# Cuttubka 5aad

# DANABKA IYO BIRLABDANABOWGA

**Ujeedooyinka cutubka: Cutubkani marka uu dhammaado ka dib waxaad awoodi doontaa in aad:**

- ✓ Fahamtid Fikradaha la xidhiidha Danabka iyo Birlabdanabowga xidhiidha Danabka iyo Birlabdanabowga.
- ✓ Koru qaadid xirfadaha xallinta Masalooyinka ee la xidhiidha Danabka iyo Birlabdanadeedka
- ✓ Ku Dhiiranaashaha xidhiidhka ka dhexeeya walxaha Dhammaan
- ✓ Isticmaashid waxyaalo badan oo suurtogal ah in aad ku kordhisid Aqoonta fikradaha ugu muhiimsan ee fisigiska

## Hordhac

Waxaad Ku soo baratay Danabka iyo Birlabdanabeedka Fisikiskii Fasalka 7aad Waxaad ku bara doontaa waxyaalo badan oo ku saabsan cinwaankan Fasalkan iyo cutubkan. Xidhiidhka ka dhexeeya korontada iyo Birlabdanabeedka. Iyo isticmaalkeeda dhaqaale ee Dalkeena iyo horumarinta Bulshada ayaa lagu baran doonaa.

## 5.1 Samaynta Qulqulka Korontada, Duubiga Mareegta iyo Fooltejka

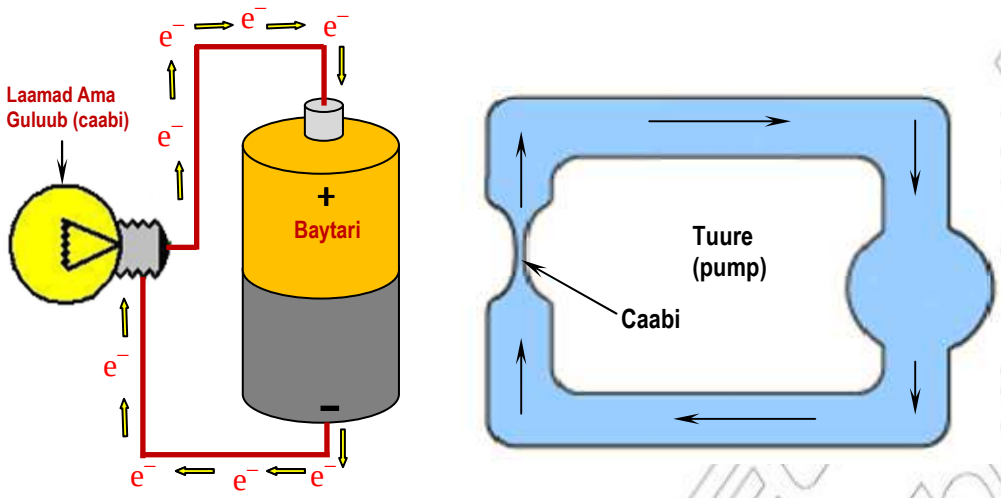
**Hawgalka 5.1**

**Kala Dood waayo – Aragnimooyinkan soo socda saaxiibadaa iyo waalidkaaga :**

- **b) Sidey u wareegtaa qulqulka Danabku?**
- **t) Waa maxay shaqada fooltejku (Dhagax)?**
- **j) Waa maxay mareegta Danabku?**
- **x) Caddee isku – mid ahaanshahooda iyo kala duwanaanshaha Biyo dhex-qulqulaya qasabad iyo elektaroono dhex qulqulaya xadhiga dabka? ( jaantuska 5.1)**

Saari doonaa socodka Danabyada Ama qulqulka Danabka. Qulqulka danabka ee Mareegta Danabku wuxuu aad ugu eg yahay qulqulka Biyaha ee dhexmaraya meel xidhan ( Fiir jantuska 5.1). A wood

qeeybiyaha (dhagaxa) waxuu ku began yahay taangiga Biyaha, caabiguna wuxuu ku began yahay qeybta qasabada ee dhuuban. Cadaadiska ka soo baxaya tuuraha ( pump) xagiisa sare waxuu aad ugu eg yahay foolteyjka dhinac dhammaadka awood qeybiyaha ee ( +) ah. Qulqulka Danabku wuxuu ku began yahay saamiga biyaha ah ee maraya.




*Jaantuska 5.1: Isbarbar-dhiga Biyo maraya qasabad – dhexdeed iyo elektaroonada maraya xadhiga dabka dhexdiisa.*

Si aan u horumarino faham laysku halayn karo Ama waxtar leh oo ku saabsan Danabka, Duubiga mareegta iyo foolteyjka. Haddaan u qaadano Bani – aadamka sidii oo " xadhig- danab- Bani- aadameed" waxay noqon hawlgal xiiso leh.

## Samaynta Socodka Danabka ee Gudbiyaha

*Jaantuska 5.2 Samaynta socodka danabka ee gudbiyaha*

Ardayda Fasalka oo dhammi waxay u noqon muunad (Tusaale) socodka Danabyada ee Gudbiyaha dhex maraya. Aan kaga Bilowno Ardayda dhinac jiiftaxa (xagga hore ilaa xagga dambe) si ay u noqdaan xadhig dabka oo kale. Sanduuqa yaala Fasalka xaggiisa hore waxuu metelayaa Beytarigii (dhagaxa Dabka) sanduuqa waxaa dhinac lagaga ranjiyeeyey calaamada tabnaanta, ka soo qaad in sanduuqa ay ku jiraan 100 dhagax oo yar- yar oo leh xajmiga fataatiiraha. Waxaa lagu qori karaa xarafka "e" iyaga waxayna u taagan yihiin elektaroon. Ardaydu waxay istaagi sanduuqa agtiisa, waxayna ka riixi dhammaantood sanduuqa dhinaca calaamada taban Ama laga jarayda leh. Ardaydaasi waa muunad (Tusaale) u taagan xoogga dhaqaajinta Danabka ( Emf). Emf –ku waa tamar keydka taasoo qabata shaqada ayadoo kala saaraysa Danabyada si ay ugu samayso in ay u safraan meel kale. Baytariga (Dhagaxa), tamar keyd is dheeridu waxay ka timaadaa Falka kiimikaad taas oo kala qeybisa Danabyada, u riixdana elektaroonada dhinaca taban. Tamarkeyd is – dheeridu waxay noqon kartaa mid uu dhaaliyo matoor.

Ama unuga foolta si loo bilaabo qulqulka Ardayda ugu xigta “Baytarigu” waxay heli elektaroonka dhagaxa Tamar keyd is – dheerida qofku waxay ka gudbi dhagaxa elektaroonka ee gacanta qofka ku jira waxayna u gudbi qofka kale. Ardayga ugu horeeya elektaroonku waxuu uga gudbi ardayda isdaba – joogta. Habkani uu socon ilaa “ Dadka – xadhiga) Ama dadka xadhiga laydhka noqday ay ku soo celiyaan dhinacii tognaa ee elektaroon ku yaaley. Tamar keyd isdheeridu si degdeg ah ayey ugu riix daa elektaroonada Ayadoo ka soo riixaysa dhinaca togan una riiaysa dhinaca taban. Halkan waxan ka soo qaadeynaa in gudbiyaha ay elektaroono xor ahi ka buuxaan. Marka hal elektaroon ka yimaado dhinaca tabanaha ah ba isla markiiba elektaroon kale ayaa soo gala dhinaca togan ee baytariga (dhagaxa). Tusaalaha ( Dab – gudbin bani – aadameedeka) ee socodka elektaroonada gudbiye wuxuu u dhacaa sida Mareegta Danabka.

Dhaqan ahaan (Dabeecad), qulgulku waxuu u dhacaa qalqulka Danabka togan, xilliyadii qarniyadii hore ee qulqulka qeexdiisa la yaqaanay waxba lagama Aqoon elektaroonada.
Saynisyahanadu waxay ogaadeen in Danabka togani uu Dhex maro xadhiga –Dabka, laakiin may garanayn. Waa in aad ogaataa in qulqulku yahay socoka Danabka taban. Inagoo eegayna Dabeecada heeda (dhaqan ka), Waxaan u qaadaneynaa qulqulka Danabka socodka Danabka tagan ee ka yimaada dhinaca togan ee Beytariga ( Dhagaxa) . Waa inaad ku qanacsan tahay in kaalinta Tamar keyd – isdheeridu ay tahay kala soocida Danabyada iyo kaalin tahay Abuure Danab xoojiye.

## Tusaale (muunad) Mareeg Danab Furan

### Samaynta mareeg furan

Ardayda is haysata laga bilaabo dhinaca taban ilaa dhinaca togan waa marinka socodka elektaroonada Marinkan waxaa lagu magacaabaa Mareegta Danabka. Mareegtu wey xidhan tahay haddii aanay jirin meel ay safka ardaydu kala go’an tahay Ama furantahay. ( Fiiri jaantuska 5.3)

*Jaantuska 5.3 Mareeg Danab xidhan*

Mareegtu wey Furan tahay haddii ay jirto meel safka ardaydu ka kala furantahay. Ama aanu iska haysan ( Fiiri jaantuska 5.4

*Jaantuska 5.4: Tusaale Mareeg Danab Furan*

## Tusaale xadhko Dhumuc wayn

Hadda aan tixgalino Ama qaadano xadhig – danabeed Bani- aadamka. halkii aan ka isticmaali Lahayn hal-jiiftax (Fiiri Jaantuska 5.5)

*Jaantuska 5.5 Tusaale xadhig Danabeed Dhumuc badan*

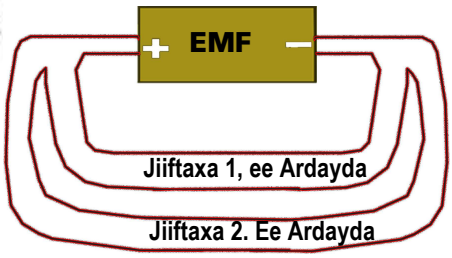
Elektaroonada uu riixayo EMF – ku ee inuu uriixayo dhinac taban waxaa gudbinaya laba Arday markiiba. Halkan elektaroonadu waxay u gudbaan si ka dhakhso badan sidii ay ugu gudbayeen halka jiiftax. Haysashada la haysto xadhig – Danabeed dhumucda Badan waxay la micno tahay haysasho la haysto Dhaqso badida socodka elektaroonada ee mareegta

## Mareegaha Danabka

Mareegta Danabku waa marin Dhammaystiran ( xidhan) oo ay marto qulqulka Danabku. Waxay ka koobnaan kartaa walxo kala duwan sida Isha tamar keyd isdheerida (Foolteyjko), Furaha ujo Guluubka iwm. Waad Muujin kartaa Mareeg kasta oo Adag ( kakan) Adigoo isticmaalaya summado. Heerka summadaha Danabka ee loo isticmaalo si loogu sawiro Jaantusyada mareegta Danabka.

## Tusaale (Namuunad) Mareegta Barbarada ah

Marka xigta, aan qaadano Ama tixgalino labada jiiftax ee Ardayda si aan ugu kala jebino laba qeybood, si aan u samayno laba marin labada jiiftax ee ardaydu waxay ka helayaan elektaroonada dhinaca taban, waxayna u gudbinayaan Dhinaca togan ee EMF-ka. Tusaalahani wuxuu sharaxayaa in elektaroonada ay riixayaa EMF – ku ee ay soo riixayaan dhinaca tabani waxuu leeyaha laba Doorasho oo uu ku safro / qulqulo ka asoo dhex maraya gudbiyaha, marlabaad elektaroonadani waxay ku darsamaan Dhinac togan ( Fiiri jaantuska 5.6)




*Jaantuska 5.6 Mareegta Barbarada ah*

**Hubinta (xaqiijinta) 5.1**

1. Qeex sida qulqulka Danabku u dhexmaro Gudbiyaha? ( u isticmaa/ Beni – aadam ka xadhiga – Danabka)
2. Sheeg kaalinta uu kaga jiro xoogga Danab – dhaqaajiyuhu qulqulka Danabka?
3. Sawir
   b) mareeg Danab – xidhan
   t) mareeg- Danab. Furan, Dabadeedna sharax Faraqooda u dhexeeya

## 5.2 Sameynta Iftiinka Guluubka ee Korontada

**Hawlgalka 5.2**

**Baadh waxa Iftiinka Guluubku ee korontada**

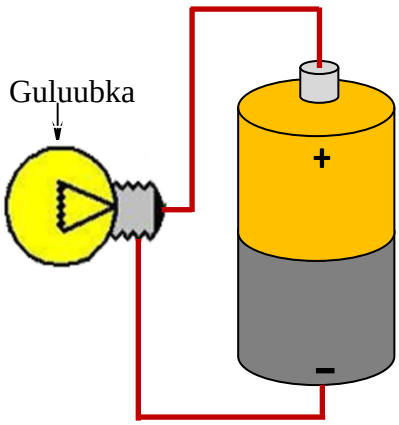
1. **Qaado Guluub gubtay**
2. **Baro qeybaha (Deris) Guluubka caddie xaasawdu, meesha uu ku xidhmo, halka u sareysa iyo qeybta haysta**
3. **Sawir jaantuska Guluubka kuna muuji qeybihiisa**
4. **Sharax Muhimada xaasowda dhuudhuuban.**
5. **Goormaad dhihi kartaa Guluubku wuu Gubtay? Ama ma Guban?**

xaasowdu waxay ka Samaysan yihiin walax Bir ah oo la dhaho Taangisten. Taangistan waxay leedahay meesha ugu sareeysa ee dhalaalka Biraha. Xaasawdu aad ayey ugu dhuu dhuuban tahay kuwa koruhaya. Guluubka dhexdiisa xaasawdu waxay ku xidhan tahay taageeraha koruhaya. Mid ka mid ah taageeruhu wuxuu ku xidhan yahay Boolka ama dabada Guluubka ka kalena waxuu ku xidhan yahay salka. Guluubka shaqeynayaa wuxuu Sameeyaa Mareeg dhammaystiran marka lagu xidho Baytari (dhagax) (Fiiri Jaantuska 5.7)


*Jaantuska 5.7 Iftiinka guluubka ee korontada*

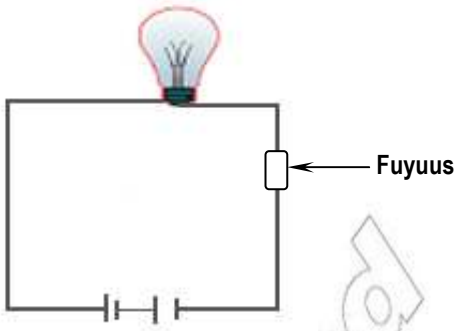
### Sameynta Fuyuus

- Dhis mareeg Danab Adigoo isticmaalaya Guluub, Baytari 12 v ah, Fure, xadhig laysugu xidho iyo xadhko kala duwan, ku buuran iyo ku aad u dhuuban.
- Meelo Banaan u yeel mareegta si aad u geliso xadhko kala duwan
- Guluubku wuu shidmaa marka Furaha xadhkaha dhumucdoodu kala duwan tahay ka buuran kuwa dhuudhuuban laysu xidho.
- Marka xadhiga – Dabka ee dhuuban lageliyo meesha banana wuu kaahi, wuuna kululaan, Markan Guluubku wuu Bakhtiyi




*Jaantuska 5.8 Samaynta qulqulka Mareegta ee Gulubka dhexdiisa.*

- Xadhiga – Dabka oo ka samaysan Birta Alooy (Alloy) taas oo heerka dhalaalideedu hooseeyo waxaa la dhahaa fuyuus, Fuyuusku wuu dhalaalaa, wuxuuna kala jabiyaa Ama kala furaa mareegta marka qulqul caadiah Dhexmaro.



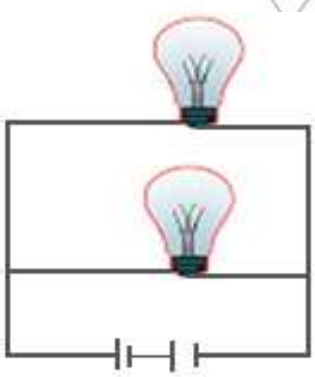

*Jaantuska 5.9 Sameynta Fuyuuska*

Fuyuusku Mareegta waxuu ka dhigaa mid Furan (aan dhamaystirnayn Marka qulqulka Danabka dhexmaray aa sareeyo.

