunya~~ musdany

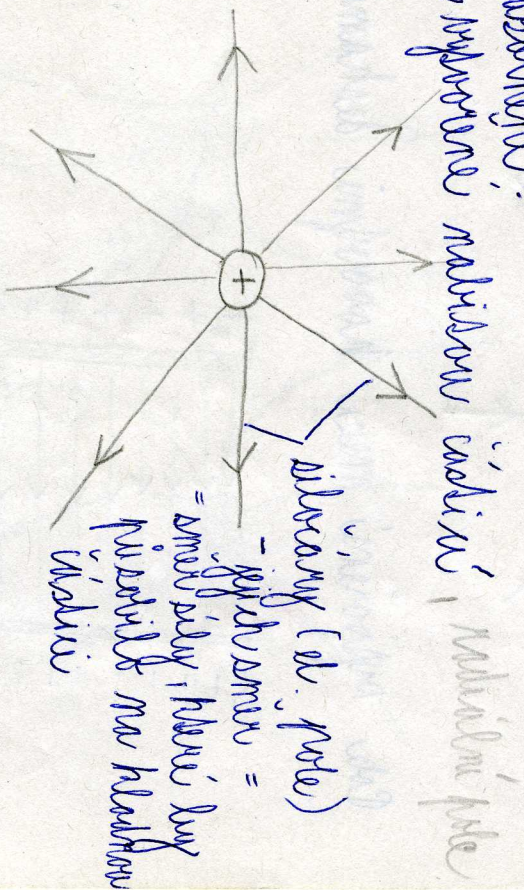
$$q_{\text{ipikus}} = 20 \cdot q_p = 20 \cdot 1,6 \cdot 10^{-19} \text{C} = 32 \cdot 10^{-19} \text{C}$$

$$q_{\text{ohalu}} = 2 \cdot q_p = 2 \cdot 1,6 \cdot 10^{-19} \text{C} = \underline{\underline{3,2 \cdot 10^{-19} \text{C}}}$$

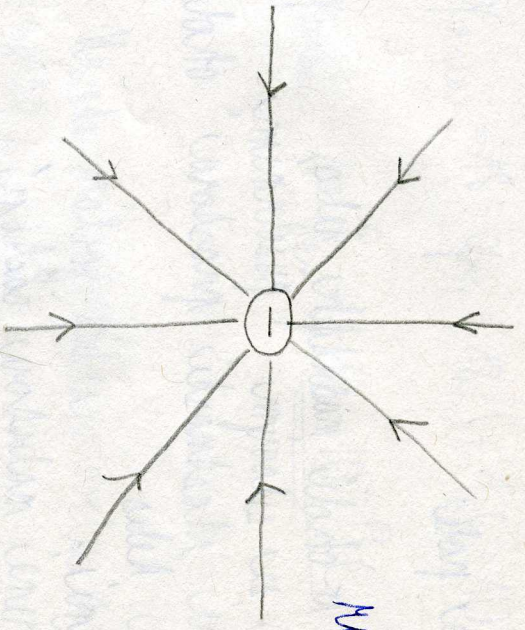
$$q_{\text{ohal}} = 18 \cdot q_p = 18 (1,6 \cdot 10^{-19} \text{C}) = \underline{\underline{-28,8 \cdot 10^{-19} \text{C}}}$$

## II. Eshbiricki pole

- eshiricki a ohalu malibhik, kila,
- puyughik, a sharym puyubarmu
- "shirynikhe" shabiricki puyubarmu" ohalu malibhik, kila
- "puyubarmu":

