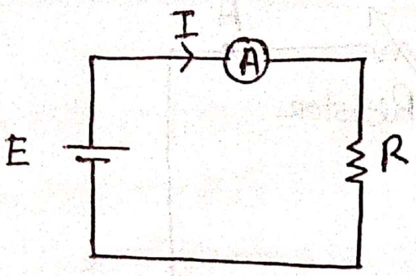
Mam

FEE

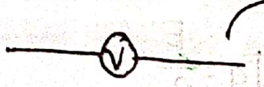
8th-D Day
20-10-19

Current measurment:

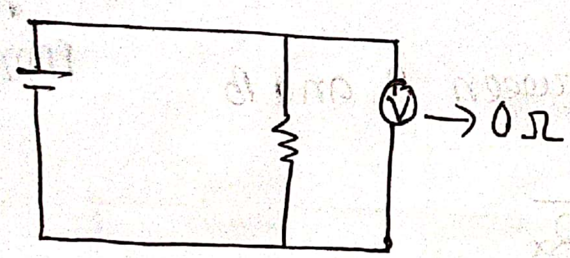
Resistance low হলে currentটা বেশি হবে



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

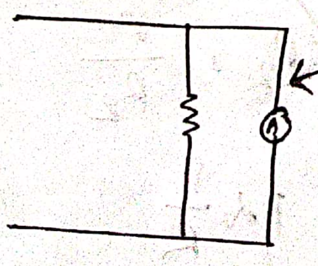


→ এই series এ সকল currentটা measure করতে পারবে না।



parallal যোগ করলে currentটা বেশি

Q. কোনো v মিটার কে series এ লাগানো যাবে কি?
Q. ,, A ,, ,, parallal ,, ,, ,, ,,?

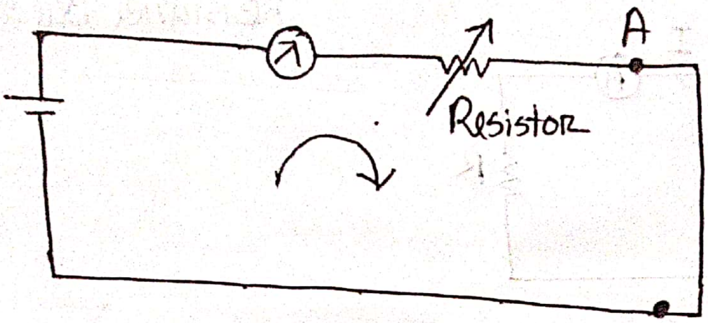


তখন এটা short circuit এর মতো কাজ করবে, তাই অ্যামিমিটারে কে parallal এ লাগানো যাবে না।

A → Internal resistance কম তাই parallal এ লাগানো যাবে না

Resistance measurement:

PMMC → (Permanent magnet moving coil)

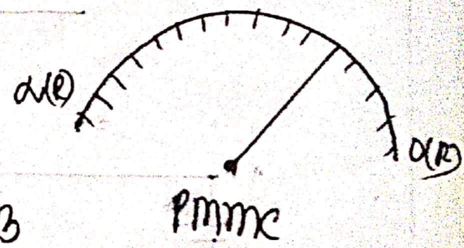


(i) A and B points are shorted

Full scale deflection current $I_g = \frac{E}{R}$

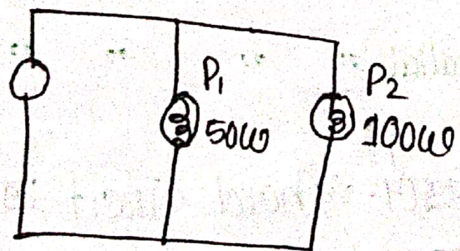
(ii) A and B are open

(iii) R_x is connected between A and B



$$I_m = \frac{E}{R+R_x}$$

Power measurement:



$P_1 = VI_1$

$P_1 = \frac{V^2}{R_1}$

$P_2 = \frac{V^2}{R_2}$

$P \propto \frac{1}{R}$

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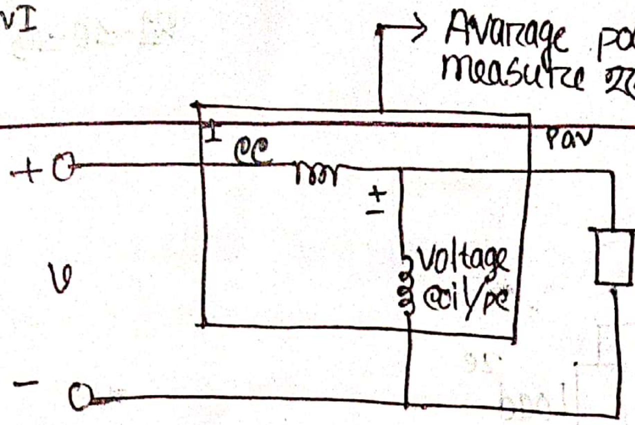
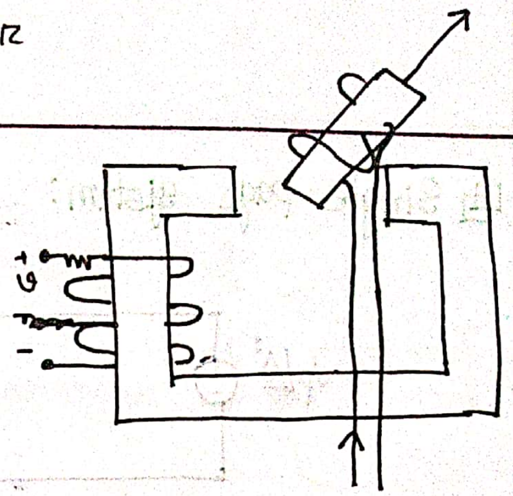
watt meter