**Hawlgalka 5.3**

***Dhisida Mareegta Barbarada ah (Fiiri jaan 5.10)***

1. **Maxaa ku dhici caddaanka Iftiinka marka labada Guluuba Shidan yihiin?**
2. **Maxaa ku dhici cadaanka Iftiinka marka Guluubyada mid laga saaro?**
3. **Maxay u dhacday in caddaanku kala duwanaado?**



*Jaantuska 5.10 Mareeg Barbaro ah*

**Hubinta ( xaqiijinta) 5.2**

1. **Waa maxay saameynta ay ku leedahay qul qulka Danabku isticmaalka Guluubka?**
2. **Sawir Dhismaha Guluubka Iftiinka ee dhabta ah, kala sheeg Ama magacow qeybihiisana?**
3. **Qeex Muhimada Fuyuuska**

## 5.3 Xidhiidhka Ka Dhexeeya Qu Lqulka, Tamarkeyd – Isdheerida Iyo Caabiga

Fasalkii 7aad waxaad ku soo baratay sida loo soo saaro Danabka korontada iyo sida uu u qeybiyaan Gudbiyeyaashu. Marka tamar– keyd is– dheerida (foolteyj) lagu isticmaalo Gudbiyaha elektaroonada xorta ah ee Gudbiyuhu wax aybilaabaan socod. Tusaale ahaan hadda Baytari (dhagax) lagu xidho lab

ada cidhif ee xadhig Danab oo Gudbiye ah, habku Gudbinta qurubyada Danabka dhacada ayadoo cidhifka tagaysa tagaysana a cidhifka kale. Qaabkan socodka qurubyada Danabka ayaa la dhahaa sida loo sameeyo qulqulka Danabka.

Qulqulka Danabku waa saamigalka socodka Danabku kaga gudbo Bedka Dusha Gudbiyaha lagu siiyey

qulqulka Danabku = $\frac{\text{socodka Danabka}}{\text{Waqtiga ay ku qaadato}}$

Summad ahaan $I = \frac{Q}{t}$ , halka

I ay tahay qulqulka Danabka,

Q – na walxaha saldanabaysan t - waqtiga ay ku qaadatay

Danabku waa xaddi Foolwaa

## Su'aal Furan.

- Miyaad xasuusan tahay halbeega qulqulka Danabka?

  Magacow,

  halbeega qulqulka Danabku waa Ambiyeer( Ampere) (A)

  Waxaana loogu magac daray Saynisyahan Faransiis ah oo la dhaho Andre Marie Ampere

$$1\ \text{Ambiyeer} = \frac{1\ \text{Kuulam}}{1\ \text{Seken}}\ ; \qquad 1A = \frac{1C}{1\ s} = 1\ C/s$$

Halkii Ambiyeer waxuu la mid yahay hal kuulam oo danab ah oo dhaqaaqa sekenkiiba; qulqulka Danabka ee hal ambiyeer waxaa la heli marka Danab hal kuulam ($6.25\times 10^{18}$ elektaroon) ayaa dhex maraan (dhaafaan) Gudbiyaha hal seken. Qul qulka Danabka waxaa kale oo lagu cabbiri karaa halbeeg kale oo la mid ah sida mili – ambiyeer iyo maykro-Ambiyeere

1mili Ambiyeer = 0.001A = $10^{-3}$A

1 Maykro -Ambiyeer = 0.000,001A = $10^{-6}$A

## Tusaalaha Ka Shaqeysan ee 5.1

1. Waa maxay qulqulka madoorsoome ee la gudbiyaa marka Danab dhan 120c dhex maro gudbi yaha muddo dhan 1 daqiiqo?

| siin | Waxa la rabo | Furturis |
|---|---|---|
| Q = 120C<br>t = 1miridh<br>= 60 seken | I = ? | $I = \frac{Q}{t}$<br>$= \frac{120c}{60s}$<br>= 2C/s<br>= 2A |

Sidaas darteed, qul qulku waa 2C/S = 2A

2. haddii qulqul dhan 90 mA uu dhexmaro muddo 150s ah, dabadeed waa maxay Danabka la gudbiyey?

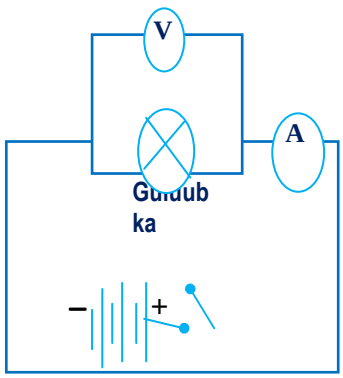
| siin | Waxa la rabo | Furfuris |
|---|---|---|
| I = 90mA = 0.09A<br>t = 150s | Q = ? | $I = \frac{Q}{t}$, dabadeed Q = It<br>Q = (0.09A) (150s)<br>= (0.09 C/s) (150s)<br>= 13.5C |

Danabka Gudbay waa = 13.5C

### Foolteyj (Tamar keyd is dheeri)

Foolteyjku waa cabbirka awooda shaqo lagu qabto waa xaddi foolwaa. Waxaa loo qaadan karaa “Tamarta Riixida” Ama “ cadaadis” ka dhex dhacaya mareegta Danabka. Ma’ aha xoog. Foolteyjwaa qeybiye, qeybiya Ilaha xoogga mootinta Danabka ( EMF)

Sida Baytariga (Dhagax), Matoorka Ama unugga Footofoltayk (photovoltaic call) EMF- ka waxaa loo isticmaalaa in uu kala sooco mareegta Danabka iyo in uu abuuro xoojinta Danabka.




*Jaantuska : 5.11Shaxda Mareegta ee xeerka ohm*

## xidhiidhka ka dhexeey a qulqulka iyo Foolteyjka

### Hawlgalka 5.4

**Baadhitaan ku Saabsan xidhiidhka ka dhexeeya qulqulka iyo foolteyjka.**

**Qalabka loo baahan yahay:- 4 Baytari (dhagax) ( 1.5v midkastaa), foolteyi, cabire, ambiyeer cabbire, Fure iyo xadhko Dana b oo isku xidhan.**

***jidka la marayo:***

**i) Isugu xidh walxaha la doortay sida ka muuqata jaantuska 5.11**

**ii) Ku xidh marka hore hal baytari ( dhagax) dabadeed akhri foolteyj cabbiraha iyo qul qul – cabbiraha.**

**iii) Ku celi jidka xagga sare markasta laba Baytari ( dhagax), seddex baytari (dhagax) iyo Afar baytari ( Dhagax) oo unugaga engegan ah si taxane ah.**

**iv) Ku Buuxi shax da hoose mitirada ay sheegaan.**

**v) Xisaabi Saamiga foolteyjka (v) iyo qulqulka (I) markasta.**

| Tirada unugyada ee isugu xidhan taxanaha | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Tamarkeyd is dheerida ( V) | | | | |
| Qulqulka (I) ( A) | | | | |
| Saamiga $\frac{V}{I}$ | | | | |

**vi) Sawir Garaafka V ~ I.**

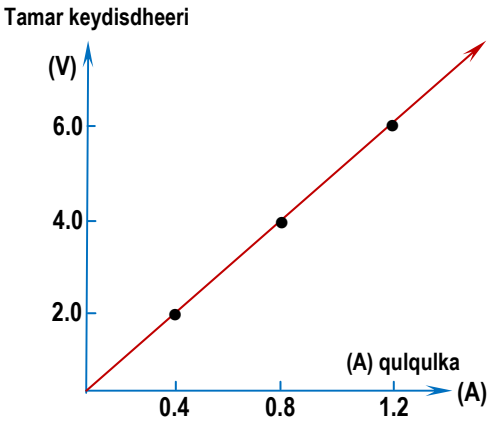
**vii) Isbarbar –dhig Saamiga tiirada Garaafka ( Jaantuska 5.12)**

- **Maxaad Aragtaa**
- **Sidee ayuu qulqulku u Kordhaa Ama hoos ugu dhacaa, haddii la kordhiyo Ama la yareeyo Foolteyjka ( Tamar keyd isdheerida)?**

Qul qulka Hawlgalka 5.4 wuu kordhaa marka uu kordho. tamarkeyd is dheeridu; sidoo kale wuu yaraadaa marka ay yaraato tamar is dheeridu?

Ninka layidhaahdo “George Simon Ohm” oo ahaa Fisigisyahan Jarmal ah ayaa cabbiray qulqulka danabka ee dhex maraya gudbiye loo adeegsaday ama kagudbayso tamar isdheeri kala duwani.

Tana Waxaa lagu agaaday xeerka ohm:-




*Jaantuska 5.12 Garaa fka Tamar keyd isdheerida iyo qul qulka.*

**Xeerka Ohm Wuuxu Sheegayaa:**

**" Qulqulka dhexsocoda birgudbiye ah heerkul Joogto ah, Wuxuu saamigal too san ku yahay Tamarkeyd isdheerida udhexaysa labada cidhif".**

**Xisaab ahaan Waxaa loo qeexi karaa xeerka Ohm Sidan:-**

**: $\frac{\text{Tamarkeyd isdheerida}}{qulqulka}$ = madoorsoome**

**Waa saamigalnimada madoorsoo maha ee astaan gaarka u ah qudbiyaha birta ah Madoor Soo mahana Waxaa loo yaqaa caabiga qudbiyaha.**

**Waa maxay caabigu?**

**Caabiga Waxaa loo qeexaa inuu yahay Lidka qulqulka danabka ee dhexmaraya gudbiyaha. Sida Kamuuqata Hawlgalka 5.4**

**Cabiga gudbiyahana waxaa loo qeexaa inuu yahay Tamarkeyd isdheerida iyo qulqulka.**

**Calaamad ahaana waa sidan. R = V marka**
**I**

**V= fooltejka (V)**

**I = qulqulka (A)**

**R = Caabiga (Ω)**

**Halbeega Caalamiga ee caabiguna waa ohm (Ω)**

$$\text{1 ohm} = \frac{\text{1 volt}}{\text{1 amp}}$$

**Shaxan mareegta caabigu waxaa u taagan Calaamadahan:**


Xeerka ohm wuxuu sax kuyahay kaliya xaalado gaara ah. Wuxuu sax ku yahay biraha gudbiyaha ah ee herkulka madoorsome.

## Tusaale 5.2

1. Waa imise caabiga laambad qulqulka danabkeedu yahay 0.5A, , marka lagu xidho 2V oo baytariah?

| Siin | Weydiin | Fur-furis |
|---|---|---|
| V = 2V | R = ? | $R = \frac{V}{I}$ |
| I = 0.5A | | $R = \frac{2V}{0.5A} = 4\Omega$ |
| ∴ caabiga guluubku = 4Ω | | |

2. Waa imisa qulqul dhex maraya marka 10 Ω oo caabiah lagu xidho 2V oo barytariah?

| Siin | Weydiin | Fur-Furis |
|---|---|---|
| R = 10 Ω | I = ? | V = IR |
| V = 2V | | $I = V/R = \frac{2v}{10\Omega}$ |
| | | I = 0.2A |

3. Caabi dhan 200Ω ayaa lagu xidhay qulqul danab dhan 1.15A, Waa imisa tamar keyd isdheeridoodu?

| Siin | Weydiin | Fur-Furis |
|---|---|---|
| R = 200Ω | V = ? | V = IR |
| I = 1.15A. | | V = 1.15A × 200Ω |
| | | V = 230V |

∴ Sidaas darted tamarkeyd isdheeridu = 230V

### Xaqiijin 5.3

1. Qeex Weedhahan soo Socda
   b) Qulqulka danabka c) Ambiyeer
   t) Foolteyj (tamar keyd is'dheeri) d) Caabiga
2. Waa maxay magaca kale ee loo yaqaan foolteejka?
3. Sheeg xeerka ohm
4. Buuxi, Halbeegyada iyo calaamada. Xadiyado sal leh ee shaxda hoose ku qoran.

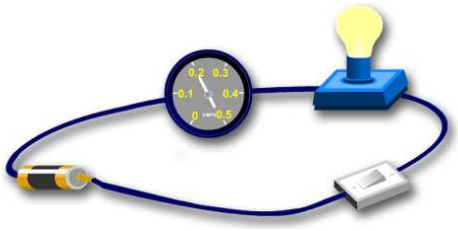
| Tiro | Xaddi Saleedka | Sumada | Calaamada Halbeega |
|---|---|---|---|
| 1 | Qulqulka danabka | | |
| 2 | Tamar keyd isdheerida | | |
| 3 | Caabiga | | |
| | | | |

## 5.4 Cabbirida, Qulqulka Danabka, Tamar Keydisdheerida, Iyo Caabiga

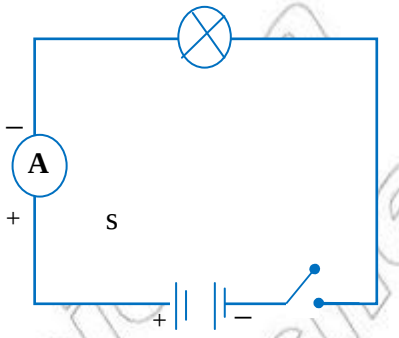
Waxaad ogsoontahay in xadiyada danabeed ay ugu muhiimsan yihiin qulqulka, Tamarkeyd isdheerida, iyo caabigu. Hadaba Waad cabbiri kartaa xadiyadan adigoo mareegta danabka u adeegsanaya qalabyo kala duwan.

## Cabbir qulqulka danabka adigoo ku cabbiraya (Ammeter) (qalabka lagu cabbir qulqulka)

Qulqulka danabka ee mareegta Waxaa lagu cabbiraa qalabka loo yaqaano: (Ammeter).



b) Shaxanka mareegta dul ahaan




t) Shaxanka calaamada Mareegta

*Jaantuska 5.13 Kuxidhida (Ammeterka)*

Adigoo isticmaalaya (Ammeterka)

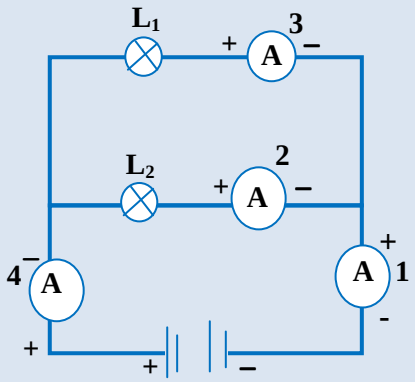
- Isugu xidh sitaxane ah caabiga ama Sida ka muuqata Jaantuska 5.13.
- Waligaa ha isugu xidhin si is waydaar ah cidhifyada baytariga adigoon haysan ugu yaraan caabi (ceeliyaha danabka) oo u xidhan si taxane ah.
- Ha isugu xidhin caabiyada si bar- baro ah.

### Hawlgalka 5.5

***Cabbirida qulqulka danabka mereeg u xidhan si bar-baro ah (Jaan 5.14)***

***Qalabka loo baahanyahay:- Ammeter, 2 guluub iyo 6v oo baytiri ah .***

1. **Ku xidh ammeterka meesha (1), si aad u cabbirtid qulqulka ka imanaya baytariga.**
2. **Ku xidh ammeterka si, aad cabbirtid qulqulka qeyb kasta (meela ha (2) iyo (3)).**
3. **Maxaad kugabagabeyn lahayd qulqulka meelaha (1), (2) iyo (3)**
4. **Qeyb tee baa mareegtan bar-barada ah leh qulqulka ugu badan? Sabab?**




*Jaantuska 5.14 Cabbirka qulqulka mareeqta bar - barada*

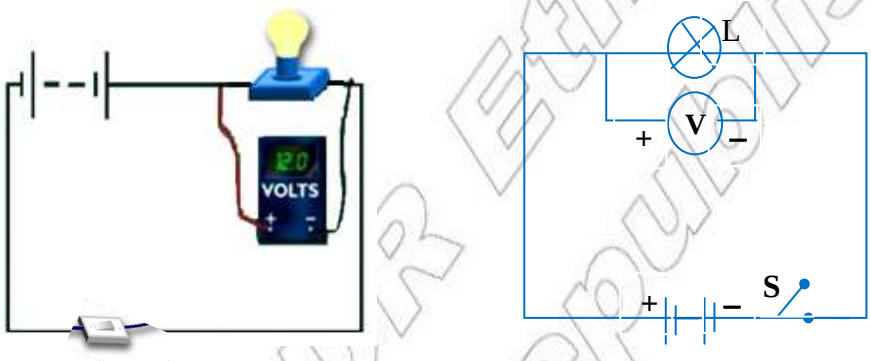
**Wadarta qulqulada ee mareegta Barbarada ahi waxay lamid tahay qulqulka ka imanaya baytariga.**

## Cabbirada Tamar Keyd isdheerida oo lagu cabbirayo (Voltmeter) (Tamarkeyd cabbire).

Tamarkeyd is dheerida ka gudbaysa laba barood oo kasta oo mareegta ka mid.ah Waxaa lagu cabbiraa qalabka loo yaqaano (Voltmeter) (Tamar keyd cabbire).