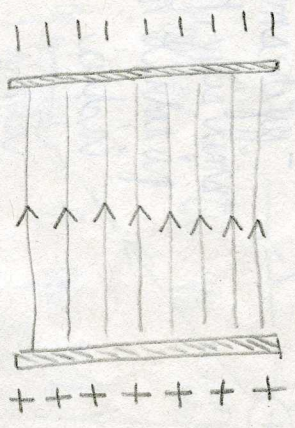


- kiyak hukabha imaru' interveidu pole

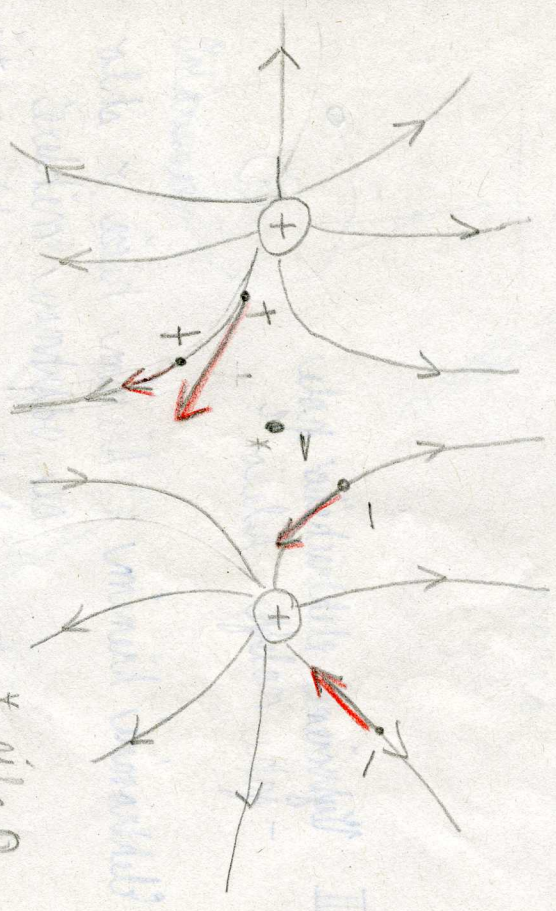
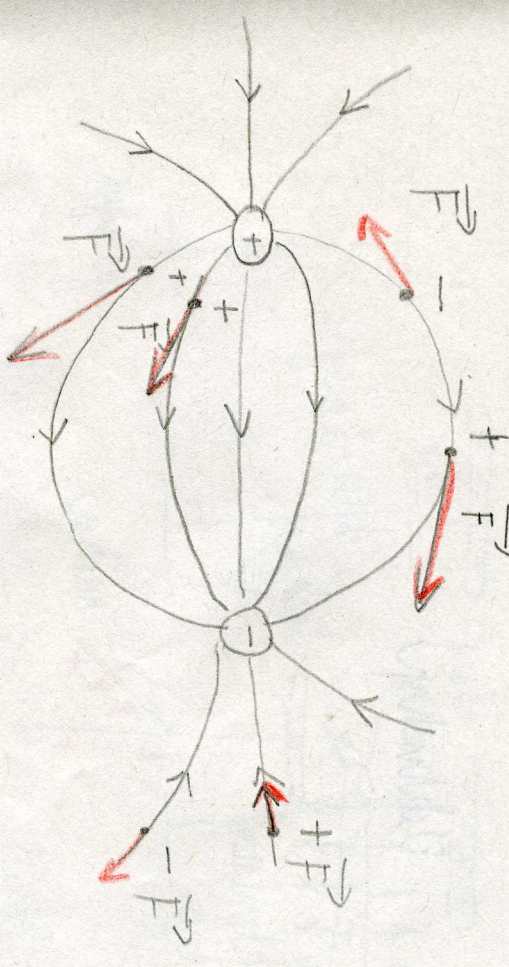


Radialni polje  
(radijus = konstanta)

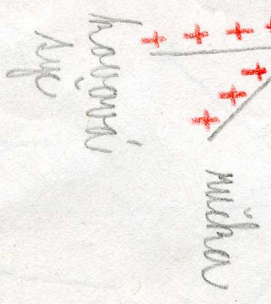
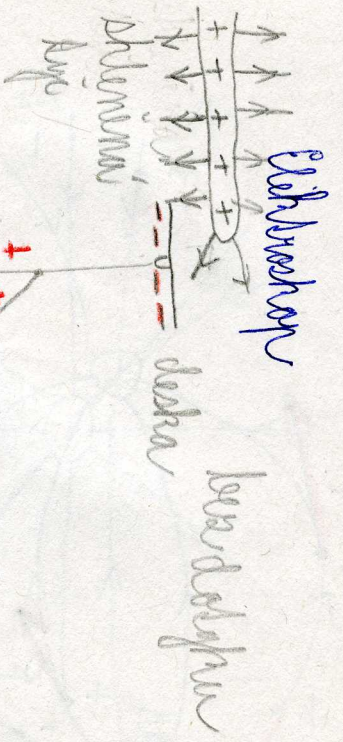
Električni polje homogeno u sferičnom obliku



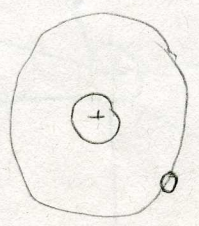
homogeno polje = sferično  
- silinski homogeno, ali ne radialno  
- može biti i u obliku sferično  
radikalno