$P = VI$





$v(t) = V_m \cos(\omega t + \phi_v)$

$i(t) = I_m \cos(\omega t + \phi_i)$

$P = v(t) \cdot i(t)$

$P = V_{rms} \cdot I_{rms} \cos(\phi_v - \phi_i)$

$= \frac{1}{2} V_m I_m \cos(\phi_v - \phi_i)$

$\bar{V} = V_m \angle \phi_v$

$\bar{I} = I_m \angle \phi_i$

Q. কিভাবে watt meter দিয়ে power a measure করা হয়?

⇒ ± একই দিকে দিতে হবে না হলে deflection দিবে

⇒ ২টি coil ব্যবহার করা হয়

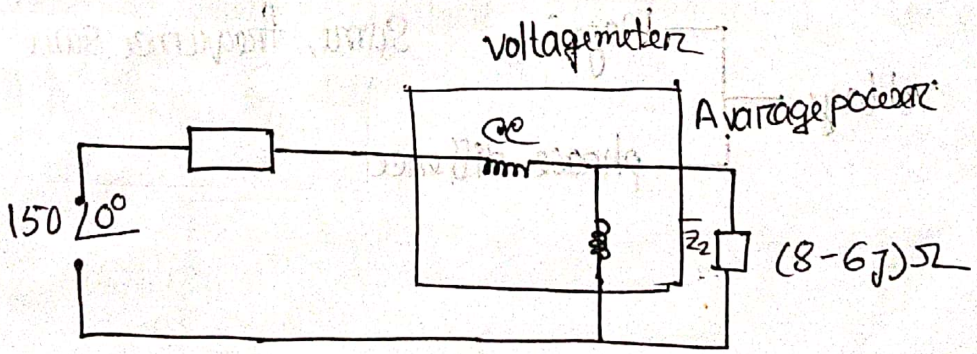
⇒ equation গুলো

$\bar{S} = \bar{V}_{rms} \cdot \bar{I}_{rms}$

$= |\bar{V}_{rms}| \cdot |\bar{I}_{rms}| \angle \phi_v - \phi_i$

$= \underline{V_{rms} I_{rms}}$

Ex: 11.16



$P = V_{rms} \cdot I_{rms} \cos(\phi_v - \phi_i)$

$= \underbrace{V_{rms} \cdot I_{rms} \cos(\phi_v - \phi_i)}_{\text{Real power}} + \underbrace{j V_{rms} \cdot I_{rms} \sin(\phi_v - \phi_i)}_{\text{Reactive power}}$

$150 \sin(\omega t + 30°)$

$I_{rms} = \frac{150 \angle 0°}{12 + j10 + 8 - j6} = 7.35 \angle -11.30 \text{ A} = (7.2 - 1.44j)$

$\bar{V}_{rms} = \bar{I}_{rms} (8 - j6)$

$= 73.54 \angle -48.17$

$= (49.045 - 54.8i) \text{V}$

$\bar{S} = \bar{V}_{rms} \cdot \bar{I}_{rms}$

$= (49.03 - j54.8)(7.2 + j1.42)$

$= (430.7 - j324.6) \text{VA}$

Practise P. — 11.16

watt meter reading = 430.7 W

volt meter reading = 324.6 VAR

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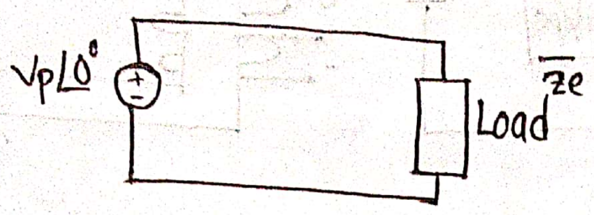
8th-E-Day
21-10-19

Single page system:



Polyphase system:

→ অনেকগুলো source থাকবে

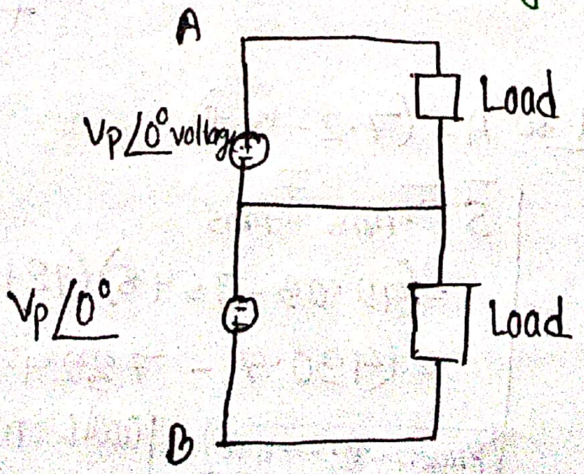
→ অনেক ধরনের voltage থাকবে

Voltage magneture, phrase থাকবে

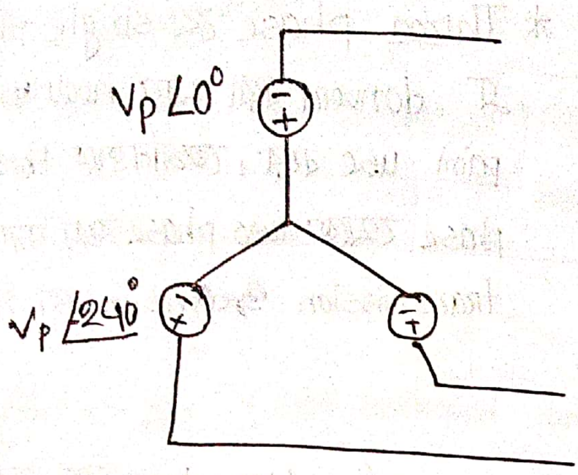
frequence same

Voltage — Magni... Same, frequence same
— phrase diffence

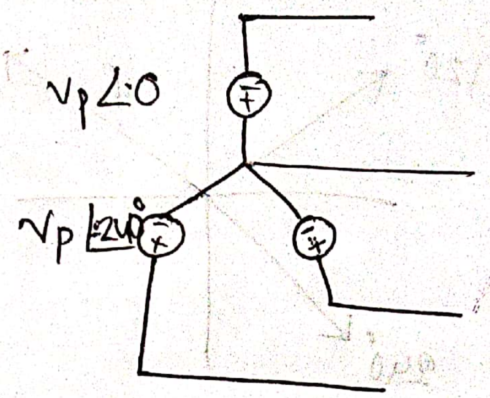
Single phrase two wire system:



Single phrass three wire system

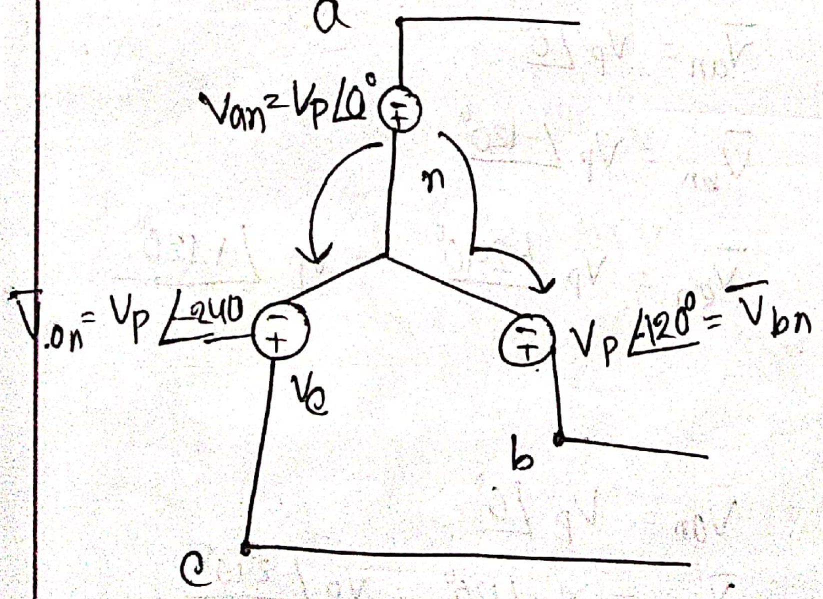


Three phase three wire system

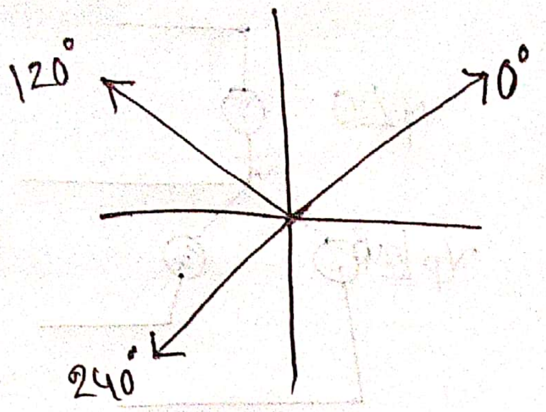


Three phase fore wire System

Three phase system is produced by a generator consisting of these sources having same magnitude and Frequence but out of phrase with each other by 120°.