Adigoo isticmaalaya voltmeter:

- Isugu xidh si bar-baro ah caabiyda si aad u cabbirto Tamar keyd isdheerida ka gudbeysa caabiga.
- Isugu xidh sibar –baro, baytariga ama unug kuwaas oo aad dooneysid inaad tamar keyd isdheeri diisa cabbirtid. Sida ka muuqata Jaantuska 5.15.
- Waligaa ha isugu xidhin si taxane'ah ilaha caabiyada ama Tamarkeydisdheerida.



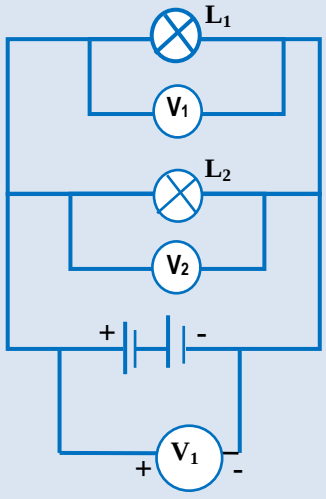

b) Shaxanka ka mareegta dul, ahaan. t) Shaxanka mareegta calaamada ahaan

*Jaantuska 5.14 Isku xidhka voltmeterka*

### Hawlgalka 5.6 Cabbirida tamar keyd isdheerida mareegta bar-barada ah sida ka muuqadata (Jan 5.16)

***Qalabka loo baahan yahay:-*** **fooltimitir, 2 Guluub iyo 6V oo baytairi ah.**

1. **Isuguxidh fooltimitirka iyo baytariga si, gudub, ah, kadibna diwaanga liakhrintiisa.**
2. **Isuguxidh, fooltimitirka iyo guluub kasta si gudub, ah ee mareegta bar-barada ah kadibna, kala sooc, diwaan galinta akhrintooda.**
3. **Isbar-bardhig Tamar keydisdheerida ka gudbaysa guluub kasta.**



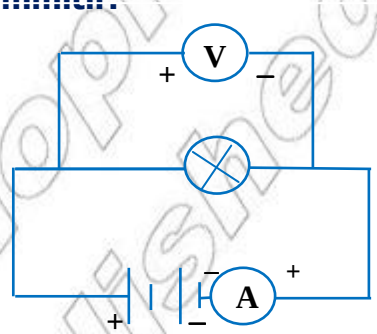

*Jaantuska 5.16 Cabbirada Tamar keydisdheerida ee mareegta bar-barada ah*

Tamarkeyd isdheerida kagudbaysa guluubka oo kamida mareegta bar- barada ahi waa iskumid.

Foltimitir, iyo ammitir waa kuwa loo adeegsado saameynta birlab danabeedka qulqulka danab. Marka la isticmaa layo qalabkan, waa in cidhifkooda toganaha ah (+) lagu xidhaa cidhifka tabanha ah ee isha mootiyaha xooga danabka. Sidoo kale cidhifyadooda tabanaha ah (-), la gu xidhaa cidhifyada tabanaha ah (-) ee isha mootiyaha xooga danabka. Sida ka muusqata Jaantuska 5.13 iyo Jan 5.15

## Cabbirada caabiga iyadoo lagu cabbirayo Fooltimitir iyo ammitir.

Caabiga guluub waxaa la cabbiri karaa iyadoo la isticmaalayo iskudarka Foltmitir ammitir iyo xeerka ohom. Xeerka ohom Waad ku cabiri kartaa. Caabiga guluubka. (Fiiri:- Jaan 5.17)




*Jaantuska 5.17. Cabbirida Caabiga guluubka*

**Hawlgalka 5.7**

***Cabbirida Caabiga guluubka***

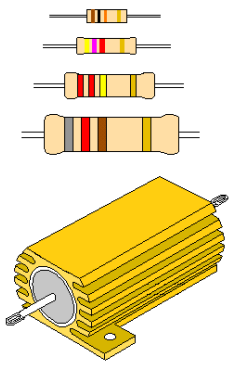
***Qalabka loo baahanyahay:*** **guluubyo kaladuwan ammittir, Foltimitir, 6V baytari; xadhkaha oo iskuxidhan.**

***Habka laraacayo:***

1. **Iskuxidh ammitirka, fooltimitir, guluubka, baytariga iyo xadhkaha isku xidhan sida ka muuqada. (Jantuska 5.17)**
2. **Cabbir qulqulka mareegta oo diwaan gali akhriskiisa.**
3. **Cabbir tamar keyd is dheerida ka gudbaysa guluubka adigoo isticmaalaya Fooltimitrika oo diwaan gali akhriskiisa.**
4. **Xisaabi saamiga tamar isdheerida iyo qul qulka danab, adigoo isticmaalaya xeerka ohom.**

Saamiga tamar isdheerida iyo qulqulka danab ee guluubku wuxuu ina siinayaa caabiga guluubka xaasawda. Guluubyada kala duwani waxay leeyihiin caabiyo kala duwan.

Caabiyadu waa qalab danabeed ka sameysan caabiye qulqulka danabka. Hadaba waxaa Jira caabiyo fara badan oo danab caabiyaal ah, Tusaale ahaan raadiyawga, tilifishinka. Badanaa caabiyadu waxay ka sameysan yihiin xadhig danabeed leh dherer. (Fiiri, Jaantuska: 5.18).



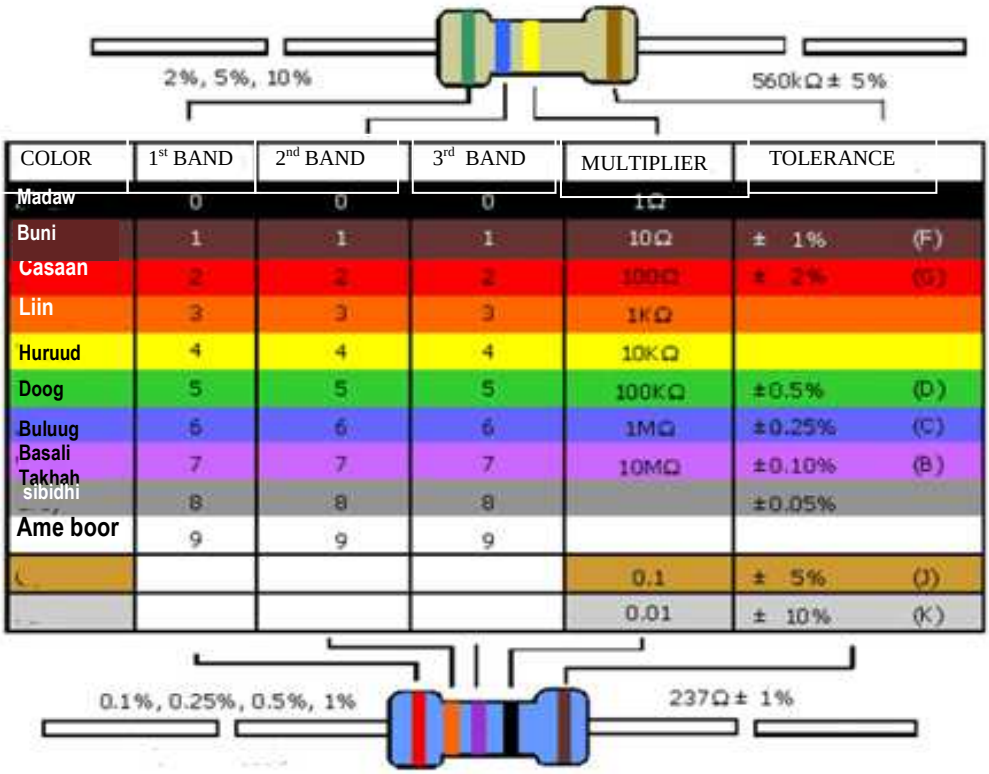
*Jaantuska 5.18. caabiyada*

## Midab ku calaamadaynta caabiyada

Midabada lagu calaamadiyo caabiyada qiimaha caabiga wakhtigyada qaarkood, waxa loo isticmaalaa inuu ina tusiyo. Calaamad midab sida ka muugata (Jaantuska 5.19) Kaas oo in a tusaya midabada calaamadaha ah ee lagu calaamadiyey, caabiga.

Qiimaha caabinta caabiga waxaa la inagu siiyey xaga sare Jaantuska 5.19, Waxaana lagu xisaabiyey, sidan:-

Cagaarku waa 5, buluugu Waa 6, huruudu waa 10kΩ, sidaas darted caabinta caabigu Waa 560kΩ (560,000Ω). Sidaas silamidah, Waxaad radisaa caabinta caabiyaha ee la inagu siiyey shaxdan hoose.

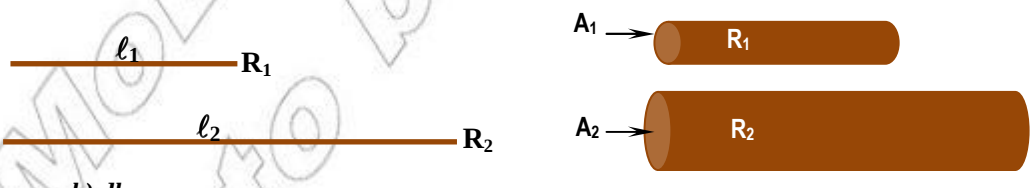



| COLOR | 1st BAND | 2nd BAND | 3rd BAND | MULTIPLIER | TOLERANCE | |
|---|---|---|---|---|---|---|
| Madaw | 0 | 0 | 0 | 1Ω | | |
| Buni | 1 | 1 | 1 | 10Ω | ± 1% | (F) |
| Casaan | 2 | 2 | 2 | 100Ω | ± 2% | (G) |
| Liin | 3 | 3 | 3 | 1KΩ | | |
| Huruud | 4 | 4 | 4 | 10KΩ | | |
| Doog | 5 | 5 | 5 | 100KΩ | ±0.5% | (D) |
| Buluug | 6 | 6 | 6 | 1MΩ | ±0.25% | (C) |
| Basali | 7 | 7 | 7 | 10MΩ | ±0.10% | (B) |
| Takhah sibidhi | 8 | 8 | 8 | | ±0.05% | |
| Ame boor | 9 | 9 | 9 | | | |
| | | | | 0.1 | ± 5% | (J) |
| | | | | 0.01 | ± 10% | (K) |

*Jaantuska 5.19 Midabku calaamadeynta caabiyada*

## Xaddiyada saameynta ku leh caabiga Gudbiyeyaasha

Caabiga gadbiyuhu wuxuu ku xidhan yahay walaxda Asalkeeda (waxay, ka Samaysan tahay), dhererka iyo Bedkeeda (Bedka uu kagudbayo). Marka heerkulku Madoorsoome yahay. Xaddiyadan soo socdaa waxay Saamayn ku leeyihiin caabiga Gudbiyaha




*b) dherer* *t) Bedka - gudbiyaha*

*Jaantuska 5.20 Xaddiyada Saameynta kuleh caabiga*

i) **dhererka: Caabiga gudbiyuhu Wuxuu Saamigal quman Ku yahay dhererka Gudbiyaha (xadhiga Dabka). Tani waxay tahay haddii la dheereeyo xadhiga caabigu wuu badan, haddii xadhiga la gaabiyana, caabigu wuu yaraan Asagoo Ku xidhan walaxda lagu Siiyey iyo Bedka Dusha uu ka gudbayo.**

Xidhiidhkan waxaa la sharixi Karaa ayadoo la isticmaalayo isku – dhaca elektaroonada xorta ah ee Gudbiyaha dhexdiisa.

Marka dhererka gudbiyahu kordhoba, Tirada isku dhaca kaas oo ay Sameeyaan elektaroona ku safraya Gudbiyaha dhexdiisu sidoo kale way kordhaan. Haddaba, qulqulku aayar ayuu socdaa xadhkaha danabka ee dhaadheer dhexdooda. Kuwa gaagaabana Ama xadhkaha Dabka ee Gaagaabana gudubku wuu Degdegaa (jaantuska 5.20 (b))

ii) ***Bedka- Dusha Gudbiyaha: caabiga Gudbiye wuxuu Saamigal rogaal ah ku yahay Bedkiisa: sida:- Bedka Dusha Gudbiyuhu waxay ina tustaa Dhumucda Gudbiyaha. Xadhiga Dabku haddii uu dhumuc weyn yahay Bedka- Dushiisu way balaadhantahay. Haddii Bedka Dusha Gudbiyuhu yaraato caabiga xadhiga Gudbiyaha ahi wuu kordhaa. Caabiga xadhiga Gudbiyaha ahi wuu yaraadaa marka Bedka – Dusha Gudbiyuhu korodho ( Jaantuska: 5.20 (t))***

Waxaad Barbar – dhigi kartaa xidhiidhkan ka xadhid – Danabeedka Bani – aadamka ee aad ku soo baratay geybta 5.1

Guryaheena xadhkaha Dabka ee Buuran Ama dhumucda leh waxaa loo isticmaalaa Dhalaalinta Biraha Danabka iyo makiinadaha Alxanka. Halka xadhkaha Dabka ee dhuudhuuban looga isticmaalo Guluubyada Korontada, Raadiyowga Ama idaacada, telefishanka, Bahalaha Moobaylada lagu dabeeyo iwm.

iii) ***Waxaay ka Sameysan yihiin walxaha Gudbiyeyaasha ahi: waxay ka Samaysan yihiin Wuxu Go'aamiyaa Ama saamayn ku leeyahay caabiga Gudbiyaha: sida Walxo Gudbintoodu kala duwan tahay waxay leeyihiin Awood kala duwan oo ay ku gudbiyaan qulqulada korontada.***

**iv)Heerkulka: Caabiga gudbiyuhu Wuxuu ku xidhan yahay heerkulkiisa. Marka heerkulka gudbiyuhu Kordhoba, caabigiisu wuu kordhaa, in kastoo xeerkii ohm uu ogolaa inay run ku tahay walxaha heerkulkoodu aanu isbedelin.**

## Hubinta ( xaqiijinta) 5.4

1. **Qeex sida loogu xidho Amitirka (qulqul cabire)iyo fooltmitir ( Tamar keyd – isdheeri cabbire) mareegta?**
2. **Sawir jaantuska mareegta Adigoo isticmaalaya Summadaha amitirka iyo fooltimitirka.**
3. **Sharax sidaa aad ugu cabbiri Karto caabiga Amitir iyoo fooltmitir.**
4. **Qeex midab ku astaynta caabiyada.**
5. **Waa maxay xaddiya Ama waxyaalaha Saameynta ku leh caabiga gudbiyaha.**

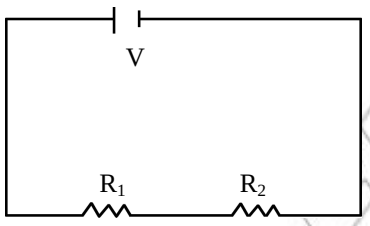
## 5.5 Qaaciidooyinka Lagu Xisaabiyo Isugeynta Caabiyada Ee Taxanaha Iyo Barbarada Ah

**Hawlgalka 5.8**

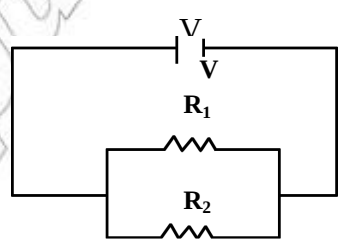
- **Sharax waxa ay la micno tahay Guluubyo isugu xidhan sitaxane iyo Barbaro ah?**
- **Sidee ayuu Guluubka Iftiinka ee Gurigiinu u xidhan yahay?**
- **Miyaad shidi kartaa Ama Bakhtiin karaa Guluubyada Gurigiina oo dhan adigoo isticmaalaya hal Fure oo kaliya? Sharax side.**

Caabiyada Danabka Guryaheena intooda badani waa maxsuulka hab mareego oo laysu geeyey. Xeerka ohm wuxuu isticmaalaa si uu u helo qulqulka mareegta Ama qeyb ka mid ah mareegta. Marka gudbiyeyaasha laysku xidho si ay u sameeyaan Mareeg, Waxa laga yaabaa in dhammaantood ay isu xidhan yihiin sida:- silsilada sida ka Muuqata ( jaantuska 5.21 (b)) Ama waxa laga yaabaa in qaar isugu xidhan yihiin Barbaro sida ka muuqata ( jaantuska 5.21 (t)). Sida ay u habaysan yihiin qeybaha Mareegtu waxay saameyn ku leedahay socodku qulqulka ee dhexmaraya mareegta. Aasaas ahaan waxaa jira laba nooc oo Mareegood. Waxayna yihiin Mareegta taxan iyo Mareegta Barbarada ah.