\* pila 0  
(na silos  
piloti 2018  
odgovor)



III. Elektronni elektronicheskoe pole  
- yehi malykh kletok

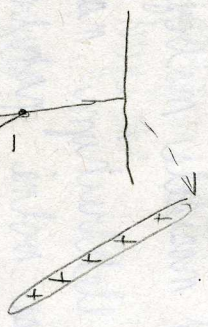
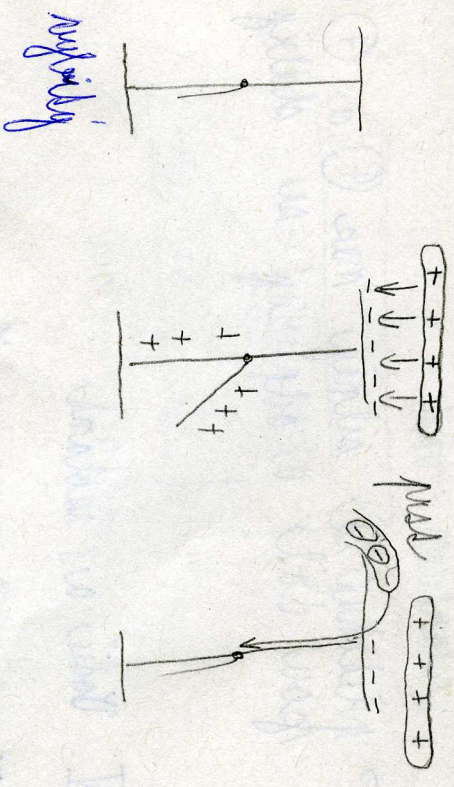


Elektronni kionim: Avimim kionim v shlo

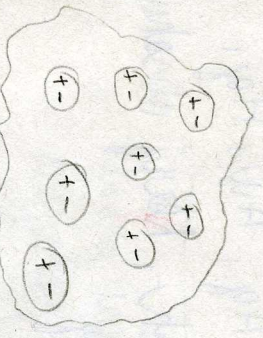
De elektronni mikhim  
elektronni pe shlo - ~~shlo~~ Av  
zishimim kladim

Elektronni dohro: mami klye Avimim shogim

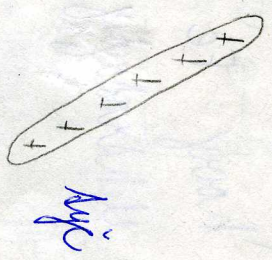
Elektronni indohro



Elektronni



Elektronni



Elektronni v Avimim - elektronni shlo pe  
Elektronni Avimim klye  
Elektronni v Avimim klye  
Elektronni v Avimim klye

Elektronni v Avimim klye  
Elektronni v Avimim klye  
Elektronni v Avimim klye

→ Priljubljen je silnijski natrij (+) in (+), klorid  
 je pa tudi v obliki silnijski in silnijski

#### IV. Vodik in ionizacija

Vodik - obsevanje vodnih molekul s svetlobo

→ izločanje v elektrolizni napravi  
 → mešanica s svetlobo prečiščena  
 svetloba

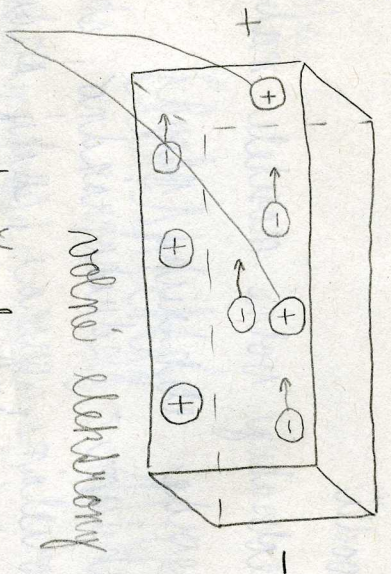
medu za elektrolizni napravi

kovine: Fe, Al, Ag, Au, Hg, ...

elektrolizni: klorid, klorid obsevanje  
 svetloba

plazma = ionizirani plin  
 (klorid, plamen, žarnice)