Three phrase from wire system



* Three phase কে single phase এ donvert করা যায় neautral point use করে। তেমনিভাবে three phase থেকে two phase করা যায়। এখানে transmission ও division করা হয়।

// Intenstanoce poweer constant থাকবে তাই voltage loss কম হবে এই phrase এ। single phrase এর তুলনায় three phase এ wire কম লাগবে।

Phase sequence : Voltage এর order fig-এ (motor এর rotation clockwise/anti clockwise জানায়)

abc phase sequence

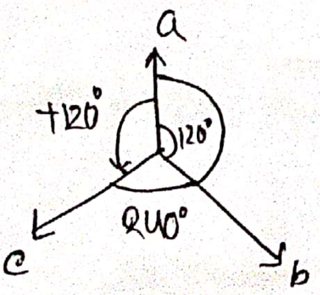
acb phase sequence

abc phase sequence,

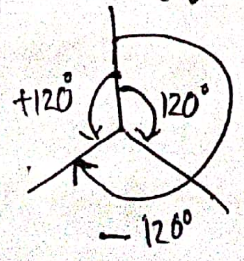
$\bar{V}_{an} = V_p \angle 0°$

$\bar{V}_{bn} = V_p \angle -120°$

$\bar{V}_{cn} = V_p \angle -240° = V_p \angle +120°$



acb phase sequence,



$\bar{V}_{an} = V_p \angle 0°$

$\bar{V}_{bn} = V_p \angle 120° = V_p \angle -240°$

$\bar{V}_{cn} = V_p \angle -120°$

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motor rotate করলে - abc abc abc .... sequence এ চলবে

এখান থেকে আর ভেবে যা

abc বা bca বা cab বা possitive phase sequence

↳ clockwise rotation

acb acb acb → anti clockwise rotation

acb/cba/bca/neg phase sequence

Problem:

$v_{an} = 200 \cos(\omega t + 10^\circ)$

$v_{bn} = 200 \cos(\omega t - 230^\circ)$

$v_{cn} = 200 \cos(\omega t - 110)$

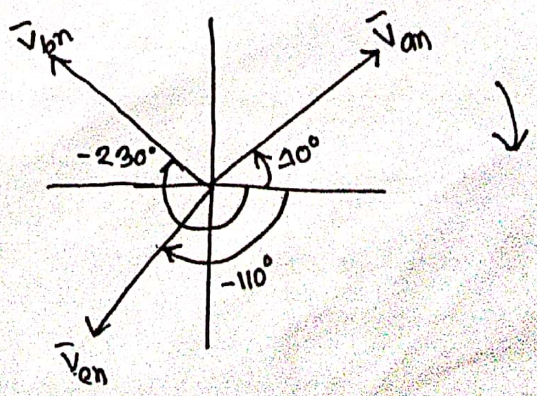
Determine phase sequence

Solve:

$\bar{V}_{an} = 200 \angle 10^\circ$ V

$\bar{V}_{bn} = 200 \angle -230^\circ$ V

$\bar{V}_{cn} = 200 \angle -110^\circ$ V



from fig.

acb phase sequence

(Ans)

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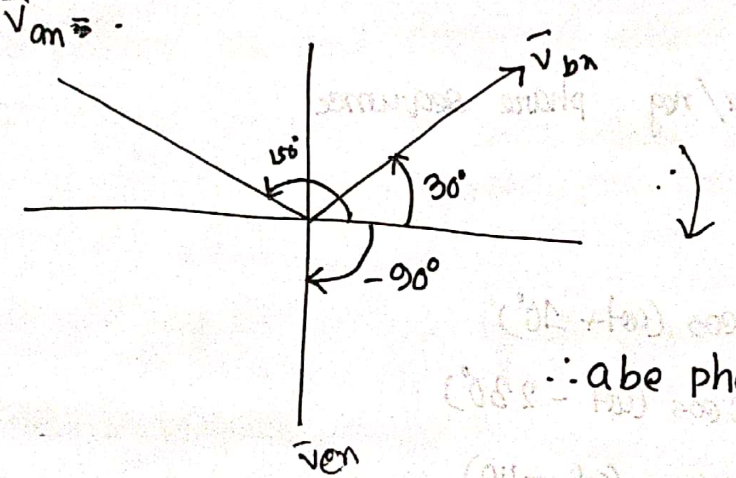
Problem:

$\bar{V}_{an} = 200 \angle 150° \, V$

$\bar{V}_{bn} = 200 \angle 30° \, V$

$\bar{V}_{cn} = 200 \angle -90° \, V$

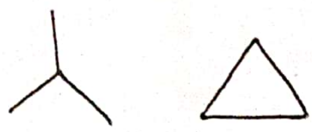
Solve:



$\therefore$ abc phase sequence

9th-Day
29-10-19

- Balanced phrase voltage → magnitube same
  phase is 120° out of each other
- Balanced load → magnitube same হবে, phase ও same হবে