- Jaantuska 5.21 (b) caabiyada $R_1$ iyo $R_2$ waxay isugu xidhan yihiin si taxane ah.
- Jaantuska 5.21 (t) caabiyada $R_1$ iyo $R_2$ waxay isugu xidhan yihiin Barbaro.




**b) Isu kidhnaanta Taxaanaha ah ee $R_1$ iyo $R_2$**




**t) isu xidhnaanta Barbarada ahee $R_1$ iyo $R_2$**

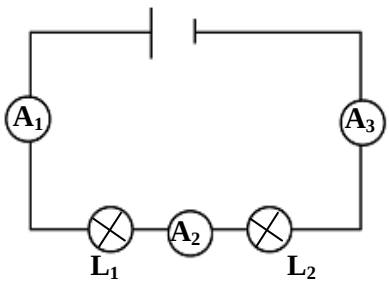
*Jaantuska 5.21 Isku – xidhida caabiyada*

### Caabiyada Mareegta taxanaha ah

Mareegta aan lahayn wax qeybo ah waxaa la dhahaa Mareegta taxanaha ah. Caabiyada midba midka kale ayuu ku daba xidhan yahay.

Marka caabiyadu isugu xidhan yihiin si taxane ah, qulqulku wuxuu u dhexmaraa caabiga mid-mid.
Jaantuska 5.22 wuxuu ina tusayaa laba Guluub oo isugu xidhan si taxane ah.

Qulqulka dhexmaraya caabikastaa waa isku mid mareegta taxanaha ah. Taas macnaheedu waa jaantuska 5.22 amitirada $A_1$, $A_2$ iyo $A_3$ waxay sheegayaan qulqul isku mid ah.




*Jaanstuska 5.22 Qqulqulka mareegta taxanaha ahi waa isku mid.*

## Hawlgalka 5.9

**Si loo tuso in qulqulka mareegta taxanaha ahi isku mid yahay:-**

**Qalabka loo baahan yahay: 2 toosh mitir, Amitir, laba guluub oo Kuwaa ilayska ah, xadhig isku xidha iyo laba baytari ama dhagax (1.5v midkastaa).**

***Jidka la marayo:*** **1. Isku – xidh Guluubyada iyo fooltmitirka sida ka muuqata shaxan ka 5.23**

2. **Ayadoo la dhigayo amitirka meelo kala duwan (sida b, t iyo j) qaado qiimayaasha qulqulada.**
3. **Qaado qiimayaasha foolteyjka ee u kala gudbaya Guluubka $L_1$ iyo Guluubka $L_2$ ee (jaantuska 5.23).**

**- Qiimaha qulqulku ma isku midbaa? Mise wuu kala duwan yahy?**

**- isbarbar – dhig tamar – keydisdheerida ka gudbaysa foolteyjka Guluub kasta iyo wadarta foolteyja.**

Haddii aad u samaysid hawlgalka 5.9 si sax ah. Dabadeed waxaad heli doontaa maxsuulada soo socda ee muhiimka ah.

1. Qulqulka maraya caabi kasta ama guluub kastaa ee mareeg taxane ahi waa isku mid sida:$I_1 = I_2 = I$
2. Mareegta taxanaha ah wadarta foolteyjyada ee maraya caabiye kastaa waxay la mid yihiin wadarta foolteyjka sida:$V= V_1 + V_2$

Inagoo ku saleyneyna labada isie'eg ee xagga sare iyo qeexida caabiga ee xeerka oom, waad xisaabin (Raadi) kartaa caabiga isu – dhiganka ee isu – taga caabiyada taxanaha ah.

Maadaama $V = V_1 + V_2$ iyo $R_1 = \frac{V}{I}$

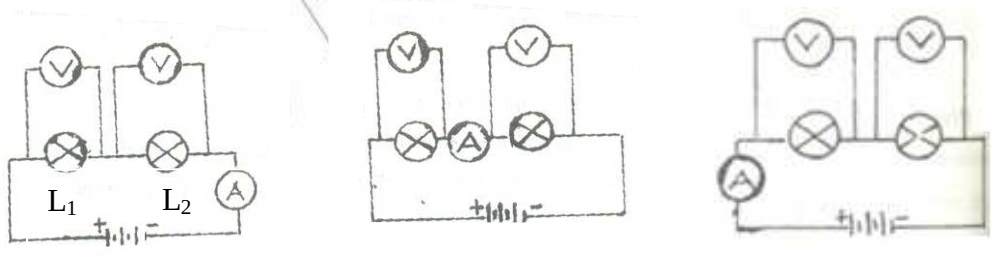
Dabadeed $V_1 = R_1 I$ iyo $V_2 = R_2 I$

$V = R_1 I + R_2 I$

$= I(R_1 + R_2)$

$\Rightarrow IRt = I(R_1 + R_2)$

$$R_t = R_1 + R_2$$




(a) (b) (c)

*Jaantuska 5.23 Cabbirida qulqulka danabka ee mareegta taxanaha ah*

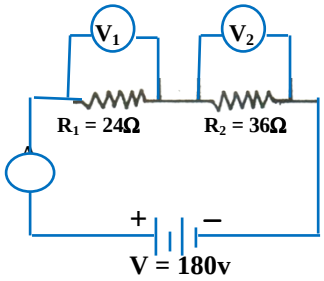
Mareegta taxanaha ah, wadarta caabigu (isu – dhiganka caabigu) waxuu la mid yahay wadarta caabiyada caabi kasta tani macnaheedu waa, laba caabiye waxaa lagu bedeli karaa hal caabi isu – dhigan.

## Tusaalaha laga shaqeeyey ee 5.3

1. laba caabi oo awoodood tahay 6Ω ayaa midkasta waxaa si taxane ah loogu xidhay baytari kaasoo soo saara 36V mareegtan Raadi
   b) Wadarta caabiga
   t) Qulqulka maraya mareegta

| Siin | Waydiin | FurFuris |
|---|---|---|
| $R_1 = R_2 = 6\Omega$<br>$V = 36V$ | b) $R_t = ?$<br>t) $I = ?$ | b) mareegta taxanaha ah, $R_t = R_1 + R_2$,<br>$\Rightarrow R_t = (6+6)\Omega = 12\Omega$<br>$\therefore$ sidaas darted isu – dhiganka caabigu waa12Ω<br>t) Markaan ueegno xeerka oom<br>$I = 3A$<br>$\therefore$ Sidaas darted qulqulka dhexmaraya mareegtu waa 3A |

2. Jaantuska mareegta ee ka muuqata shaxanka 5.24 Raaeli;




1. Wadarta caabiga
2. Amitirku waxa uu sheegayo
3. Fooltmitirku wuxuu sheegayo

*Jaantuska 5.2; Caabiyo xidhan si taxane ah.*

Jaantuska5.24 waxaan ku aragnaa in $R_1=24\Omega$, $R_2= 36V$ iyo $V=180V$ ay yihiin taxane hadaba

b) Wadarta caabigu waa $R_t = R_1+R_2 = 24\Omega + 36\Omega = 60\Omega$

t) Amitirku wuxuu sheegayaa in qulqulku uu la mid yahay qulqulka I ee dhexmaraya

$$\text{mareegt } I = \frac{V}{R} = \frac{180V}{60\Omega} = 3A$$

j) Fooltmitirka ka gudbaya $R_1$ wuxuu la mid yahay $V_1=IR_1= (3A)(24\Omega)=72V$

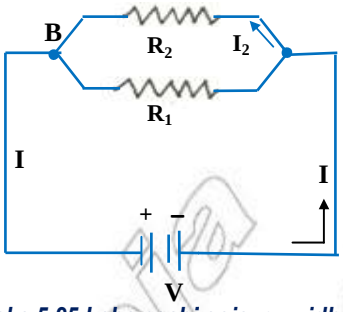
$V_2=I_2R_2=(3A)(36\Omega)=108V$

## Caabiyada Mareegta Barbarada ah

**Mareegta taasoo u kala qaybsan laba ama in ka badan oo qeybood waxaa la dhahaa mareeg barbaro ah, tusaale ahaan laba caabiye waxaa la dhahaa waxay isugu xidhan yihiin Barbaro marka ay isu garab yaalaan dhinac dhinac ee labadooda dhinac ee isu – beeganina ay isu xidhan yihiin.**

**Jaantuska 5.25 wuxuu ina tusayaa laba caabi oo isugu xidhan Barbaro**

Shaxanka 5.25 wadarta qulqulka (I) waxay u qeybsantaa $I_1$ iyo $I_2$ bar kulanka A. iyo $I_1$ iyo I2 waxay isaga xidhmaan barta B si ay inoo siiyaan mar labaad wadarta qulqulka taasoo ah $I = I_1+1_2$



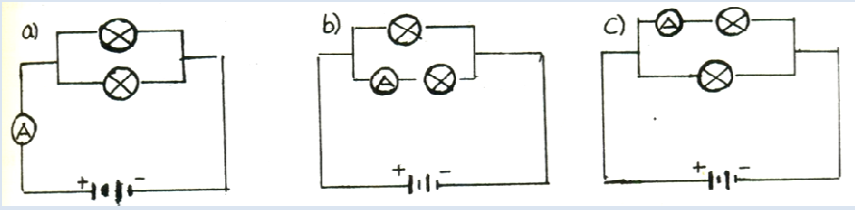

*Jaantuska 5.25 Laba caabi ooisugu xidhan barbaro*

## Hawlgalka 5.10 Si loo cabbiro qulqulka qeybkasta oo ka mid ah qeybaha caabiga barbarada ah

***Qalabka loo baaha yahay:*** laba unug oo 1.5V ah, xadhig isu xidha, laba Guluubyada la shito ah iyo Amitir.

***Jidka la Raacayo:***

1. Isugu xidh Guluubyada si Barbaro ah
2. Qor waxa uu sheegayo Amitirku (qalabka lagu cabiro qulqulka) meelaha kala duwan sida ka muuqata. Jaantuska 5.26
3. Isbarbar – dhig wadar qulqulka iyo wadarta qulqulada dhexmaraya labada Guluub miyey la mid tahay wadarta Guud ee qulqulka?



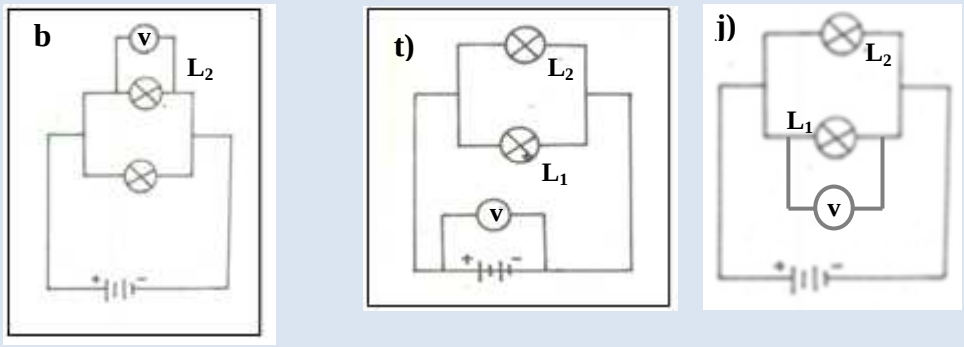

*Jaantuska 5.26 Cabbirida qulqulka mareegta Barbarada ah*

## Hawlgalka 5.11 si loo cabbiro Foolteyjka ka gudbaya caabi kaste

***Qalabka loo baahan yahay:*** laba unug oo ah 1.5V midkiiba, xaalhkaha Dabka oo isku – xidha labad Guluub ee ilayska iyo fooltmitir.

***Jidka la marayo:*** 1. Isugu xidh guluubyada si barbaro ah.

2. Dhig fooltmitirka meelkasta oo caabi ah mareeg kasta sida ka muuqata jaantuska 5.27
3. Qor waxa uu sheegayo fooltmitirku dabadeedna Barbar dhig foolteyjka guud ee unugyada.
   - Ma isku midbaa foolteyjka maraya caabi kasta?
   - Foolteyjka maraya caabi kastaa ma la midbaa, wadarta Guud ee foolteyjka unugyada?




*Jaantuska 5.27 Cabbirida foolteyjka mareegta barbarada ah*

Haddii hawlgalka 5.10 iyo 5.11 loo qabto si sax ah, dabadeed waxaad heli doontaa maxsuuladan soo socda.

1. Wadarta qulqulada dhex maraya labada Guluub waxay la mid tahay wadarta guud ee qulqulka, taasi waa $I= I_1+I_2$
2. Foolteyjka ka gudbaya guluub kastaa wuxuu la mid yahay foolteyjka guud ee la siinayo, taasi waa
   $V = V_1=V_2$
3. Adigoo isticmaalaya xeerka ohm iyo isle' egyada sare waxaad heli kartaa xidhiidhka muhiimka ah ee ku saabsan wadaarta Guud ee caabiga laba caabiye oo isugu xidhan Barbaro.

Haddii $I = I_1 + I_2$ iyo $I = \frac{V}{R_t}$ (xeerka oom)

Halka $I_1 = \frac{V_1}{R_1}$ iyo $I_2 = \frac{V_2}{R_2}$ dabadeed;

$\Rightarrow I = \frac{V}{R_t} = \frac{V_1}{R_1} + \frac{V_2}{R_2}$ laakiin $V_1=V_2=V$

Hadaba $\frac{V}{R_t} = V\left(\frac{1}{R_1}+\frac{1}{R_2}\right)$

Ama $\boxed{\frac{1}{R_t} = \frac{1}{R_1}+\frac{1}{R_2}}$

Wadarta caabiga labada caabiye ee $R_1$ iyo $R_2$ ee isugu xidhan Barbaradu wey ka yar yihiin ta caabiya caabi kasta. Isugu xidhida laysugu xidho caabiyada Barbaro waxay yaraysaa caabi isudhiganka waxayan kordhisaa wadarta qulqulka, isticmaal qaababkan la fududeeyey ee soo socda si aad u hesho caabi isudhiganka $R_t$

$$R_t = \frac{R_1R_2}{R_1+R_2}$$

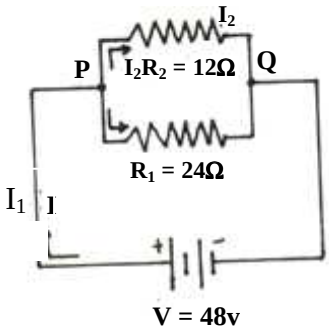
Qaaciidadani kaliya waxaa lagaga shaqeyn karaa kaliya caabiyada barbarada ah waxaanad isticmaali kartaa hab – xisaabeed ka isu geynta jajabyada si loo helo qiimaha $R_t$.