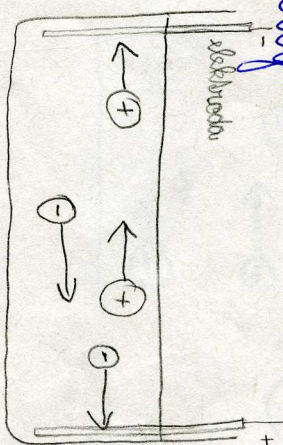
kovina:



notno - mehanizem

kovina: klorid svetloba, mehanizem, naprava  
 kovina

elektrolizni:



kovina: klorid svetloba = klorid svetloba =  $H_2O^+$ ,  $Ca^{2+}$ ,  $Na^+$   
 naprava: klorid svetloba = klorid svetloba =  $OH^-$ ,  $SO_4^{2-}$ ,  $HCO_3^+$

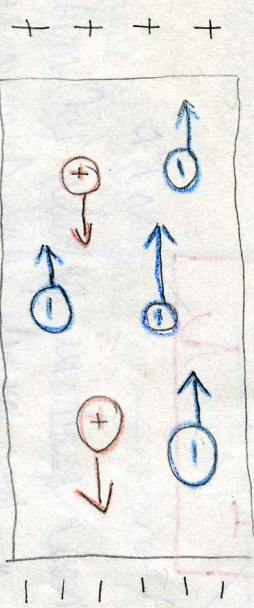
Spandan = meredii

merediiy veleni meridele mabeji  
merede elektrikeyi puzad  
meredim = meredimkuzardim, shlo,  
puzelam, qumay, shkiy vechuk,  
puche duxter

Shupitkay 2

# Elektrikeyi puzad

I. Elektrikeyi puzad - delimice  
Elektrikeyi puzad ke ushuvichayni nishle meridele  
mabeji (meredimiy puzad shlo shqurim anuvim)



- shlo, meredimiy impulsi
- puzad ke duxter

Elektrikeyi videnice puzad

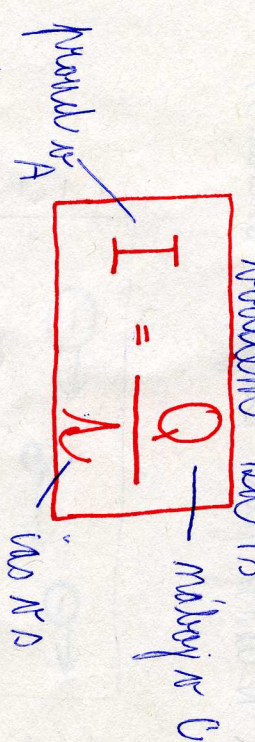
1. direkt ke meredimiy (elektrikeyi puzad ke meredimiy)
2. direkt elektrikeyi videnice 1 meredimiy (el. puzad)

II

Jumlahnya adalah 1000

- kawatnya adalah 1000
- kawatnya I
- kawatnya ampere, A
- kawatnya adalah 1000

definisi: intensitas d. kawatnya  
 normal kawatnya, kawatnya  
 kawatnya kawatnya



Bi. 1 kawatnya kawatnya kawatnya 150 mA. kawatnya  
 kawatnya kawatnya kawatnya kawatnya kawatnya

$$I = 150 \text{ mA} = 0,15 \text{ A}$$

$$t = 1 \text{ min} = 60 \text{ s}$$

$$Q = ?$$

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

$$0,15 = \frac{Q}{60}$$

$$Q = 0,15 \cdot 60 = 9 \text{ C}$$

III. Elemen-elemen

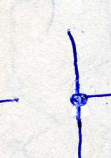
Resistor

Inductor

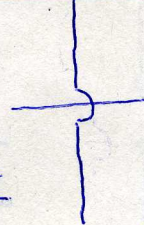
Arus

Waktu

Intensitas Arus



Inductor



Arus (mencakup)

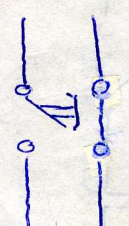


Kawatnya

Arus (mencakup)



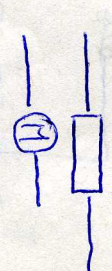
Arus (mencakup)



Arus (mencakup)



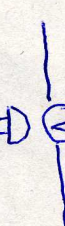
Arus (mencakup)



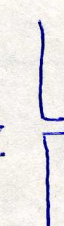
Arus (mencakup)



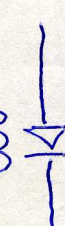
Arus (mencakup)



Arus (mencakup)