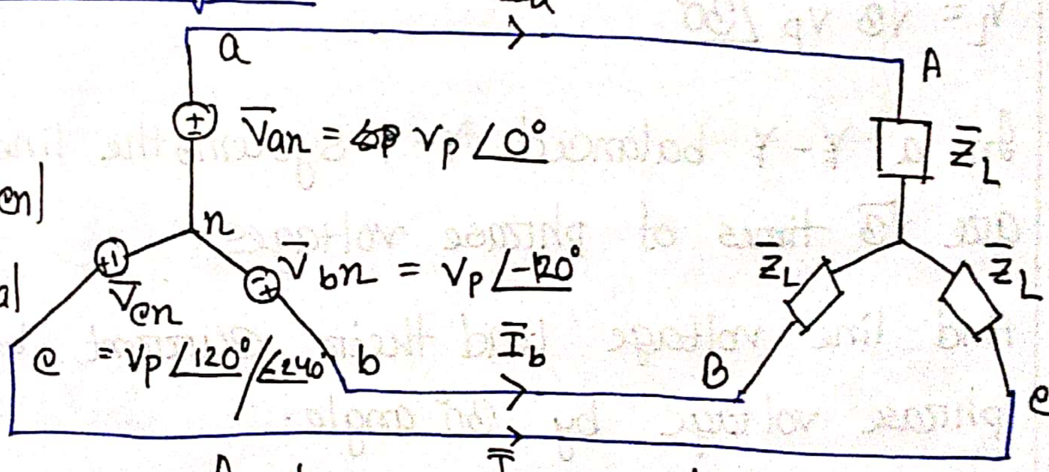
Balanced Y-Y system

abc phase

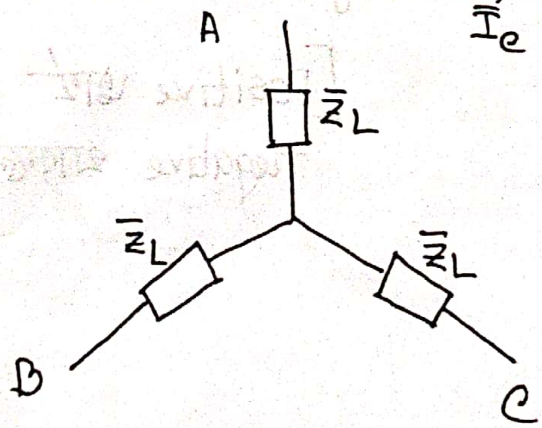
$V_p = |\bar{V}_{an}| = |\bar{V}_{bn}| = |\bar{V}_{cn}|$

$V_L = |\bar{V}_{ab}| = |\bar{V}_{bc}| = |\bar{V}_{ca}|$

$= \sqrt{3} V_p$



$Z_Y = |\bar{Z}_L|$



Line voltage

$\bar{V}_{ab} = \bar{V}_{an} - \bar{V}_{bn} = V_p \angle 0^\circ - V_p \angle -120^\circ = V_p \{(\cos 0^\circ + j \sin 0^\circ$

$- \cos(-120^\circ) - j \sin(-120^\circ)$

$= V_p \left(\frac{3}{2} + \frac{\sqrt{3}}{2} j\right)$

$= \sqrt{3} V_p \angle 30^\circ$

$\bar{V}_{bc} = \bar{V}_{bn} - \bar{V}_{cn} = V_p \angle -120^\circ - V_p \angle 120^\circ$

$= \sqrt{3} V_p \angle -90^\circ$

$\bar{V}_{ca} = \bar{V}_{cn} - \bar{V}_{an}$

$= V_p \angle 120^\circ - V_p \angle 0^\circ$

$= \sqrt{3} V_p \angle 150^\circ$

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$\overline{V}_{bc} = \overline{V}_{bn} - \overline{V}_{cn} = \sqrt{3}\, V_P \angle 30^\circ - 120^\circ$

$= \sqrt{3}\, V_P \angle -90^\circ$

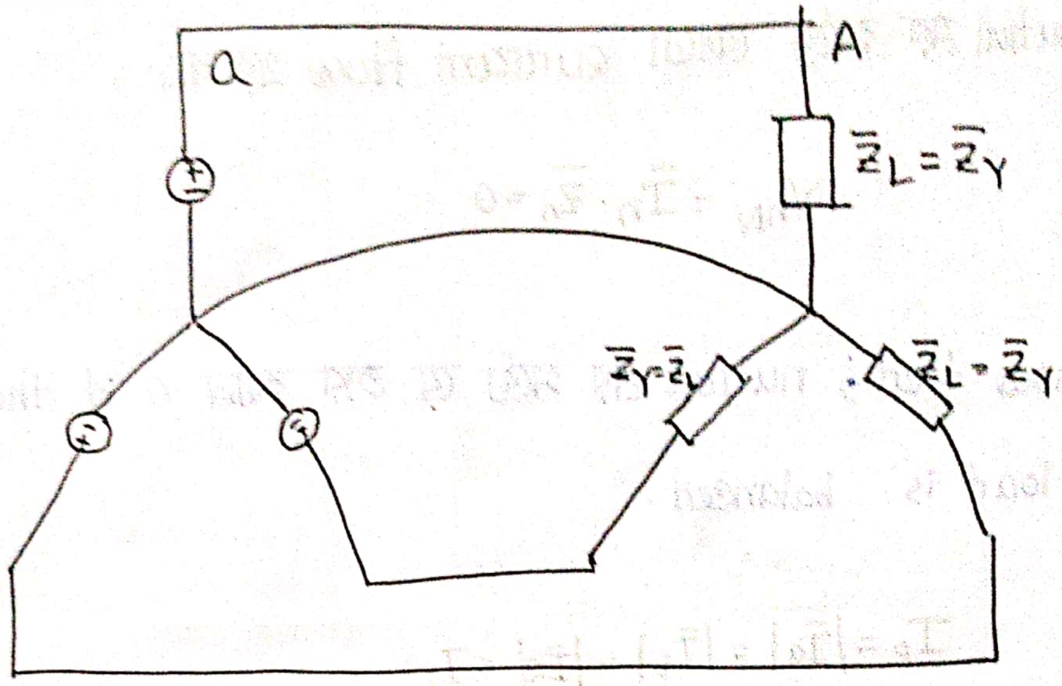
$\overline{V}_{ca} = \overline{V}_{cn} - \overline{V}_{an} = \sqrt{3}\, V_P \angle 30^\circ - 240^\circ$

$= \sqrt{3}\, V_P \angle -210^\circ$

$V_L = \sqrt{3}\, V_P \angle 30^\circ$

In a Y-Y balanced Y-Y system, the line voltages are $\sqrt{3}$ times of phrase voltages.
And line voltage lead their current bonding phrase voltage by 30° angle.

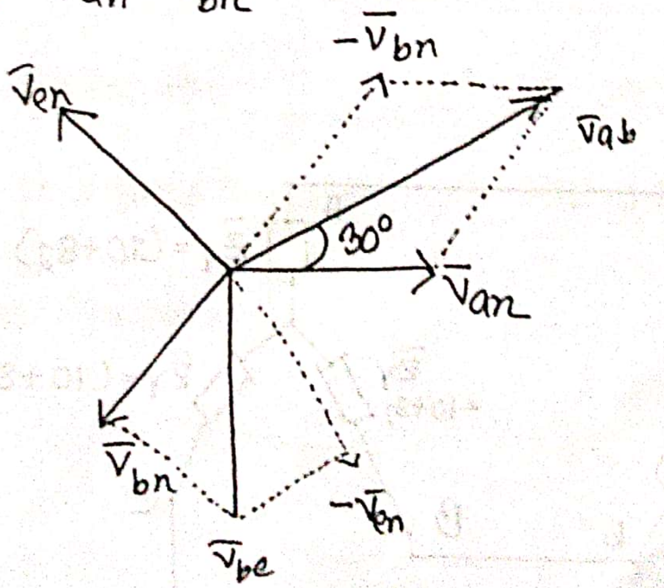
[Positive থাকলে lead
negative থাকলে lag]



$$\bar{I}_n = \bar{I}_a + \bar{I}_b + \bar{I}_c$$

$$\bar{V}_{ab} = \bar{V}_{an} - \bar{V}_{bn}$$

$$\bar{V}_{bc} = \bar{V}_{bn} - \bar{V}_{cn}$$



Phazor diagram

$$\bar{I}_n = \bar{I}_a + \bar{I}_b + \bar{I}_c$$

$$\bar{I}_a = \frac{\bar{V}_{an}}{\bar{Z}_y}$$

$$\bar{I}_b = \frac{\bar{V}_{bn}}{\bar{Z}_y} = \frac{\bar{V}_{an}\angle{-120^\circ}}{\bar{Z}_Y}$$