## Tusaalaha laga shaqeeyey ee 5.4

1. Laba caabi oo caabigoodu kala yahay 9Ω iyo 18Ω ayaa laysugu xidhay Barbaro ayadoo la dhexmarinayo qeybiye 24V ah. Mareegtan Raadi.
   b) Wadarta caabiga  t) wadarta qulqulka

| Siin | Waydiin | Furfuris |
|---|---|---|
| $R_1$= 9Ω<br>$R_2$ = 18Ω<br>V= 24V | a) $R_t$ = ?<br>b) I = ? | b) Anagoo adeegsaneyn a isleegta sare<br>$\frac{1}{R_t} = \frac{1}{R_1} + \frac{1}{R_2} = \frac{1}{9\Omega} + \frac{1}{18\Omega}$<br>$R_t = \frac{9\Omega \times 18\Omega}{9\Omega + 18\Omega} = \frac{162\Omega^2}{27\Omega} = 6\Omega$<br>∴ $R_t$ = 6Ω<br>t) xeerka ohm ee sare waxaan ku heysanaa.<br>$I = \frac{V}{R} = \frac{24v}{6\Omega} = 4A$<br>Taasi waxaa weeyi ; I = 4A |

2. laba caabi oo caabigoodu kala yahay 12Ω iyo 24Ω ayaa laysugu xidhay si barbaro ah baytari (dhagax) awoodiisu tahay 48V. (fiiri jaantuska 5.28). mareegtan Raadi.
   b) Caabiga guud
   t) Qulqulka Guud
   j) qulqulada $I_1$, $I_2$ iyo I.
   x) isbarbar dhig wadarta $I_1$ iyo $I_2$ ta I



*Jaantuska 5.28 Caabiyada Barbarada ah.*

| Siin | Waydiin |
|---|---|
| $R_1$= 9Ω<br>$R_2$= 12Ω<br>V = 48V | a) $R_t$ =?<br>b) I = ?<br>c) $I_1$ = ?, $I_2$ = ?<br>d) I = $I_1$ + $I_2$ =? |

**Furfuris**

b) Caabi isudhiganka isu geynta barbarada ahi waa

$\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2}$ Hadaba, $\frac{1}{R} = \frac{1}{12\Omega} + \frac{1}{24\Omega}$

$\frac{1}{R} = \frac{2+1}{24\Omega} = \frac{3}{24\Omega} = \frac{1}{8\Omega}$

$$\frac{1}{R} = \frac{1}{8\Omega}$$

∴ sidaadarted caabi isudhiganku waa $R = 8\Omega$

t) Anagoo isticmaalayna xeerka ohm, $I = \frac{V}{R_t}$

$$I = \frac{48V}{8\Omega} = 6A$$

$$I = 6A$$

j) Caabiyada isugu xidhan Barbarada

$$V_1 = V_2 = V$$

Haddaba $I_1 = \frac{V}{R_1} = \frac{48V}{24\Omega} = 2A$

$$I_2 = \frac{V}{R_2} = \frac{48V}{12\Omega} = 4A$$

x) $I = I_1 + I_2 = 2A + 4A = 6A$

Qulqulka guud waa (I = 6A) wadart qulqulada caabi kasta

## Tamarta Iyo Awooda Mareegta Danabka

Caabiyo danab ama koronto oo farabadan guryaheena waxaan u isticmaalaa in aan ugu badalno tamarta danabka qaab tamaro kale. Tusaale ahaan tooshka waxaa loo isticmaalaa in uu tamarta danabka u badalo ilays, kuleyliyeyaasha danabku, tamarta danabka ayey u badalaan kul xaddi ama qiyaasta tamarta ah ee laga soo qaato caabiyada danabku waxay ku xidhan yihiin muddada la isticmaalayey intay le'eg tahay. Hadaba, waxaa la doorbiday in laga hadlo qiyaasta tamarta ah ee gudbaysa sekenkiiba. Tamarta gudbaysa seken kiiba (ilbiriqsigii) waxaa loo yaqaanaa awood.

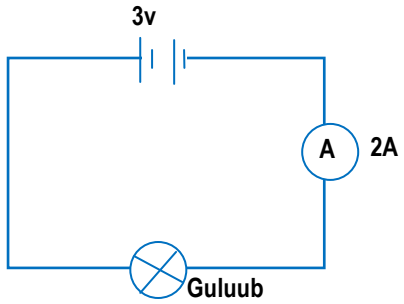
$$\text{Awood} = \frac{\text{Tamarta Gudubtay}}{\text{waqtiga ay kuqaadatay}}$$

$$P = \frac{E}{t},\ E = Pt$$

### Su'aal furan

**Awooda danabku miyey ku xidhan tahay fooltayjka iyo qulqulka?**

Ka fikir Baytari awoodiisu tahay 3V oo lagu xidhay Guluub sida ka muuqata jaantuska 5.29 qulqulka mareegta dhexmarayaa waa 2A. tan macnaheedu waa 2 kuulam danab ah ayaa dhexmaraya guluubka ilbiriqsigiiba (sekenkiiba). Hadda foolteyjku (Tamerkeyd isdheeridu) waa 3V. tan macnaheedu waa in halkii kuulamba uu gudbinayo 3J sida ay ku dhexmarayso guluubka.




*Jaantuska 5.29 Awoodu waxay ku xidhan tahay toolteyjka iyo qulqulka*

Maadaama 1V uu la mid yahay tamarta loo isticmaalay si loo dhaqaajiyo 1c oo danab ah oo isaga gudb aya cidhifyada.

Haddii ay jiraan ilbiriqsigiiba 2c, oo kuulam kastaa Gudbinayo 3J, imisa juul ayaa Gudbi Ilbiriqsi kasta?
Jawaabtu waa 6J/s, sidoo kale Awoodu waa 6J/s ama 6w.
Halbeega awooda danab (korontadu) waa watt una taagan w halka 1W = 1J/s.
Awooda danabku waa taranta foolteyjka iyo qulqulka

$$P = IV$$

Adigoo isticmaalaya xeerka ohm V = IR, halka P aan u qori karo R ahaan, V, iyo I .

$$P = I^2R \text{ Halka } (V = IR)$$

$$P = \frac{V^2}{R} \text{ where } (I = \frac{V}{R})$$

## Tusaalaha ka shaqeysan ee 5.5

1. Guluub ay aa isticmaalay 1,500j oo tamar ah 25 Ilbiriqsi (seken) waa imisa awoodu?

| Siin | Waydiin | Furfuris |
|---|---|---|
| E = 1500J | P = ? | $P = \frac{E}{t}$ |
| t= 25second | | $P = \frac{1500J}{25s} = 60W$ |

sidaa darted awooda guluubku waa P = 60 W

2. Guluubka korontada ayaa waxaa ku qornaa 220V, 60W.
   b) maxay yihiin tirooyinkan macnahoodu?
   t) waa maxay qulqulka danabka ee uu soo saarayaa guluubku marka lagu xidhiidhiyo 220V?
   j) Waa maxay caabiga xaasawda guluubku?

## Furfuris

b) 220v waa foolteyjka ka gudbayo taasoo guluubk u inuu ku xidhantahay ay tahay, tan macnaheedu waa 220J oo tamar ah ayaa gudbaya markasta oohal – kuulam oo Danab ahi maroba (dhaafoba).
60w waa awooda danabka (korontada). Waxay la micno tahay 60J oo tamarta danabka ah ayaa loo bedeli doonaa ileys ilbiriqsi kasbaba marka lagu xidho qeybiye 220V ah (ame Baytadri).

t) Si loo xisaabiyo Ama raadiyo qulqulka danabka ee guluubka dhexdiisa

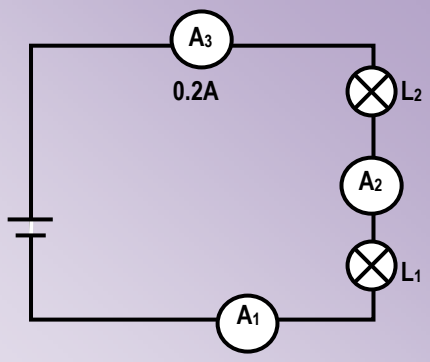
$$P = IV,\ I = P/V = \frac{60W}{220V} \Rightarrow I = 0.27A$$

j) Caabiga guluubka

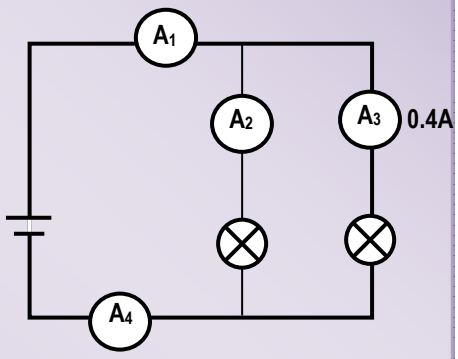
$$P = \frac{V^2}{R} \Rightarrow R = \frac{V^2}{P} = \frac{220V \times 220V}{60W} = 806.6\ \Omega$$

## Hubinta (xaqijinta) 5.5

1. Qor Faa'iidada iyo waxyeelooyinka guluubyada isugu xidhan
   b) si taxane ah  t) si barbaro ah
2. b) ku sawir jaantuska 5.30 Buuggaaga qoraalka, magacowna habka ay isugu xidhan yihiin guluubyadu kana jaw aab su'aalaha t iyo j
   t) Haddii $A_3$ sheegayso 0.2A, maxay sheeegayaan labada Amitir eekale?
   j) Haddii guluubyada midka mid ah laga saaro, sharax waxa ku dhici doona guluubyada kale.
3. Ku sawira jaantuska 5.31 Buuggiina qoraalka, dabadeed ka jawaaba su aalahan soo socda
   b) Magacow habka ay isugu xidhan yihiin guluubyadu.
   t) Haddii guuubyadu ay isku mid yihiin oo $A_3$ ay sheegayso 0.4A, ku tus jaantuskaaga waxa amitirada kale sheegayaan
   j) Haddii Guluubka ku xiga $A_3$ laga saaro, maxaa ku dhici guluubyada kale?
   x) Muxuu akhrin Ama sheegi karaa amitirka $A_4$?
4. Qeex caabiyada iskugu idhan taxanaha iyo barbarada Adigoo sawiraya Jaantuskooda
5. Maxaa ku dhici caabiga labada caabi marka ay isugu xidhan yihiin  b) taxane  t) Barbaro
6. Ku qeex awooda korontada Adigoo u qeexaya qulqul iyo foolteyj ahaan.




*Jaantuska 3.30 Akhrina Ametirka ee mareegta taxanaha ah*




*Jaantuska 5.31 Akhrinta Amitirka mareegta barbarada ah.*

## 5.6 Birlab - Danabow

Xidhiidhka isa soo jiidasho ee ka dhexeeya kornotada danabka iyo birlabta waxaa la yidhaa Birlab danabow qeytan waxaad ku baran doontaa saameynta ay ku leedahay Birlab – danabeedku qulqulka danabka iyo isticmaalkooda. Si kastaba ha abaatee waxaad u baahan tahay inaad nakhtiinto astaamihii birlab danabeedka.

### Hawlgika 5.12

Kala dood su'aalahan saaxiibadaa (nakhtiin fiisigiskii fasalkaagii 7aad ee birlab danabeed)

1. Waa maxay badada birlab danabeedku? Sidee u muujin kartaa badada birlab danabeedka?
2. Sawir, qeexna xariiqyada badada birlab – danabeedka ee ku wareegsan gobolka birlabta ah.
3. Jiheeye waa maxay? Maxaa loo isticmaalaa?

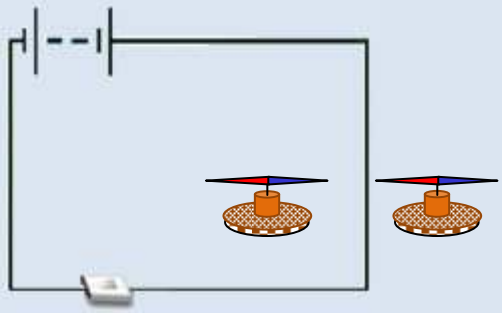
## Saameynta Birlab – danabeedka ee qulqulka

Fisikiskii Fasalki 7aad waxaad ku soo Baratay in qulqulka danabku soo saari karo birlab – danabow. Jidka ugu fudud ee lagu tusi karo saameynta Birlab – danabeedku ku leedahay qulqulka danabku waa in la ag qabto ama dhigo jiheeye meel u dhow qulqulka xadhiga dabku sida. Qabo hawlgalka soo socda.

### Hawlgalka 5.13 Indho indhaynta saamaynta ay birlab danabeedku ku leedahay qulqulka danabka

**Qabo Hawlgal – gacan ka qabad ah, dabadeedna ka jawaab su'aalaha soo socda.**

***Qalabka loo baaha:*** **unug engegan, caabiye, jiheeye, xadhig – dheer oo isku xidha.**



Hamas Oersted

*Jaantuska 5.32 Tijaabada isku xidhida mareegta oersteed*

***Jidadka la marayo:***

1. **Isku – xidh caabiga, furaha iyo unuga engegan si taxane ah, sida jaantuuska 5.23**
2. **Xidh furaha ku hayna jiheeyaha xadhiga dabka hortiisa, Fiifri jihada uu u qalloocsamo jiheeyuhu**
3. **Dabadeed kala badal labada cidhif. Ee uu kaga xidhan yahay baytariga ayadoo aan laga dhaqaajinayn ama lagu xatidayo jiheeyaha xadhiga dabka hoostiisa. Fiiri jihada uu jiheeyuhu u qalloocsamo**
4. **Ku celi talaabooyinka (2) iyo (3) Adigoo dhigaya irbada jiheeyaha meel ka sareysa xadhiga dabkan**
   - **Maxay ku tustay fiir – firintaadii ama indha indhayntaadii?**
   - **Side ayey qulqulka danabku u saameysaa badada birlab – danabeedka ee ku wareegsan sida Jiheeyaha?**
   - **Miyaad ku gabagabeyn in badada Bir lab – danabeedku ay ku wareegsan tahay gudbiyaha qaada qulqulka?**

Hawlgalka 5.13 waxaad ku aragtay in irbada jiheeyuhu ay ka leexatay meesheedii hore marka qulqulka danabka ee dhexmaraya xadhiga – dabka la dul-dhigo ama la hoos dhigo jiheeyaha. Haddaba qulqulka danabku wuxuu soo saaraa badad birlab – danabeed. Raadkan ama saameyntan waxaa markii u horeysay daahfuray saynisyahan dhaj ah oo la odhan jiray Hamasoersted qulqulka danabka ee dhexmaraya Gudbiye wuxuu u yeelaa badad – Birlabdanabeed meelaha ku wareegsan dhacdadan waxaa la yidhaa raadka birlab danabeedka ee qulqulka danabka.

## Su'aal furan

**Miyaad sheegi kartaa waxayaalo kale oo raad ama saameyn ku leh qulqulka danabka?**

## Badada birlab danabeed ee ay sababto qulqulka toosan ee uu qaadayo xadhiga dabku

Qulquulka danabka ee dhexmaraya xadhig dheer oo toosan wuxuu soo saaraa xariiqo birlab – danabeed kuwaasoo kaga wareegsan sallaxyada xagasha quman ee xadhiga dabka.