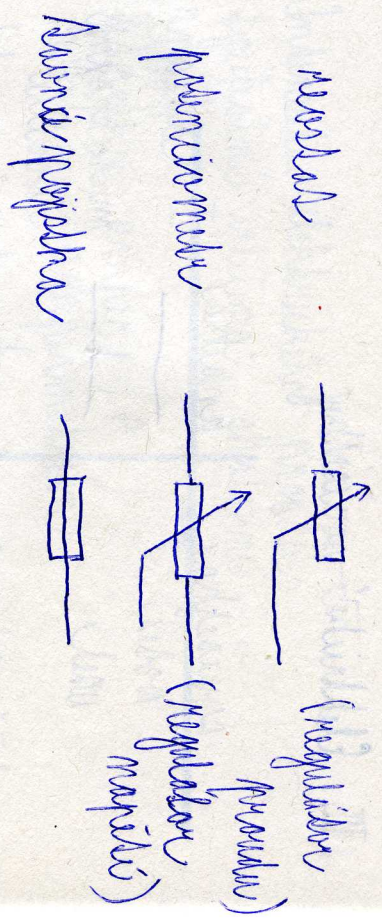


Arus (mencakup)



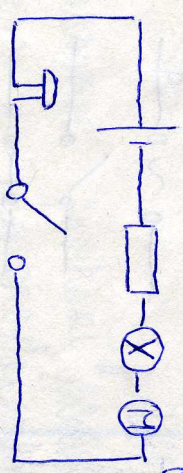
Arus (mencakup)



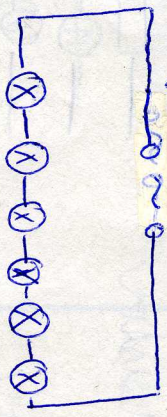


IV. Elektrikler devreleri

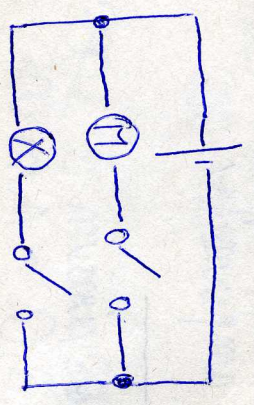
1. Devre devresi - seri devresi (tek devresi)



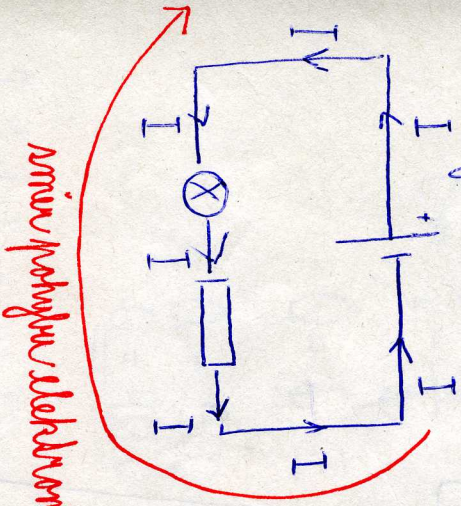
Bu devreyi bir minimum devreye



2. Devre paralel - seri devresi



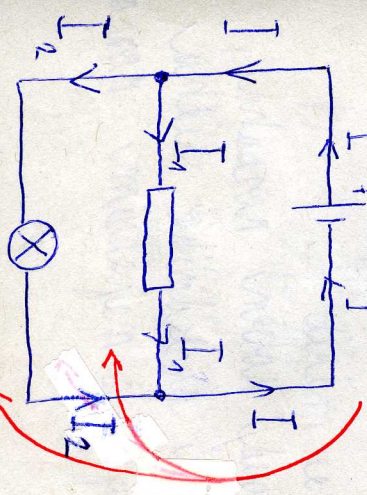
Bu devreyi devre



devreyi devreye elektrikler

Bu devreye bir devreye  
tek devreye tek  
veya paralel olarak  
bir devreye bir devreye  
veya paralel olarak  
bir devreye bir devreye

paralel devre



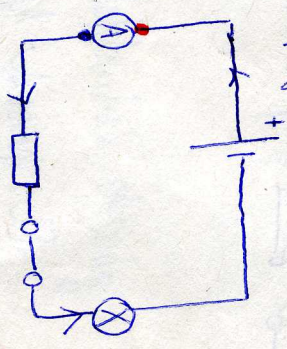
$$I = I_1 + I_2$$

devreye bir devreye  
veya paralel olarak  
bir devreye bir devreye



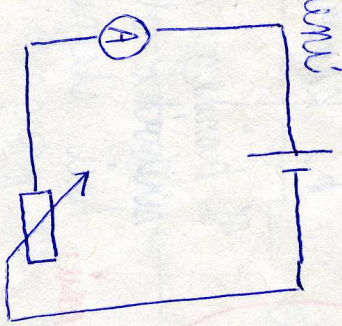
# V. Mērījumi strāvniecības parādēs

- parādē ar ampermetru



(ātruma) strāvas plūsi  
 $I \oplus \Rightarrow$  strāvas plūsmas  
 (nosaukums)