$$= \bar{I}_a \angle{-120^\circ}$$

$$\bar{I}_c = \bar{I}_a \angle{-240^\circ}$$

$$\therefore I = \bar{I}_a + \bar{I}_a\angle{-120^\circ} + I_a\angle{-240^\circ}$$

$$= \bar{I}_a \times [\cos 0^\circ + j\sin 0^\circ + \cos(-120^\circ) + j\sin(-120^\circ) + \cos(-240^\circ) + j\sin(-240^\circ)]$$

$$\therefore I = 0$$

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$V_L = \sqrt{3} V_P$

$I_L \quad I_P$

∴ nutral এর মধ্যে কোনো current flow হবে না।

$$V_{nN} = \bar{I}_n \cdot \bar{Z}_n = 0$$

Q.Q Show that; nutral এর মধ্যে যে তার মান 0 if the

load is balanced.

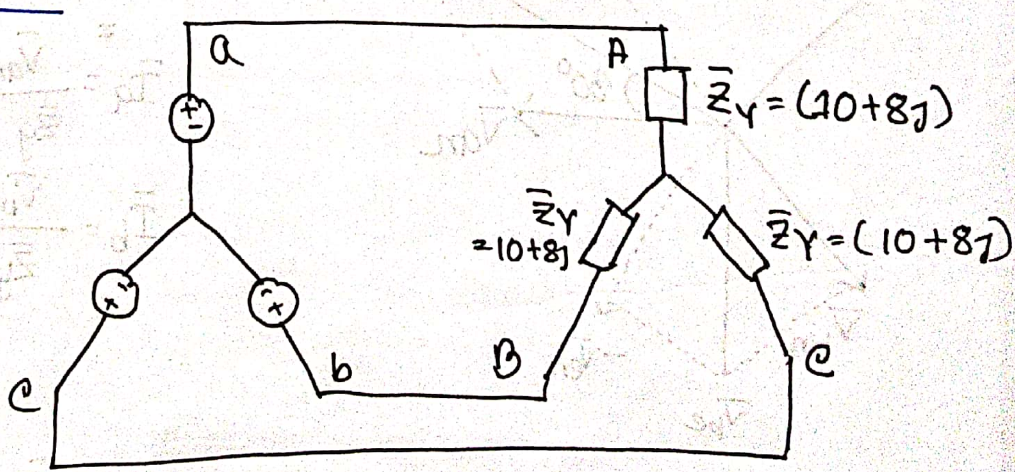
$$I_P = |\bar{I}_a| = |\bar{I}_b| = |\bar{I}_c| = I_L$$

Show that line current is equal to I_P in Y-Y system.

Problem 12·2

Ex: 12·2

abc phrase Sequence



$\bar{V}_{an} = 110 \angle 0^\circ$ v

$\bar{Z}_Y = (10 + j8)\Omega$

phrase voltage,

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$\bar{V}_{an} = 110^\circ \angle 0^\circ$ V

$\bar{V}_{bn} = 110^\circ \angle -120^\circ$ V

$\bar{V}_{cn} = 110^\circ \angle -240^\circ$ V

$\therefore$ Line voltage $\bar{V}_{ab} = \bar{V}_{an} - \bar{V}_{bn}$

$= 110^\circ \angle 0^\circ - 110^\circ \angle -120^\circ$

$= 190.52 \angle 30$

$\bar{V}_{bc} = 190.52 \angle 30-120$

$= 190.52 \angle -90^\circ$

$\bar{V}_{ca} = 190.52 \angle 30-240^\circ$ / $= 190.52 \angle 30^\circ + 120^\circ$

$= 190.52 \angle -210^\circ$ / $= 190.52 \angle 150^\circ$

Phrase current:

$\bar{I}_a = \frac{\bar{V}_{an}}{Z_Y}$

$= \frac{110 \angle 0^\circ}{10+8i} = 8.58 \angle -38.65$

$\bar{I}_b = 8.58 \angle -38.65-120^\circ = 8.58 \angle -158.65$

$\bar{I}_c = 8.58 \angle -38.65-240^\circ = 8.58 \angle -278.65$

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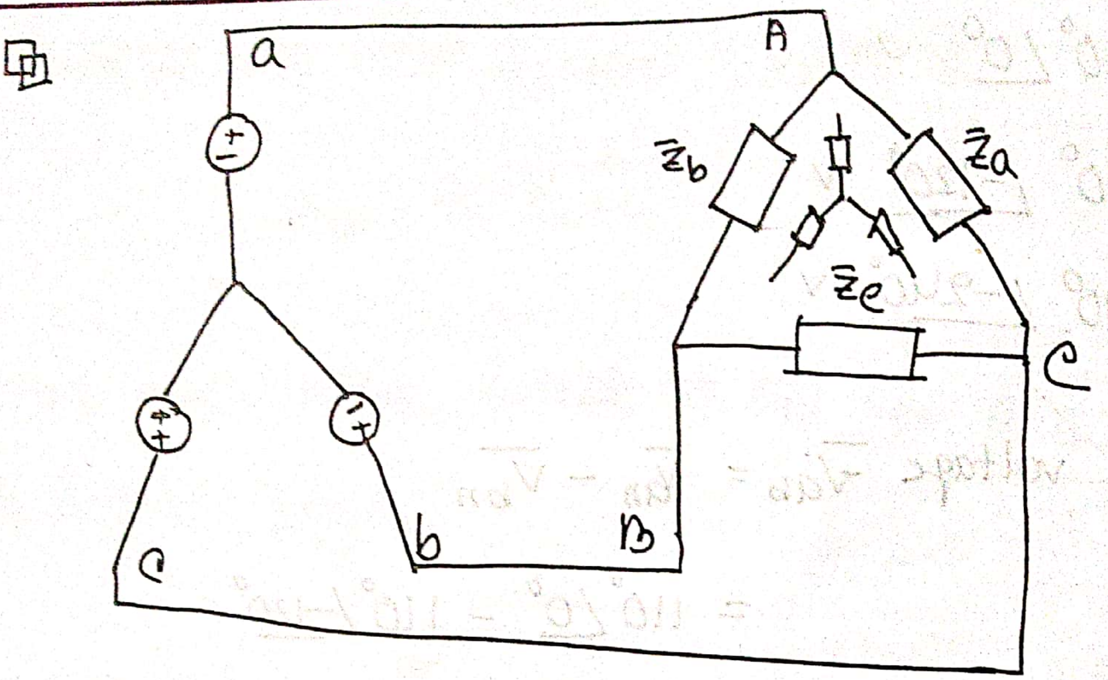
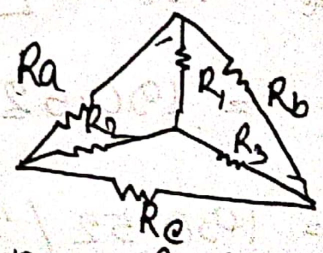