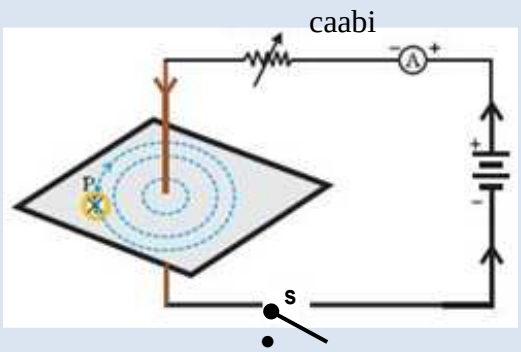
### Hawlgika 5.14

***Si loo fiiriyo jihada badada birlab danabeedka eek u wareegsan qulqulka danabka ee toosan ee uu qaado gudbi yuhu.***

***Qalabka loo baahan yahay:*** **unug engegan, xadhigga dabka oo toosan, caabiye, qurubyo xadiidah, fure ama dare damiye, irbada jiheeyaha iyo kartoon (wargad kartoon).**

***Jidka la marayo:***

1. ***ugu xidh xadhiga dabka si taxane ah caabiga, daare damiyaha iyo baytariga (dhagax) (sida aad ka muuqata jaanguska 5.33 kaga taagan xadhiga toosoan jihada ku qotonta.***




*Jaantuska 5.33*

2. **Dul – dhig warqada kartoonka ah xadhigga – dabka ee toosan dabadeed ku dhaji qotomaha.**
3. **Si fiican ugu daadi qurubyada xadiidka ah warqada kartoonka ah dusheeda. Fiirin siday isu habeeyaan ama u ururaan qurubyada xadiidka ahee warqada kartoonka dul yaala.**
4. **Ka dul-xaadh qurubyada xadiidka ah ee warqada kartoonka ah. Dabadeedna dul – dhig jiheeyaha warqada kartoonka ah. Si aayar ah dhaqaaji warqada kar toonka ah adigoo ku wareejinaya qulqulka xadhiga dabku sido.**
5. **Ku sawir jihada irbada jiheeyaha warqada kartoonka ah dusheeda. Jihada jiheeyuhu wuxuu inoo sheegaa ama inatusaa xariiqyaha badada birhab danabeedka ee ku wareegsan xadhiga dabka ee toosani qulqulka uu sido.**
6. **Isu – bedel xidhitaanka cidhifyada baytariga, dabadeedna ku celi talaabooyinka 4 iyo 5.**

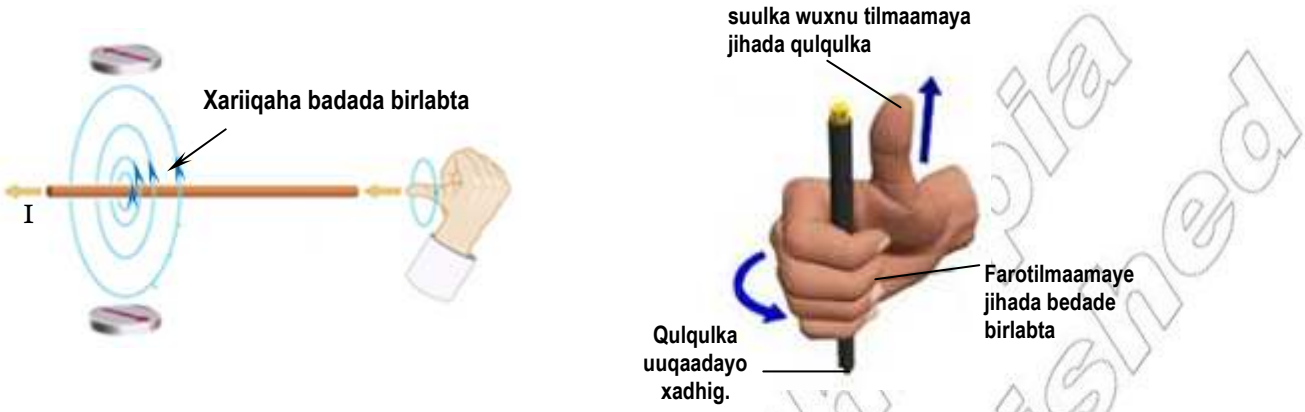
Hawlgalka 5.14 wuxuu ina tusayaa in xariiqyada badada birlab – danabeedka ee ku wareegsan qulqulka uu sido gudbiyaha toosani ay wareegsan yihiin.

Waxaa laga yaabaa in aad aragtay in jihada

## Badada birlabta xariiqahoodu waxay kuxidhan yihiin jihada qulqulka.

Jihada xariiqaha badada birtabta ee qulqulka tooska, ah ee uu qaadayo gudbiyuhu waxaa sifudud loogu Muujin karaa isticmaalka, xeerka suulka midig xeerka suulka midi g ee qulqulka tooska ah ee uu qaado gudbiyuhu.

Wuxuu ururSadaa qulqulka uu qaadayo gudbiyuhu ee suulka gacanta midig wuxuu tilmaamay aa jihada qulqul. Farahaaguna waxay tilmaamayaan jihada xariiqaha taasoo badadu ay ku wareegsan yihiin xadh iga (sida ka mnnqadata jantnska 5.34)

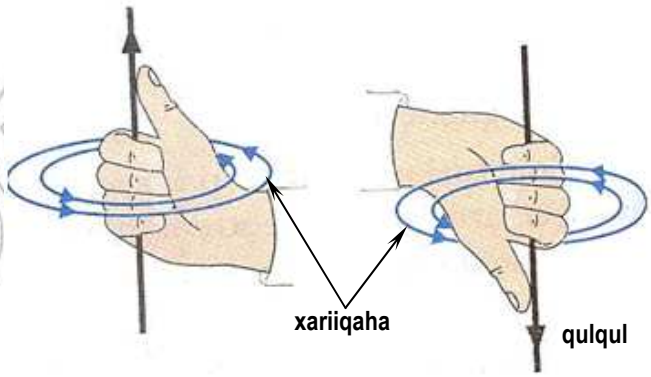



*Jaantuska 5.34 Qaabka shaxanka in a tusaya xeerka suulka midig.*

Adigoo isticmaalaya xeerkan waxaad raadinkartaa

1) Jihada bedada birlabta xariiqahaada, haddii jihada qulqlka la garanayo.
2) Jihada qulqulka, uu soo saaray jihada bedada birlabta xariiqaheeda lagaranayo.

Hada waxaad baadhi xadiga saameeya Laxaadka (xoojinta) bedada Bir labta, ee kuwareegsan qulqulka uu qaadayo gudbiynhu sida Hawlgalka 5.14 waxaad fiirinkartaa qeybta ama meesha ay cufnaanata qurubyada birtu kubadan tahay iyo firidhsanaan. Ma ogsoontahay qurbyada birtu ay kubadan yihiin meelaha xadhiqa udhaw. Taasina waxay in a tusaysaa in bedada birlabta ee udhowa xadhigu ay ka xoog badan tahay bededa birlabta ee ka fog xadhig (jaantuskda 5. 35)




*Jaantnska 5.35 Jihada bedada birlabta xariqaheeda ku wareegsan xadhkaha toosan ee qaadaya qulqulka*

Miyey xoojinta bedadu ku xadhantahay qulqulka haa way ku xidhantahay, haddii aad dib u firisid hawl galka 5.14 ee unugyada tirooyinka kala duwan. Unugyada tirada weyni waxay ku beegantahay qulqulka xoogan.

Ma ogsoontahay in cufnaanta qurubyade birlabtu ee qeyb gaar ah way korodhaa, marka uu qulqulku kordho.

Sidaas darted bedada birlabta ee qulqulkeedu xoogan yahay way ka xoog badan tahay ta qulqulka daciifka ah leh.

**Laxaad bedada birlabta ee qulqulka uu qaadayo xaddigu waxay ku xidhan tahay**

i) **Laxaadka qulqulka danabka**

ii) **Fogaanta uu u jiro xadhiga.**

## Badada ku wareegsan xurbiyaha

Waa maxay xurbiyuhu? Xurbiyuhu waa xadhig duuban, oo leh tiro duuban waa weyn. Waxayna leeyihiin qaabab dhululubo ahaan sida ka muuqata jaantuska 5.36 b) iyo t).

*Jaantuuska 5.36 Tuska i- xurbiye*

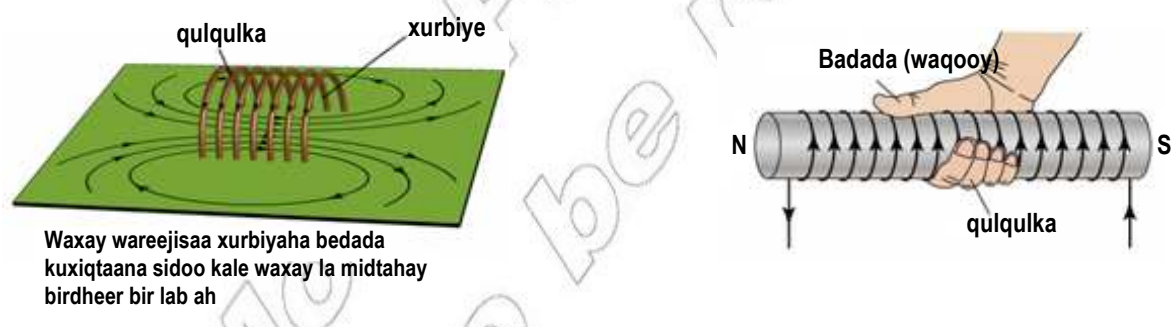
**Xoojinta bedad bir lab danabeed qulqulka uu qaadayo xurbiyuhu waxay kuxidhan tahay**

i) **Tirada duubabka**

ii) **Laxaadka qulqulka dhexmaraya xurbiyaha**

iii) **Nooca xudunta qalabka ku dhex jira xurbiyaha.**

Bedada birlabta ee gudaha xurbiyaha ay udhaw dahay iney iskumidnoqoto, laxaad badada birlabta ee kuwareegsan qulqulka uu qaadayo xurbiyuhu wuu kordhayaa marka ay xurbiyaha birxadiidahi badhtanka u taalo,




*Jaantuska 5.37 Xariiqde badede birlabta ee xurbiyaha.*

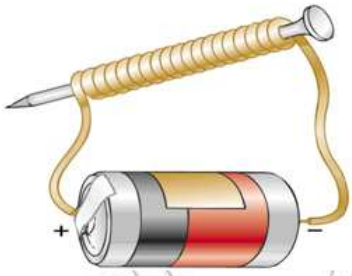
Sida ka muuqata jaantuska 5.37 badada birlab xariiqaha duub kasta oo xadhig ka midahi way iscaawiyaan, xurbiyaha dhexdiisa sidaas darteed. Bedada birlabta ee xur biyuhu way ka xoog badan tahay badada birlabta ee kabaxsanduubka.

Bedada birlabta ee xurbiyuhu way korodhaa marka tirada duubabku iyo qulqulka duubabku ay kordhaan. Waxaa intaa sii dheer badada bir labta ee xurbiyuhu way korodhaa marka bir xadiidka ah ladhexgalkiyo xurbiyaha.

## Birlab danabow

Birlabdanabaw waa xurbiyaha birxadidka badhtankeeda, wuxuu na ka koobanyahay xadhig magudbiye, ah oo laga helo, wareega badhtan birta xadiidka ah. Duubku wuxuu yeelan karaa qaababkala duwan, waxay noqon karaan kuwo dhaadheer ama qaababka fardaha Ama musbaarka sida kamunqata jaantnska 5.38, ee ina tusaya birlabdanabaw ka samaysata musbaar bir, ah,

Birlab danabawgu wuxuu aad ugu fiican yahay kor u qaadida qalabka biraha ah marka qulqulka duubabka la xidho birta xadiid ka ah oo waxay lumisaa birlabnimadeedii.



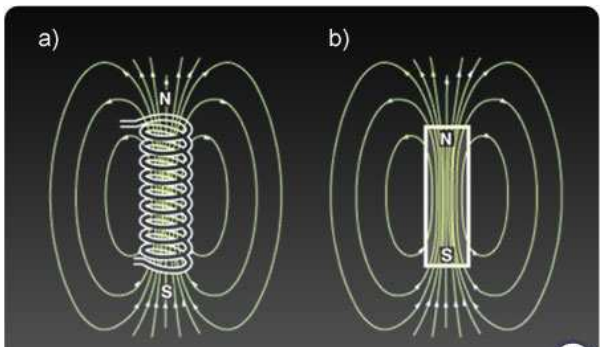

*Jaantuska 5.38 Jebirlab danabow.*

**Bededa birlabta ee birlab danabawgu waxay ku xidhan tahay xadiyadan soo socda**

- **Qulqulka dhexmaraya duubabka**
- **Tirada wareega duubabka**
- **Nooca birlab qalabka kudhexjira duubka.**

Raadi jihada bedada birlabta ee xariiqaha birlabdanabowga aad rabtid inaad sameysid. Xeerka suulka midig ee isku laabkastaa wuxuu isugu soo ururaa xurbiyaha ku dhexjira qacantaada midig ee barta fartaada ee kubeegan jihada qulqulka, markaan suulku waxuu tilmaamayaa jihada waqooyi ee birlab danabawga

**Isu, ekaanshaha iyo kaladuwanaanshaha birlab danabawga iyo gobolada birlabta jaantuska 5.39**




*Jaantuska 5.39 Isu, ekaanshaha birlab danabnegi iyo gobolada birlabta*

**B. Isu, ekaanshaha udhexeeya. Birlab danabawga iyo gobalada birlabta**

1. Labaduba waxay leeyihiin astaamaha birlabta.
2. Labaduba waxay leeyihiin bedad birlab oo ay xariiqahood isu, egyihiin,
3. Labaduba waxay leeyihiin, W – k cidhif
4. Labaduba way soojiitaan biraha.

**T. Kala duwanaansha u dhexeeya birlab danabawga iyo gobolada birlabta**

| Birlabdanabawga | Gobolada Birlabta |
|---|---|
| - Birlab danabawgu waa ku meel gaadh.<br>- Bedida xooqani way kordhi kartaa ama way yaraan kartaa<br>- Lid ahaan tooda (iska soo horjeedkoo dun) wuu isbalalikaraa<br>- Bedada birlabta mamuuqato marka la xidho qulqulka | - Birlabnimadoodu waa joogto<br>- Bedada xoogani ismabadsho.<br>- Lid ahaantooda (iske soohorjeedkoodu isma badalo. |

**Xagiijinta 5.6**

1. Sharax qaabka bedada birlabta xariiqaha kuwareegsan, qulqulka toosan ee ay xadhkuhu qaadayaan.
2. Jaantuska 5.41 wuxuu ina tusayaa qulqulka dhexmaraya xadhig toosan hadaba waxaad sawirtaa bedada birlabta xariiqda kuwareeglsan.

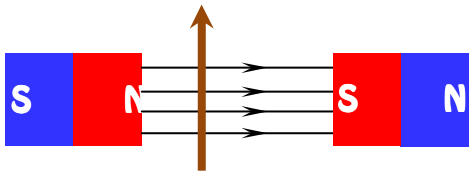

*Jaantuska 5.41 Qulqul ku xoqida xariiq toosan*

3. Waamaxay xurbiyuhu?
4. Sawir bededa birlabta, birlabta xariiqda kudhex jirta iyo qulqulka, ku, wareegsan ee uu qaadayo xurbiyuhu.
5. Qor xaddiyada ka dhigaya bilabdanabuwga mid xoogan.
6. Sawir bedada birlabta xariiqaha ku wareegsan ee gabalada birlabta iyo qulqulka uu qaadayo xurbiyuhn. Qeex, isu, ekaanshahooda iyo kala du wanaanshahooda.

## 5.7 Matoorka Danabka

matorka danabku waa qalabka wareega marka qulqulku ka gudbayo waxaana loo isticmaalaa in loogu badalo tamarta danabeed, tamarquud ama tamarsocod sidee buu u shaqeeyaa matoorka danabku? Waa maxay qodobada loo adeegsado?

Qulqulka uu qaadayo xadhiga ka baxsan bedada birlabta wuxuu leeyahay xoog. Jihada xooga birlabtuna ee xadhiguna waxay ku xidhantahay jihada qulqulka xadhiga iyo jihada bedada birlabta xariiqahooda.



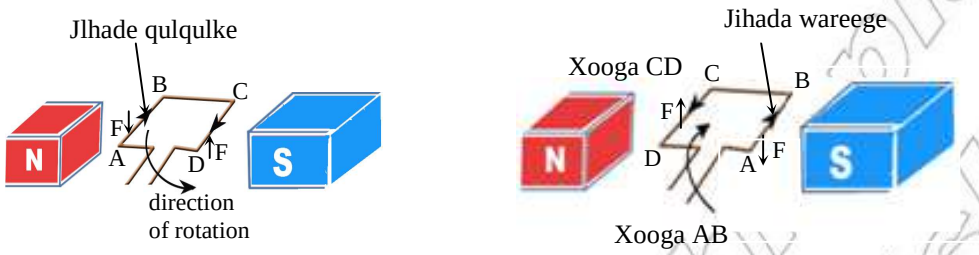

*Jaantuska 5.41 Qulqulka uu qaadayo xadhig Ka gudbayo badade bir labtau*

Waxaan isticmaalaa xeerka suulka midta si aan ugu cadeyno jihada xooga ku tilmaan suulka gacan taada midig jihada qulqulke, Farahaaga intahadheyna kutilmaan jihada bedada Birlabta markaana baa bacada gacantaadu waxay tilmaamaysaa jihada xooga

Jaan tuska 5.42 wuxuu muujinayaa xooga loo adeegsaday qulqulka uu qaadayo xadhiga ku dhexjira bedada birlabta. Fiisigiski fasalkii 7aad waxaad ku soo barateen in xooga loo adeegsado walaxda wuxuu soo saara saameyn wareeg oo loo yaqaano xooga maroojinta.

Sidaas dartaad xooga maroojintu wuxuu u sameysmaan jihooyin lid isku ah. Taas oo sababta waxlaxdu inay ku wareegto agagaarka dhidibka.

Qodob kana waxaa loo is ticmaalaa qodobada shaqada ee matoorka danabka.




b) xooga AB wuxuu ujeedea hoose xooga CD wuxuu ujeedee ko

t) xooga CD wuxuu ujeedea kor, xooga AB wuxuu ujeedaa hoos.