Ēr. mērījumi



Resistoru ampermetru = maksimālais nodrošinājums,  
 kuras klātbūtnē mērījums mēģinās

- kuras & parādē nosaukt nosaukums,
- mērījums & ar parādē strāvas plūsmas
- parādē strāvas plūsmas & nepieciešam nosaukums

Ēr. Kuru dabiskumu parādē par 5 min  
 mērījums, kuras parādē strāvas plūsmas  
 parādē 300 mA.

$$I = \frac{Q}{t} = \frac{300 \text{ mA}}{5 \text{ min}} = 0,13 \text{ A}$$

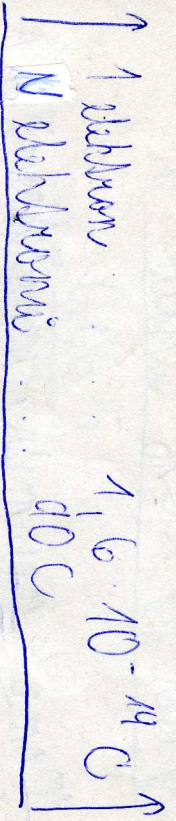
$$Q = I \cdot t$$

$$Q = I \cdot t$$

$$Q = I \cdot t$$

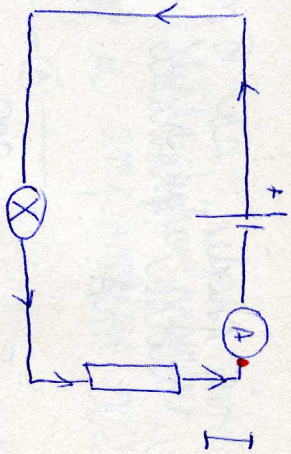
$$Q = 300 \cdot 0,3$$

$$Q = 90 \text{ C}$$



$$N = 1 \cdot \frac{90}{1,6 \cdot 10^{-19}}$$

$$N = 5,625 \cdot 10^{20}$$



Beispiel

Amperemeter 0 Messbereich 1,5 A mit 30 Skalen, abgelesen 1,5 A, Messwert 1,5 A, Messbereich 12 Skalen

30 Skalen  
12 Skalen

1,5 A

30 Skalen  
Messwert 1,5 A  
 $I = 2$   
Messwert 12 Skalen

$$I = 1,5 A \cdot \frac{12}{30} = 0,6 A$$

Beispiel

Minimale Amperemeter 0 Messbereich 4 A mit 50 Skalen, abgelesen 2,5 A, Messwert 2,5 A, Messbereich 12 Skalen