$$\bar{Z}_{AN} = \frac{\bar{Z}_\Delta \times \bar{Z}_\Delta}{\bar{Z}_\Delta + \bar{Z}_\Delta + \bar{Z}_\Delta}$$

$$= \frac{1}{3}\bar{Z}_\Delta$$

$$\Rightarrow \bar{Z}_a = 3\bar{Z}_Y$$



$$R_1 = \frac{R_a \cdot R_b}{R_a + R_b + R_e}$$

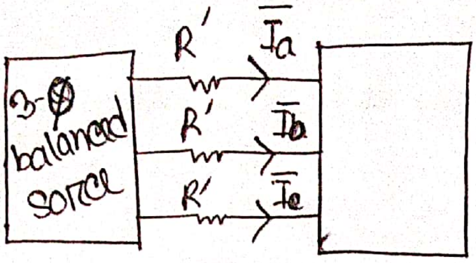
Ex

Practice P 12·2

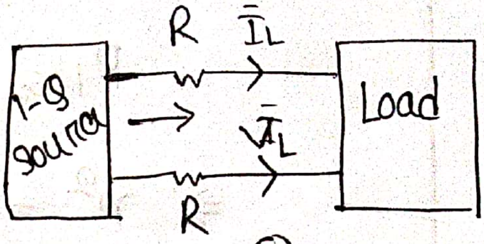
Ex — 12·3

P·P — 12·3

9th-D-Day
30-10-19



(i)



(ii)

$$R = \frac{\rho L}{A}$$

Resistivity same
same power loss
" " absourve

two wire 3-∅ system $I_L = \frac{P_L}{V_L}$

3-∅ Three wire system $I_L = |\bar{I}_a| = |\bar{I}_b| = |\bar{I}_c| = \frac{P_L}{\sqrt{3}V_L}$

$$P_{loss} = 2I_L^2 R$$

$$= 2 \cdot \frac{P_L^2}{V_L^2} R$$

$$P'_{loss} = \frac{3I_L^2 R'}{1}$$

$$= 3 \times \frac{P_L^2}{(\sqrt{3})^2 V_L^2} R'$$

$$= \frac{P_L^2}{V_L^2} R'$$

$$\frac{P_{loss}}{P'_{loss}} = 2 \cdot \frac{P_L^2}{V_L^2} R \times \frac{V_L^2}{P_L^2 \times R'} = \frac{2R}{R'}$$

$$R = \rho \frac{l}{\pi p^2}$$

$$= \frac{2 \times \rho \times l}{\pi p^2} \times \frac{\pi p'^2}{\rho l}$$

$$= \frac{2p'^2}{p^2}$$

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যেহেতু Power loss এর পরিমাণ সমান

$$P_{loss} = P'_{loss}$$

$$\Rightarrow r^2 = 2r'^2$$

$$\frac{\text{Matarial for 1-}\phi\text{ system}}{\text{Matarial for 3-}\phi\text{ system}} = \frac{2\times \pi r^2 l}{3\times \pi r'^2 l}$$

$$= \frac{4 r'^2}{3\times r'^2}$$

$$= \frac{4}{3}$$

Matarial for 1-ϕ = 1·33 × Matarial for 3-ϕ system

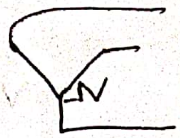
∴ 1-ϕ system uses 33% more matarial than a 3-ϕ system

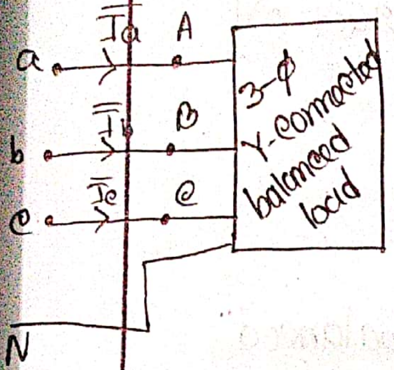
Q. Show that 1-ϕ system uses 33% more matarial than 3-ϕ system

R equal এর এটা question এর জন্য পড়তে হবে

Power distribution:

N = nutral point





$$i_a = \sqrt{2} I_p \cos(\omega t - \theta)$$

$$i_b = \sqrt{2} I_p \cos(\omega t - \theta - 120^\circ)$$

$$i_c = \sqrt{2} I_p \cos(\omega t - \theta + 120^\circ)$$

[θ কারণ voltage ~~দিবার~~ ~~কিছুক্ষণ~~ পর current flow করে]

$$V_{AN} = \sqrt{2}\, V_p \cos \omega t$$

$$V_{BN} = \sqrt{2}\, V_p \cos(\omega t - 120^\circ)$$

$$V_{CN} = \sqrt{2}\, V_p \cdot \cos(\omega t + 120^\circ)$$

Total ~~intan~~ instandineous power $p = p_a + p_b + p_c$

$$= V_{AN} I_a + V_{BN} I_b + V_{CN} I_c$$

$$= 2V_pI_p \cos \underbrace{\omega t}_{A} \cos \underbrace{(\omega t - \theta)}_{B} + 2V_pI_p \cos \underbrace{(\omega t - 120^\circ)}_{A} \cos \underbrace{(\omega t - \theta - 120^\circ)}_{B} + 2V_pI_p \cos \underbrace{(\omega t + 120^\circ)}_{A} \cos \underbrace{(\omega t - \theta + 120^\circ)}_{B}$$

$$= V_pI_p \left[3\cos\theta + \cos(2\omega t + \theta) + \cos(\underbrace{2\omega t - \theta}_{A} - \underbrace{240^\circ}_{B}) + \cos(\underbrace{2\omega t - \theta}_{A} + \underbrace{240^\circ}_{B})\right]$$

$$= V_pI_p \left[3\cos\theta + \cos(2\omega t - \theta) + 2\cos(2\omega t - \theta)\cos 240^\circ\right]$$

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$$= V_pI_p\left[3\cos\theta + \cos(2\omega t-\theta) + 2\cos(2\omega t-\theta)\left(-\frac{1}{2}\right)\right]$$

$$= V_pI_p\left[3\cos\theta + \cos(2\omega t-\theta) - \cos(2\omega t-\theta)\right]$$

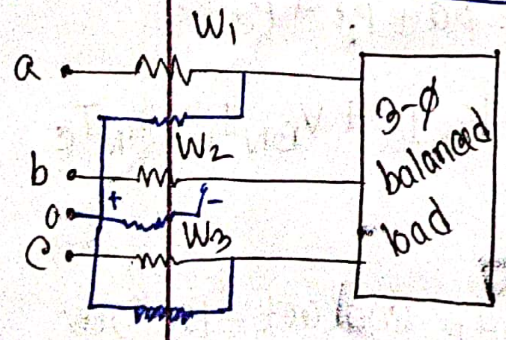
$$\therefore P = 3V_pI_p\cos\theta$$

∴ Total instanteneous power of a 3-ϕ balanced system remains constant.