*Jaantuska 5.43 Wareega duubabka bedade birlabta*

Matoorka danabku wuxuu ka kooban yahay birlab xoogan oo joogto ah, iyo duubab xadhko siman wareega duubabkuna waxay u fududu yahay xeerarka xooga maroojinta sida tusaalaha kor ku qoran. Xeerarkuna waa laba xoog ee lidka isku ee kufalmaya xarigimaha lidka, isku ah qulqulka siman ee ay qaadayaa duubku markaa, duubku wuxuu ku wareegayaa dhidibka xoogagu waxay ku qotomaan salaxa xariiji bal fiiri duubka laydi ahaaneed ee ka muuqda (jaantuska 5.43b)

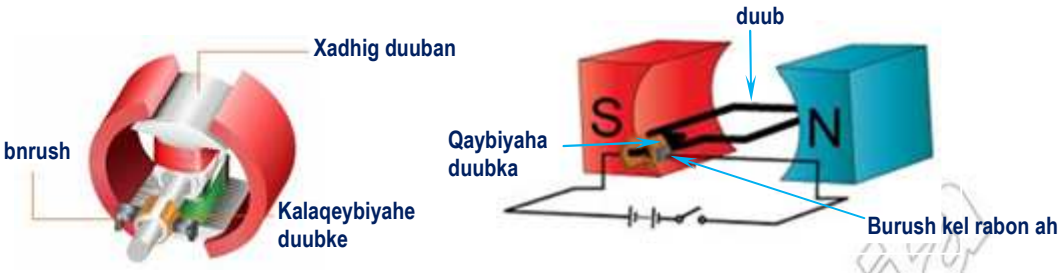
Xariijimaha $\overline{AB}$ iyo $\overline{CD}$ waxay ku qotomaan xariiqaha birlabta xooga. Gudbiyaha wuxuu ahaanayaa mid kuqotonma bedada birlabta eeleh xooga (marka gulgulka socodo), jihada xooguna waxay kuxidhantahay jihada qulgulka

Sidaas darteed, xoogag lid isku ah ay aa ku falmaya labada xariijimood. Tanina waxay sababtaa wareega duubka; kadib wareeg badhka (Jaantuska 5.43t) xoog xariijin kasta wali wuxuu lamidyahay kii hore. Laakin meelihiixariijimuhu way isbadaleen sidaas darteed jihada wareegu way isrogtey.

**Qeybaha ugu muhiimsan ee matoorka danabku waa: burushka duubka qeybiyaha beda'da birlabta, iyo xadhiga duuban.**

Wareega uu matoorku u wareego haljiho. Waxaa loo adeegsadaa burushke duubka qeybiyaha. Burushka duubka qaybiyuhu waa lammaha kala badh ka duubabka, oo uu magudbiyuhu kala soocan yahay.

Cidhifyada duub ka dhexwareegaya duubab ke qeybiyaha. Cidhif kamida waxaa lagu xidhay baytari hal dub qeybiye. Cidhifka kalena waa duubka qeybiyaha labaad, halkana waxaah ka ogaaneynaa qulqulka danab ee xariijin kastaa inuu iskala badalayo kadib wareeg badh. Tan waxaa sababa wareega duubka ee hal jiho. Kana waxaan kumnnjiney naa Jaantuska 5.44 waa kuwee qeybaha uqn muhiinlsan matoorka danabku? Magacaw adigoo isticmaalaya (Jaantuska 5.44).




*Jaantuska 5.44 Shaxanke matoorke denabka*

Si aan u kordhino xawaaraha matoorkadanabka waxaan sameynay midke mida ku wan sosocda.

1. **Duub, duubke bir badhtan ee fudud.** Birta Badhtankeedu waa xadhig duuban. Tani waxay kordhisaa xooginta bedada birlab
2. **Kordhi tirada wareega duubka.** Duleeli birta badhtanka oo kuduub wareegyo badan duleelada, tanina waxay kaa caawineysaa simida wareegya
3. **Isticmaal biralbdanabow, halka aad ka isticmaali lahayd birlab joogto ah**

   Xageed ka heli kartaa matoor danab oo la isticmaalayo? Waxaan ka heli karaa waxay aabah aan u isticmaalo nolol maal meedkeedna sida CD, qalabyada lagu heeso, makinada tilmaha, mishiinka qoditaanka (riigal, marawaxada, baabuurta I.W.M.

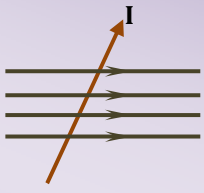
**Mashruuc shaqo**

**Sameeya matoor danab oo fudud adiga iyo saaxiibadaa.**

Matoorka danabku waa qalab u badala tamarta danab tamar socod. Waxaa jira qalabyo kale oo ku sheqee yo saameynta birlabta ee qulqulka danabka. Kuwaasha waxaa ka mid kuwalagu cabbiro danab sida;- fooltimirka, ammeterka, oommitir ka qalfanameterke I.W.M.

**Xajiijinta5.7**

1. Sheeg jihada xooga qulqulka uu qaadayo badada birlabtu sida ka muqada jan 5.45
2. Sawir shaxanka matoorka danabka oo ku qor qeybihiisa.
3. Sheeg qaarkamida caabiye danabeed kaas oo ay leeyihiin matoorka danabku




*Jaantuska 5.44 Beele de birlabte*

## 5.8 Soo Saarida Birlab danabawga

Qeybihii hore waxaad ku soo baratey in qulqulka danabka ee qudbiyuhu soo saaro bedadbirlabeed? Waa, sidee rogaalkeeduna? Miyey badada birlabtu soo saartaa qulquldanab?

**Hawlgalka 5.15**

***Fiiri xariiqaha birlab ee xooga kala jaraya gudbiyaha, oo soosaaraya qulqulka danabke ee dhexmaraya qudbiyaha.***

***Qalabka loo baahayahay:*** **Qalab cabbirka danab ka eeg ka aad udeg – dega badan ll loo yaqaanogalfanamitir, xadhko qudiyeyaalah iyo birlab qaab keeduyahay (u)**

***Habka laraacayo***

1. **Ku xidh cidhifyada gudbiyaha, cidhifyada galfonamitir, qalfanomitirku waa qalab aad udareen badan oo ah qolab danabeed loo isticmaalo in lagu cabbiro, qulqulka danabka joogtada ah.**
2. **Birlabtan dhaqaaji hoos oo fiiri jihada qalfanometer, uu u leexdo. Muxuu leexadku ina tusayaa?**
3. **Udhaqaajikor birlabta oo fiiri jihada leexadka galfanoomitirka.**
   - **Maxaad ka ogaatey leexashada**
4. **Hada birlabta udhaqaaji, sijiifah adigoo ilaalinaya xadhig udhexeeya cidhifyada.**
   - **Miyuu jiraa waxa leexasho ah barta galfanomitir? Sabab?**

Hawlgalka kor ku xusan, tallabad 2, marka birlabta loo dhaqaajiyo hoos, galfanamitir, wuu leexdaa. Leexsankani wuxuu inatusayaa qul qulka uu abuurayo gudbiyuhu taalaabade 3. Marka birlabta loo dha qaajiyo kor, qalanomitir ku wuxuu uleexdaa lidka jihadii hore leexadkeedii. Marka ay birlabtu tahay midjiif udhaqaaqda, majiro leexad. Waxaad ogsoontahay inay lamid tahay marka aad dhaqaajisid qudbiyaha bededa birlabta.

**La soco Hawlgalka ku xiga.**

Halkaadka isticmaaleysid birlaba qaabka (u) waxaad isticmaalikartaa la ba gabal oo birlabah, ilaali cidhifyada lidka isku ah ee birlabaha isku xidhan. Ku xidha cidhifyada xadhiga toosan iyo cidhifyada eberka ee galfanomitir, dhaqaaji xadhiga kor, hoos, iyo jiifba into udhaxaysa cidhifyada, kala, ku xawaaraha sacodka xadhiga, markasta fiiri leexsan ee galfanomitir.

Haddisocodka gudbiyuhn bar – baro la yahay xariiqaha birlabnimade majirto wax saameyn ah oo aad arkeysda. Hawlgalkan waxaad ku arkeysaa

1. Inuuna jirin leexasho marka xadhiga loodhaqaajiyo si barbaro lahah xariiqaha badada birlabta
2. Leexashadu waxay badalaysaa jihada marka xadhiga loo dhaqaajiyo kor iyo hoos.
3. Qulqulka uu soo saarayaa waa midxoogan marka qudbiyuhu u dhaqaaqo si xawliya

Waxaadku arkeysaa asaameyn iskumida, marka aad dhaqaajsid babadada birlabta ah ee u dhaxaysa xurbiyaha. Guud ahaan qulqulka waxaa soo saara gudbiyaha markasta oo laka jaro gudubka xariiqaha xooga.

Hadaba xaalada sidan oo kale ah ayaa looyaqaan:- dhalinta birlab danabowga.

Ninka layidhaahdo (micheel faraday ayaa ah saynisyahan kii ugu horeeyey ee caddeeyey dhalinta qulqulka danab, ee ka sameysan birlab).

Jaantuska 5.15 ayaa loo yaqaanaa tigaabadin Michael Faraday

***Soo saarid birla baana bawga*** **Waa habka lagu soosaaro xooga muujiya danab duubka isagoo udhaqaaqaya si xedhiidh la'ah birlabra qulqulka danab ay soo saarayaan duubabku ay aa loo yaqaa:- xoo saarida qulqulka iyo xooga mootiya danabka.**

Habka soo saarida birlab danabawga tamarta guud ayaa waxay isubadashaa tamar danabeed. Hawsha guud ee ay qaban ayaa waa dhaqaajinta duubka ama birlabta xidhiidka la leh midkala taas oo soo saarta qulqulka wareega.

Jihada qulqulka la soo saarey way isbada shaa marka ay is badasho badada birlabtu

**Xaqiijinta 5.8**

1. Qeex weedhehan b) soo saarida birlabdanabeed ka
   t) soosaared qulqulka
2. Qeex wareega korantada ee dhaqaafa birlab ee xadhiga duubka xurbiyaha

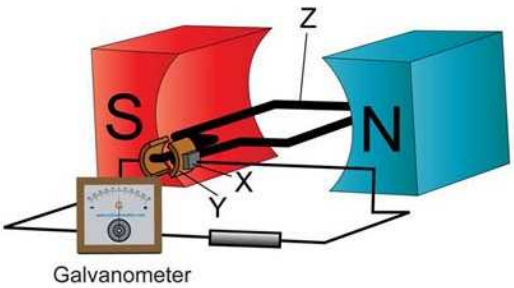
## 5.9 Mishiin

Qeybihii hore waxaad ku soo baratay qulqulka iney soo saaraa aaraan duubabka dhaqaaqaya ee bedada birlabta, xoojin soo saarid qulqulka waa daciif marka uu duubku kaliyahay. Nololmaalmeedkeena wareegyo badan oo duubi leydiyeed ah ay aan istic maalaa duubab. Intaa waxaa sii dheer wareegyada waxaa soosaara xadhig kaliya oo laga duleeliya badhtan birlabta.

Xadhiga duubitaan wuxuu ku wareegsan yahay badhtan birlabta ayaa loo yaqaanaa duubkawareega.

Birta weyn eeduubani waxay iskuxidhaa wareega duubabka iyo ilaha tamarta quud. Marka duubabka wareegayaan waxay dhex wareegaan badada birta, taasina waxa ay keentaan in wareegu sooasaaro qulqul. Qalabka noocan ah waxaa loo yaqaa mishiin.

**Mishiin waa qalab loo isticmaalo in looqu badalo tamarta quud tamar danabeed, waxaana lagu sameeyaa adeegsiga xeerka soo saarid birlab danabawga**




X = Burush
Y = kala qeybiyaha duubka
Z = duubka wareega


*Jaantuska 5.46 Qaabka mishiinka*

Marka uu duubkaxadhigu ku dhexwareego bedada birlabta ama marka birlabtu ku wareegto agagaarka duubka aan dhaqaaqeyn qulqulka waxaa soo saaraya duubka. Qulqulka danabka ee duubkana waxaa qeybiyaha mareegta dibada eh waxayna kuqeybisaa qeybiyaha duubabka iyo burushka. Qeybiyaha duubabka waxaa si, adag loogu duubay duubka, waana lagu wareejiyey, qeybiyaha duubabka iyo mareegta dibada ah waxaa isku xidha burushyada. Qeybaha ugu muhiimsan ee mishiinkuna waa:- wareega duubka, burushyada, qeybiyeyaasha. Duubabka iyo bedada birlabta.

- Wareega duubku wuxuu ku wareegsan yahay xudunta birta xadiidka ah
- Qeybiyaasha duubabkuna:- waa duubab bir, ah oo loo kala jabiyey labaqeybood. Waxayna ku xidhan wareega duubka.
- Bnrushyada qotimo kaarboon, ah oo loo isticmaalo in lagu xidho mareegta dibada ah ee wareega duubka.

Marka duubku sameeyo wareeg badhi ihada qulqulku way isbadashaa qulqulka wuxuu ka bedelaa jlhadiisa wakati loo yaqaano qulqulka talantaaliya ah (AC) mishiin wuxuu soo saaraa qulqul talantaali ah oo loo yaqaano mishiinka AC.

Qulqulka aan badalin wakhti jihadiisa ayaa loo yaqaanaa qulqulke tooska ay (DC). Tusaale ahaan unuga engagan iyo baytariga baabuurtnba waa ilaha qulqulka tooska ah.

Daynabada baaskiilku waa matoor danabeed kaas oo soo saara qulqul toos ah (DC). Marka ay wareegaan taayirada baaskilku, xaaladana matoorka danabku wuxuu matalayaa mishiin D.C ah.

**Xaqiijinta 5.9**

1. **Waa maxay mishiinku?**
2. **Sawir mishiin AC oo ku qor qeybihiisa .**
3. **Sharax Faraqa udhexeeya qulqulada AC iyo DC.**

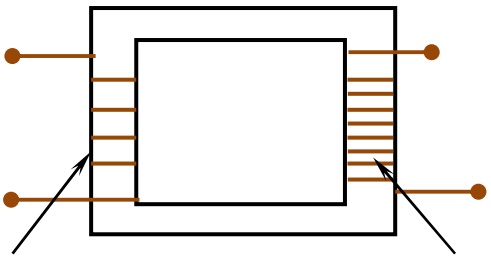
## 5.10 Badalaha (Transformer)

Badaluhu waa qalabka bedala tamarta danabad isagoo ka badalaya mareeg una badaleya Mareeg kale iyadoo laraacaya habka soo saarida birlabdanabawga. Iyadoo loo isticmaalaya qulqulka talantaaliga ah, qulqulka tooska ah oo kaliya loona isticmaali karo.

Badaluhu waa qalabka badala tamardanabeed ee hal mareega illaa mareegkale iyadoola adeegsanayo habka soo saarid birlabdanabawga, sidoo kale waxaa loo adeegsan qulqulke talantaaliga ah (AC) kaliya. Laakin loo adeegsan maayo qulqulka tooska ah (DC).

Badaluhu wuxuu ka kooban yahay laba duub, kuwaasoo laga helo Badhtanka birlabta labada duub ee xadhiga waxaa layidhaa (duubka hore iyo duubka daa nbe) marka qulqulka talantaaliga ah uu ka

gudbayo duubka hore, waxay badasha badeda birlabdanabeedka waxaana kor ukaca soo saaritaanka qulqulka talantaaliga ah ee duubka danbe



*Jaantuska 5.46 Calaamada bedelaha*

*Jaantuska 5.47 Badalaha*

Badalaha, duubka danbe ayaa ka wareeg badan duubka wareega hore waxaana loo yaqaa xoojinta badelaha. Marka badalaha la xoojiyo wuxuu badalayaa ama koor uqaada tamarkeyd isdheerida waxaaana badalaya tirada duubabka danbe iyago kabadalaya tirada tubabka hore, ($N_s$>$N_p$).

Badalaha duubka dhanbe wuu wareeg yarhay marka ladhimo tirada duubabka, waxaa loo yaqaanaa yaraynta badalaha.

Hadaba yareynta badaluhu waxaybadashaa tamarkeyd isdheerida wayna yareysaa waxay leedahay tirada duubka hore ayaa ka badan tirada duubka darba. ($N_P > N_S$).