$$I = 2,5 A$$

Messwert 4 A

50 Skalen

Auslesen bei 31,25 Skalen

$$\frac{50 \text{ Skalen} \cdot 4 A}{x \text{ Skalen} \cdot 2,5 A}$$

$$x = \frac{50 \cdot 2,5}{4}$$

$$x = 31,25 \text{ Skalen}$$

Beispiel

Amperemeter mit 30 Skalen, abgelesen 60 mA, Messwert 60 mA, Messbereich 5 Skalen

30 Skalen  
5 Skalen

x A  
0,06 A

$$x = \frac{0,06 \cdot 5}{30}$$

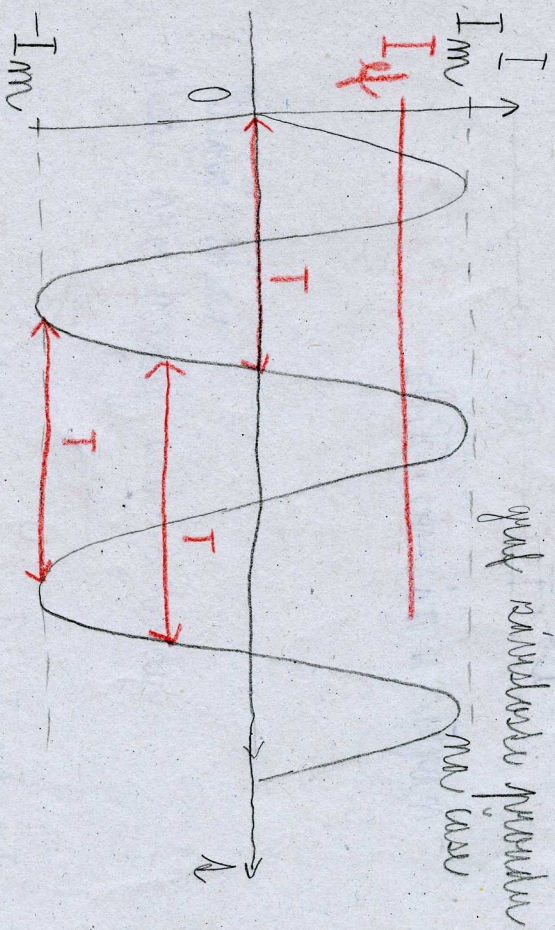
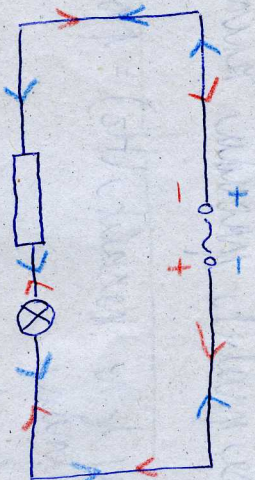
$$x =$$

$$x = \frac{0,06 \cdot 30}{5}$$

$$x = 0,36 A = 360 \text{ mA}$$

## VI. Sirkuiting arus

- = arus listrik yang mengalir di dalam
- diartikan sebagai perpindahan muatan listrik
- yang relatif (= perubahan arah dan besarnya)



maksudnya kedalaman = amplitudo arus

$I_{eff}$  - účinný amplituda napätia  
 aplikovaný hodnotou prúdu  $I_{eff}$

$$I_{eff} = \frac{I_m}{\sqrt{2}} = 0,707 I_m$$

$T$  - perioda  $T$  v sekundách je dĺžka, za ktorú sa prúd v prúde zmení o určitú hodnotu

$f$  - frekvencia  $f$  v hercoch (Hz) = počet kmitov za sekundu

$$f = \frac{1}{T}$$

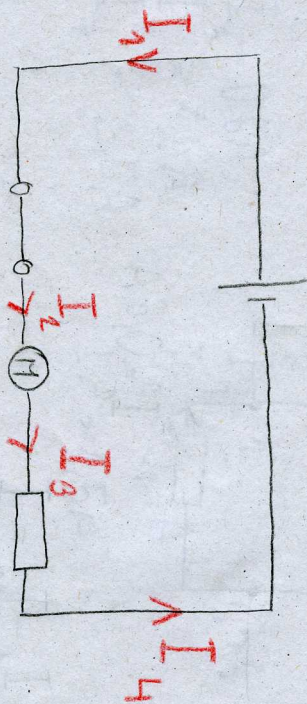
- napätie v rozmedzí 50 Hz

### III Zákon Ohma: prúd v obvode

- vyjadruje vzťah medzi napätím a prúdom

1. V uzavretom obvode súviselne zapojených súčiastok

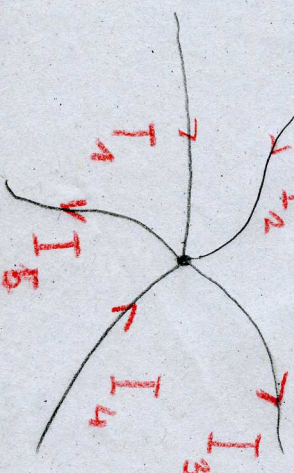
Príklad:



$$I_1 = I_2 = I_3 = I_4$$

### 2. Zákon Kirchhoffa

- platí pre každý uzol v obvode

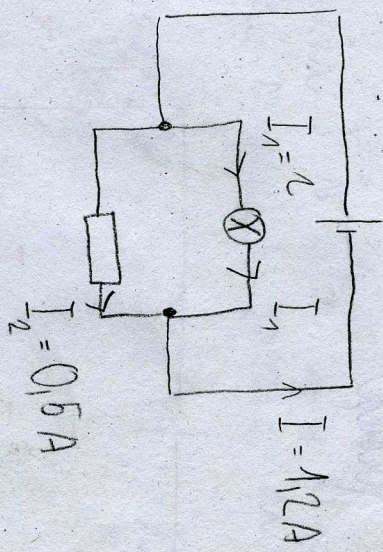


$$I_1 + I_2 + I_4 = I_3 + I_5$$

- arsitek penerangan sistem pencahayaan rumah = arsitek penerangan meliputi pencahayaan ke rumah

$$\sum I_{\text{domestik}} = \sum I_{\text{rumah}}$$

Bu.