Q. Total instanteneous power of a 3-ϕ balanced system remains constant → show that.

[balaced system থাকলে 2-ϕ system use করা]

⊡ 3-ϕ power measurment:



Total avarage power

$P = P_1 + P_2 + P_3$ ($P_2 \to 0$)

Two wattmeter measured

a,b,c 3টি source যা Y/Δ connected

যদি systemটি balanced হয় তাহলে Nutral current ০ থাকবে যায় তাই P=0

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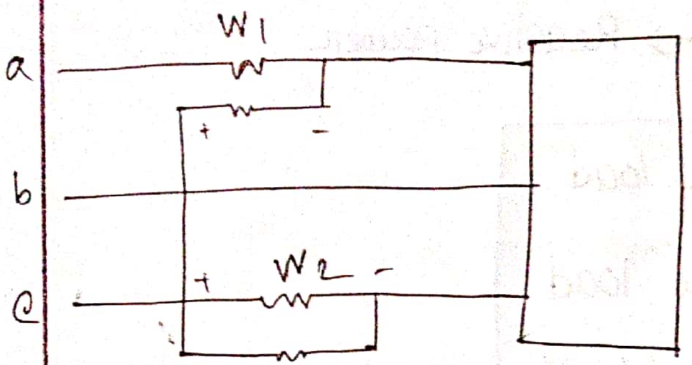

$P_1 = Re[V_{ab} \bar{I}_a]$

$P_2 = Re[\bar{V}_{cb} \bar{I}_c]$

Total avarage power $P = P_1 + P_3$

$= V_L I_L \cos(\theta + 30^\circ) + V_L I_L \cos(\theta - 30^\circ)$

$= V_L I_L [\cos(\theta + 30^\circ) + \cos(\theta - 30^\circ)]$

$= V_L I_L \cdot 2\cos\theta \cos 30^\circ$

$= V_L I_L \cdot 2\cos\theta \cdot \frac{\sqrt{3}}{2}$

$$P = \sqrt{3} V_L I_L \cos\theta$$ → Real power

$P_1 = Re[V_{ab} \bar{I}_a]$

$= V_{ab} I_a \cos(\theta + 30^\circ)$

$= V_L I_L \cos(\theta + 30^\circ)$

$P_3 = Re[\bar{V}_{cb} + \bar{I}_c]$

$= V_{cb} I_c \cos(\theta - 30^\circ)$

$= V_L I_L \cos(\theta - 30^\circ)$

Q. discass to wardmeter method for mearing avarage power?

$P_3 - P_1 = V_L I_L \cos(\theta - 30^\circ) - V_L I_L \cos(\theta + 30^\circ)$

$= V_L I_L [\cos(\theta - 30^\circ) - \cos(\theta + 30^\circ)]$

$= V_L I_L \cdot 2\sin\theta \sin 30^\circ$

$= V_L I_L \cdot 2 \cdot \sin\theta \cdot \frac{1}{2} = V_L I_L \sin\theta$

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$P_3 - P_1 = V_L I_L \sin\theta$ → Reactive power

$P_1 = P_3$ → Resistive load

$P_1 > P_3$ → capacitive load

$P_1 < P_3$ → Inductive load

Ex: 12.13

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9th-E Day
02-11-19

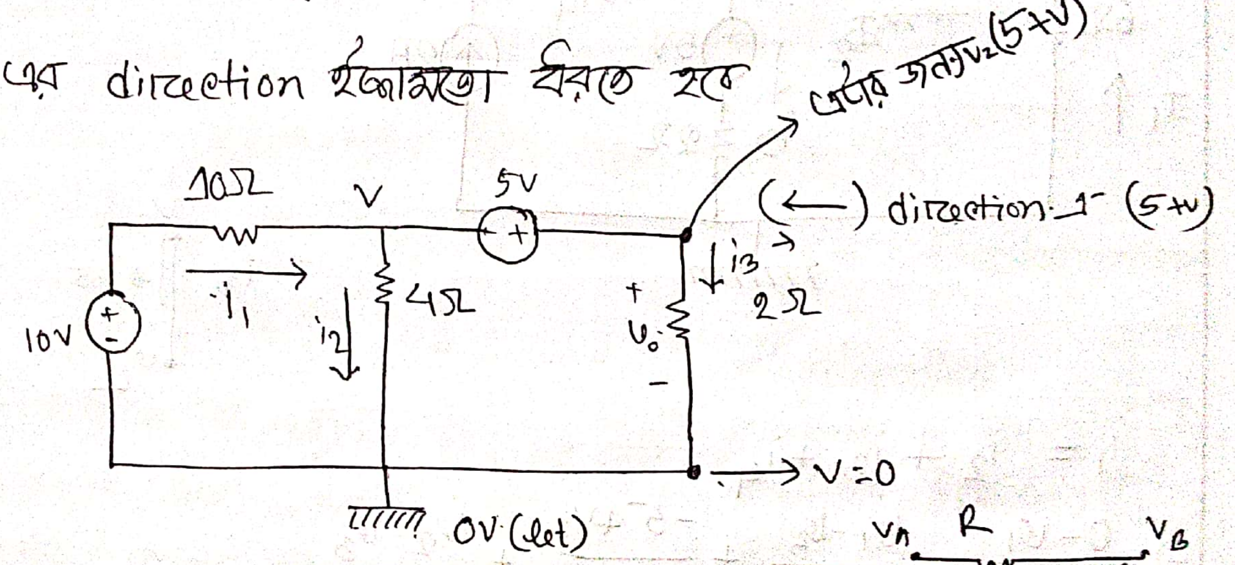
EEE (Reza sir)

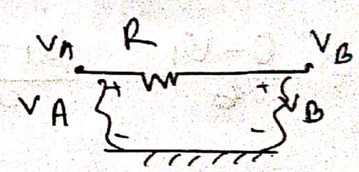
Node anylis: একাধিক element connect থাকে

একটি reference এ node ধরতে হবে

kcl apply করতে হবে।

Current এর direction ইচ্ছামতো ধরতে হবে





$$I = \frac{V_B - V_A}{R}$$

$$i_1 = i_2 + i_3$$

$$\Rightarrow \frac{10-v}{10} = \frac{v-0}{4} + \frac{(5+v)-0}{2}$$

$$\Rightarrow v = -1.76$$

$V_{AB} = V_A - V_B$ [KCL অনুযায়ী]