Awooda danabka ee bedaluhu waa iskumid duubka hore iyo duubka danbaba awood danabka ee duubka hore.

Waa $Pp = I_P V_P$.

Awooda danabka ee duubka danbe waa

$P_s = I_s V_s$

Maadaama awooda $I_1$ $V_1$ ee usocdo xaga badalaha waa iney lamidnoqotaa. Awooda $I_2V_2$ ee ka soo baxaysa $I_1$ iyo $I_2$ ee duubka hore iyo duubka danbe sidey u kale horeeyaan

Saamiga duubabkuna waa sidan

$$\frac{\text{Tamar keydisdheerida duub kahore}}{\text{Tamar keydisdheerida duubka danbe}} = \frac{\text{wereeg d.hore}}{\text{wareega d.danbe}}$$

$$\Rightarrow \frac{V_1}{V_2} = \frac{N_1}{N_2} = \frac{I_2}{I_1}$$

## Tusaalayaal

1. Badale ayaa duubka wareega danbe leeyahay tamarkeyd isdheeri dhan 600volt; sidoo kale tamar keyd isdheerida wareega duubka horena tahay 120volt, Haddii tirada wareega duubka hore tahay 800, waa imisa tirada wareega duubka danbe?

| Siin | weydiih | Furfuris |
|---|---|---|
| $V_1 = 120\ V$ | $N_2 = ?$ | $\frac{V_1}{V_2} = \frac{N_1}{N_2}$ |
| $V_2 = 600\ V$ | | $\frac{120\ V}{600\ V} = \frac{800}{N_2} \Rightarrow 800 \times 5 =$ |
| $N_1 = 800$ | | $\Rightarrow$ tirade w, drdanbe = 4,000 |

## Isticmalka Badalaha

Awooda danabka waxay ku gudubtaa xariiqyo oo loo isticmaalo Badalahafor in uu kordhiyo ama uu yareeyo mishiinku awooda danabka, waxaad si sax ah ugaraneysaa inta Bedele ee taala gurigiina. Mobayl jaar jin waa badale, wuxuna ku shaqeeyaa tamar dhan 9v, wuxuuna badelaa 240v. oo inta ugu muhiimsani ay tahay 9V. waxaa ka loo kamida badalayaasha kombuyuutarka, raadiyawga I.W.M.

Taransformarku wuxu door muhim ah ka ciyaaraa qudbinta (qeybiyaa) tamarta koronta wuxuuna qeybiyaa meelo fagfag oo wadarka kamida. Tana waxaa sameya. Tamar weyn oo xariiquhu qaadayaa qulqul ayar, si uu u yareeyo tamar luminta ay sababayso kuleylin xariiquhu kululaadaan.

**xaqiijin 5.10**

1. **Waa maxay badalaha gudbiye?**
2. **Sheeg laba nooc oo taransformaro ah oo sharax waxqabadkiisa midkastoo kamid ah.**
3. **Sawir, taransformar (Gudbiye) , oo kuqor qeybihiisa**
4. **Sheeg qaar kamida qalabka elektaroonikada eeleh taransformarka?**

## 5.11 Awooda Gudbinta

Itoobiya waxay isticmaashaa awooda korontada ee biyuhu dhaliyaan waxaana loo isticmaalo waa caasimadaha laydhadh wadooyinka, warshadaha guryaha iyo waxyaabo kale masheegi kartaa quwad koronto oo laga helo deegaankeena? Magaaladeebayse tamarta siisaaa?

Meelaha ugu muhiimsan ee awooda korontada ka helo waxaan ku arki doonaa shaxda 5.3.

**Hawlgalka 5.17 Fiirin (Indho - indhayn)**

**Booqo xarunta korontada ee kugu dhaw.**

1. **Caddee tamarkeyd isdheerida kor uqaadida iyo tamarkeydisdheerida yaraaneysa ee habka gudbinta.**
2. **Waa maxay ujeedada yaraynta tamar keydisdheeridu**

Hadaba aynu fiirino sida ay tamarta danabku uga gudubto xarunta awood korontada oo ayugusoo gudubto guryaheena ay soo qaadano xaruta awood korontada ee koke waxay soo saartaa tamar dhan

25kv, tamartana waxaa lagu kordhiyaa Taraansformerka, waxayna noqotaa 270kv am 400kv: oo meelayaw kala duwan.

Tamar keyd isdheerid badan waxaa lagu yareeyae lumida tamarta danab maadeema oo ay soconeyso fogaan badan. Markay gaadho magaalo 400kv.

Waxaa lagu yareeyaa badalaha (taransfor). Waxayna nogotaa 11kv oo warshada loo isticmaalo guryaha, isguulka, tukaanada, waxaa loo isticmaalaa 240v. (Jaantuska 5.48). muujinta awooda korontada ee aah ka helo xarumaha kala duwan.

*Jaantuska 5.48 Xariiqaha gudbinta*

Guriga waxaaloo isticmaaka 240 v, waxaase ugu sii fiican in loo yareeyo ilaa gv

**Shaxde 5.3**

| Magaca xarunta Awooda korontada | Meesha lagahelo |
|---|---|
| 1. Meelkaawakana | Kilika oromada |
| 2. Koka | Kililka oromada |
| 3. Finjaa | Kililka oromada |
| 4. Tekeze | Kililka tigreygaa |
| 5. Tanabels | Kililka axmaarada |
| 6. Tise abal | Kilillka Axmaarada |
| 7. Gelgel glibe I | Kililka oramada |
| 8. Gelgel glibe II | Kililka shucuubta koofureed. |

**Xaqiiji 5.11**

1. Waa maxay shaqada taransformerku
2. Sawir calaamada taransforka?
3. Maxaa tamar keyd is dheerida sare loogn isticmaal koronta?

## Xeerarka badbaadada korontada (electrical safety rules

Korontadu khatar ay ku tahay biniaadamka haddii aan la ilaalin khatarteeda. Hadda waxaad ubaahan tahay inaad baratid xeerarka badbaadada korontada si, aad uga badbaadisid naftaada iyo dadkaleba khatarta koronta. Hadaba halka waxaad ku baran waxyaaba loo baahan inaadka taxadartid waxaana kamid:-

1. Xadhkaha korontada
   - Waligaa xadhig diiran haku dhufan shay
   - Usheeg waalidka macalinka haddii aad aragtid xadhig go, an silo hagaajiyo
   - Hataabanin xadhkaha korontada kuwo diiran iyo kuwo aan diirnaynba ilaa aad weydiisid waalidka Ama macalinkaaga
   - Kafogee wax dableh xadhka korontada.
2. Biyaha
   - Ka fogee biyaha dhamaan caabiyada korontada
   - Ha taaban caabiyad korontada meelahe banaan eekorontaele sida daaraa demiyaha garahaaga oo qoyan.
   - Haku dabaala biyo danabeysan
3. Meelaha banaan eekorontada iyo soo keetke:-
   - Fartaada hataab siin meelaha bamaan eekorontada iyo sookeedada
   - Marka aad guluub badalisay korontade iska bakhtii
4. Xadhkaha gudbiyahe danable
   - Xadkaha gudbiya laydhku hadiiaad taabatid wuxuu sababaa dhaawac ama dhimasho sidaas daraadeed.
   - Dhamaan waxyaalabaha lagaga taxa dari karo, ama laga hortag karodhacdoo yin waa in la sameeyaa:-
   - Dadka loo soo tababaray oo kaliya waa iney hagaa jiyaan xadhkaha laydh.
   - Xadhiga xadhigainsifican loo hagaajiyo ama labadalo.
   - Xadhiga hahagaajin ilaa aadka bahtii so saa cado laydhka.
   - Mareeg kasta waa iney leedahay fuynus leeg cabbirkeeda.
   - Fuyuusku wuxuu kadifaacaa qalabka mareegta iney dhaawacanto.
   - Ha ku dulunduulin meelkudhaw xadhkaha laydhka.
   - Ha fuulin tiirarka leydh ka
   - Ha tagin aqalka isa oo uu shidanyah ay qalab electaroonikada ahisida qasaalade TV.Ge, kaawiyade, talaagad I.W.M.
   - Xadhka laydhku way kululaadaan marka qulqulku dhexmarayo, haddii wax kululeyliyaa ku dhaco, ama dabqabsado Haddii laydh badani ku soo dhaco ama aymareegta danabku yaraato, xadhkaha laydhku kululaadaan.

# Soo koobbidda Cutubka

## Cutubka waxaad ku soo baratay

- Mareegta danabku waa shaxan dhemaystirah tiran oo uu qulqulke danabku dhexmaro. Waxay na ka koo bantahay waxyaabo kaladuwan sida, laha tamar isdheerida, daaraadamiye, xadhkahe danabka iyo guluub.
- Qaabka guluubke leydh iyo waxqabadka fiyuuska wuxuuke dhigaa mareegtamid furan ama aandhamays tirayn wakhtige uu qulqul badani dhexmarayo.
- Qululka danabku waa saamigaqulqulke eekagadbaya dedka qeybata gudubka ee qudbiyahe
- Qulqul ka danabko waa socodke electroonikada nadu ayke socodneyaa cidhifka taban una soconayaa cidhifka toga nee ilaha danab.
- Habka wareeg qulqulkuwaa aragti odhaneysa qulqulku wuxun usocdaa dhinala lidka ku ah dhinaca ay ay elektaroonada qulqul jiraan.
- Tamar ta waxaa lagu cabbiraa iney tahay kar tida hawsha laguqabanayo. Xeerka ohm wuxuuqeexay aa xidhiidhke udhexeeya qulqulke iyo tamar keyd isdheerida waxuunna uqeexayaa sidan, “Qulqulke dhaxmaraya qudbiye bir, ah ee heerkul kiisuna joogtade yahay wuxuu saamigal toosah ku yahay tamar keyd isdheerida udhexaysa laba cidhif.
- Cabbirida qulqlka danabka, tamarkeyd isdheerida, iyo caabiga ee mareesta lagu siiyey.
- Qulqulka danabka ee dhex maraya gudbiye wuxuu soo saaraa bedade birlab danabeeda ee kuwareegsan.
- Qulqulke uu qaadayo xadhigu ee kabaxsan bedad birlabdanabeed ka wuxuu leeyahay xoog.
- Matoorka korontadu waa qalabka tamar danabeedka ubadala tamar quud. Ama tamar socod.
- Soo saarid birlab danabawgu waa habka soosaarida xooga mootiye danabka ee duubke isaga oo udheqaaqaye dhinaca birlabta. Mishiin waa qalabka loo isticaamalo inuu badelo tamar taguud. Tamar danabeed, iyadoo la isticmaa laya xeerrka soo saarida birlabdanabawga.
- Tarans former ka waa qalab loo istic maalo inuu tamar danabeed uu kabadalo halmareeg oo uu badalo walaxkale, iyada oo la, adeegsanayo habka soosaarida birlab danabawga. Taransformerku waa laba nooc ookalaah kordhiye iyo yareeye.
- Ilaha uguwaaweyn ee tamarta danabeedku waa awood dhalinta danab ka, waa xarumaha awooda dhalin ee danabku Waxay tamarka keydsan eebiyaha soo dhacaya u badelaan tamar danabeed.

# Nakhtiinka su, aalaha iyo masalooyinka

## I. Kuqor “Run” ama “been” suaalaha soosocd

1. Qulqulka dhexmaraya laba caabi ee qeybaha taxanaha ah _____.
2. Wadarka tamar keyd isdheerid ee kagudbeysa caabi kastaa waxay lamid tahay tamar keyd isdheerida ilaha.
3. Qulqulka dhexmaraya labacaabi oo iskumidah oobarbaro ah wxuu lamid yahay wadarta qulqulka.
4. Laba caabi oo barbaro ah tamarkeyd isdheerida kagudbay saa caabikasta waxay lamid tahay tamar keydis dheerida ilaha tamarta
5. Hadddii laba caabi aybar baroyihiin markaa rogaalka caabiga saafiga ahi waa wadar taa rogaalka labada caabi.
6. Qulqul wuxuu soo saara bededa birlabadanabeed.
7. Qulqulka uu qaadayo gudbiyuhu malaha loog marka uu kabaxsanyahay badada birla beedka.
8. Matoorka danab wuxuu tamarta danabeed ubadalaa tamar socod.
9. Bededabir dabdanabeedka ku dhexjira birlab danabawgu saameyn kuma laha Tirada wareega duubabka.
10. Taransformerku wuxuu tamarta ka badelaa walax wuxuuna ubadelaa walax kale.

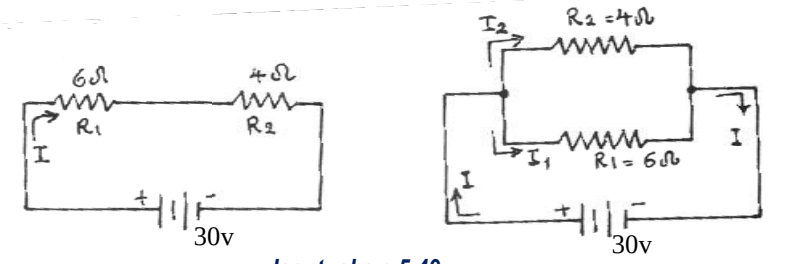
## II. Ka dooro jahaabta sax de ah

1. Laba xoog oo lid iskuah oo lagufaley qotonka dhidibka waxay sababaan
   b. dibama hore socod  j. Socod soodhicitaah
   t. Wareeg  x. majiro socod (negi).
2. Qeybta matoorka danabka ee kalabadasha qulqulka xariiji mahe danabku waa
   b. Ambeer  t. (kalaqeybiyahe wareega)  j. Burushyo  x. Baytari
3. Qulqulka uu gaadaya qudbiyuhu wuxuu _____ (bar – baro/qoton) xariiqahe birlab danebeed kan waxay leeyihiin xoogaga.
4. Keelibmarka uu mateerku wareego qoobo badhkeed isagoon lahay kele qeybiyihii duubku wuxuu uwareg (xaga hor/xagadan be
5. Matoorka danabku wuxuu badadaa (danabeed (guud) tamarta wuxuuna ubadalaa (danabeed /guud) tamar.

## IV. Fur – Fur masalooyinka soosocdn

1. Qulquldhan 15A ayaadhex maraya qudbiye amindhah 1 saac. Hadaba waaintee xadiga uu danab ku kudhex marayo wakatiga ama imisa elektaroon baa ka gud bayo?
2. Laba caabiooah 40Ω midkaste waxaa loo xidhay sitaxane ah waxaa qudbayo tamar dhan 120v
   b) Waa imisa wadar ta caabiyada ee mareeg tu?
   t) Waa intee qulqulka dhexmaraya mareegtu
   J) Waa imise tamar keydisdheerida ka gudbaysa caabikasta.

3. **Quluubdhan 75Ω iyo kuleyliye dhan 150Ω ayaa la isugu xidhay si bar – baro ah iya da oo ay ka gudbayso 150V oo tamar keyd isdheeriah**
   **b) Waa kuwee caabiyada iskudhiga ee laba walxood.**
   **t) Raadi qulqulk dhex maraya labada walxoodba**
   **J) Waa imisa qulqulka dhexmaraye mareegta gudaha ah?**
   **x) Isbarbardhig wadar ta qulqulade dhexmaraya gulubka iyo kuleyliyah wader ahaanba**
4. **Xisaabi wadarta caabiyada iyo qulqulka dhexmaraya caabikasta**




*Jaantuska e 5.49*

**(a)** **(b)**

## *V. Kajawaab su, aalahan soosocda*

**1. Waa maxay isticmaal ka magudbiyaha udhexeey kalaqeybinta duubabka?**
**2. Waa maxay ujeedada loo duubo duubabka badan ee xadhkaha?**
**3. Adiga oo isticmaalaya shaxah sidee buu matoorka danabku ushaqeeyaa? Sharaxaad kabixi.**
**4. Sheeg oo caddee saamigal gacanta midi gee qulqul ka mu qaadayo xadhigueebadede birlabdanabeedku ku dhexjira.**
**5. Sharax tijaabadii faraday adigoo isticmaalaya duubka iyo birlab?**
**6. Sheeg soo saarid bir lab danabawga**
**7. Maxaa loogajeedaa birlab kor dhiyo taransformer ama dhiyo taransformer ama in layareeyo Badalaha**
**8. Waa maxay fuyuusku? Muxuuse qabtaa**