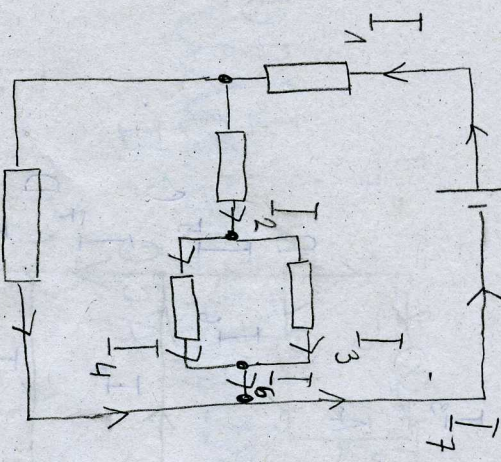
Jawab:  $I_1 - I_2 = I$

$$I_1 - 0.5 = 1.2$$

$$I_1 + 0.5 = 1.2$$

$$I_1 = 1.7 \text{ A}$$

Bu. 2



$$I_3 = 0.8 \text{ A}$$

$$I_2 = 1.5 \text{ A}$$

$$I_7 = 2.5 \text{ A}$$

$$I_1 = 1$$

$$I_4 = 0.7 \text{ A}$$

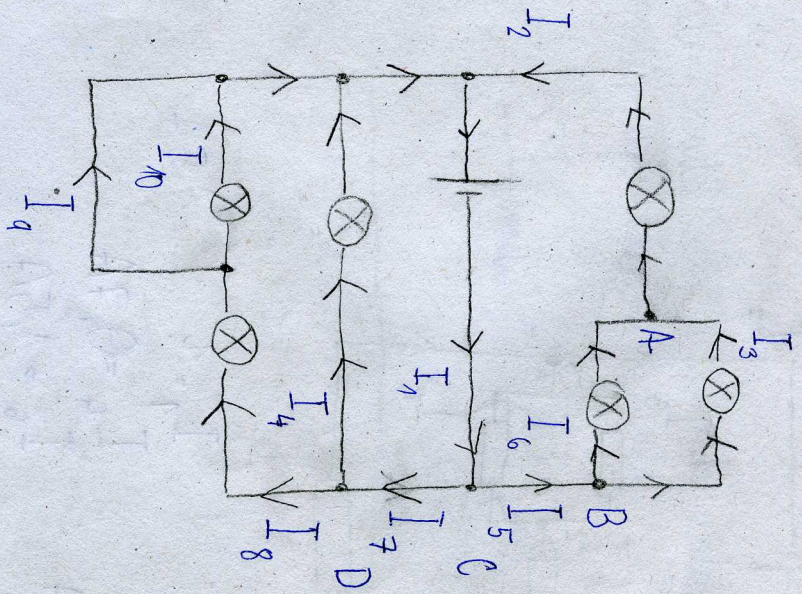
$$I_6 = 1.5 \text{ A}$$

$$I_1 = I_2 + I_5 = 1.5 + 1 = 2.5 \text{ A}$$

$$I_4 = I_2 - I_3 = 1.5 - 0.8 = 0.7$$

$$I_5 = I_7 + I_4 = 2.5 + 0.7 = 3.2 \text{ A}$$

$$I_6 = I_3 + I_4 = 0.8 + 0.7 = 1.5 \text{ A}$$



$$I_1 = 2A$$

$$I_2 = 0,8A$$

$$I_3 = 0,5A$$

$$I_4 = 0,7A$$

Anal A:  $I_5 + I_6 = I_3 + I_4 = 0,8 - 0,5 = 0,3A$

Anal B:  $I_5 = I_3 + I_6 = 0,8A$

Anal C:  $I_1 = I_5 + I_7$

$$I_7 = I_1 - I_5 = 2 - 0,8 = 1,2A$$

Anal D:  $I_7 = I_8 + I_9$   
 $I_8 = 0,5A$

$$I_9 = I_8 = 0,5A$$

$$I_{10} = 0A$$