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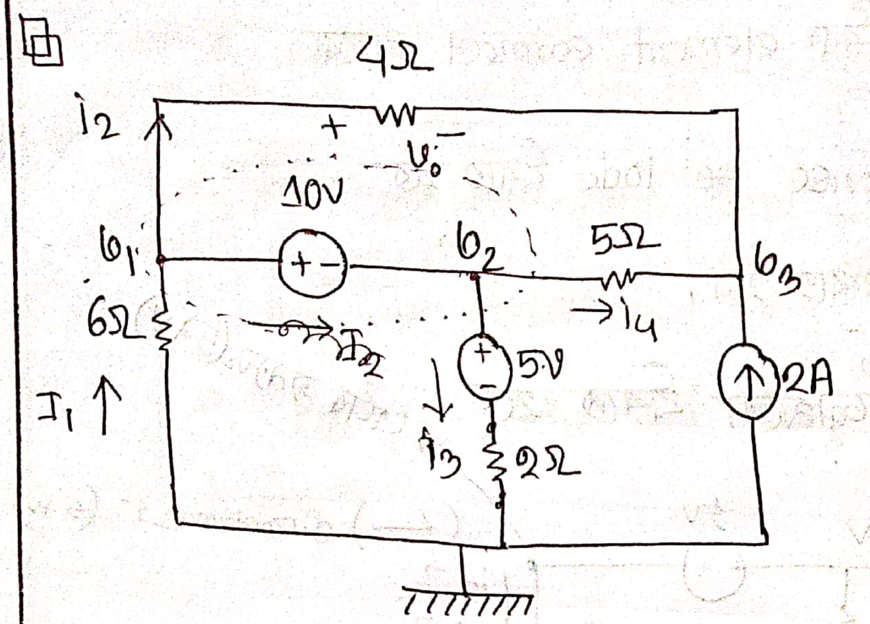
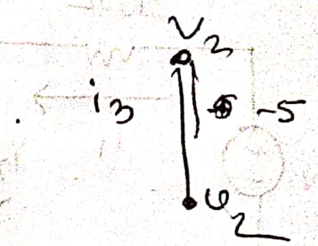
Super node





$$i_1 = i_2 + i_3 + i_4$$

$$\Rightarrow \frac{0 - v_1}{6} = \frac{v_1 - v_3}{4} + \frac{-5 + V_2}{2} + \frac{V_2 - v_3}{5} \quad \text{— (i)}$$

$\Rightarrow$

$$v_1 - v_2 = 10 \quad \text{— (ii)}$$

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২৩-১১-১৯
12-D Day

CT-3 → Three phrase current
CT-4 → Electronic

New chapter

Electronics

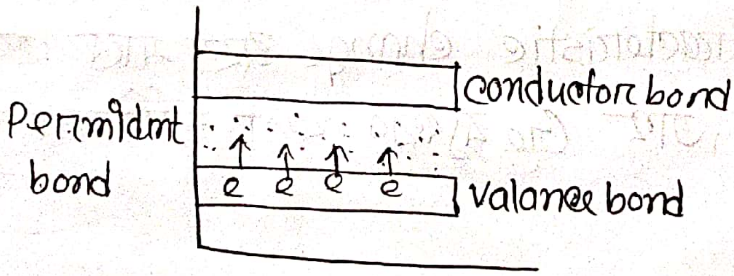
Current conductor দিয়ে হলে electrical
" " sumiconductor দিয়ে হলে electronics.

electrical

* electron এর জন্য current flow হয়
* conductor use করা হয়।

electronics

* electron ও bond ছুটার জন্য current flow হয়।
* Semi conductor use করা হয়।



* Semi conductor এ conductor ও valance bond এর মাঝামাঝি। এর ২ ধরনের reason এর কারণে current flow হয়।

* Semi conductor:

Si → 0.7V	Ge → 0.3V
(14)	(32)
2, 8, 4	2, 8, 18, 4

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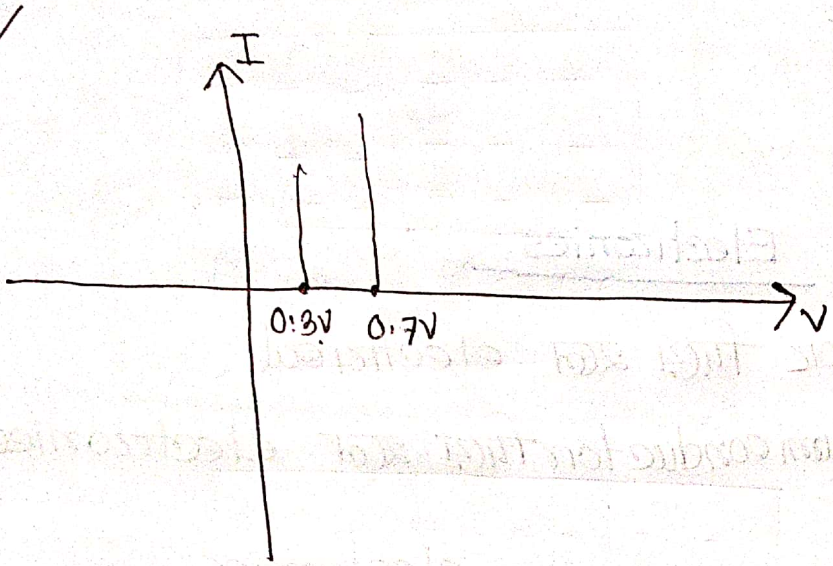
Question আসবে

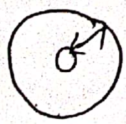
I-V characteristic curve:



Ge use করা সুবিধাজনক নাকি?

* নিউক্লিয়াস থেকে last orbite এর দূরত্ব অনেক বেশি electron কে relize করা যায় সহজে এবং temperature বাড়লে এদের characteristic change হয়ে যাবে এবং unstable হয়ে যায়। তাই Ge ব্যবহার করা সুবিধাজনক না।

Si এর ক্ষেত্রে



→ distance কম তাই temperature বাড়লে এর characteristic chng হয় না তাই Si ব্যবহার করা সুবিধাজনক

electron relize করা যায় না সহজে

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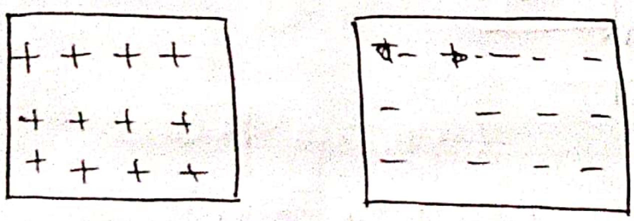
Semi conductor:

- → Intrinsic
- → Extrinsic
  - → p-type
  - → n-type

Doping:

→ বাহির থেকে ভেজাল add করলে conductivity বাড়ানোর জন্য Doping ব্যবহার করা হয়।

→ electron এর সংখ্যা বাড়ানো যায়।



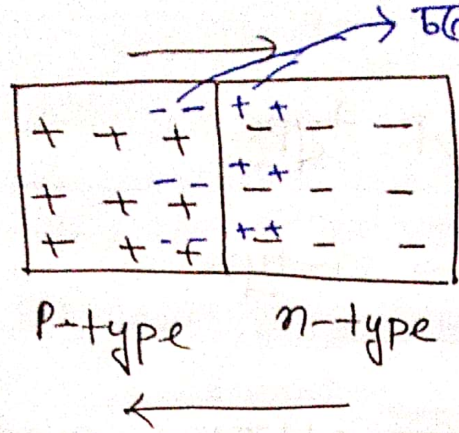
hole ← p-type   n-type →

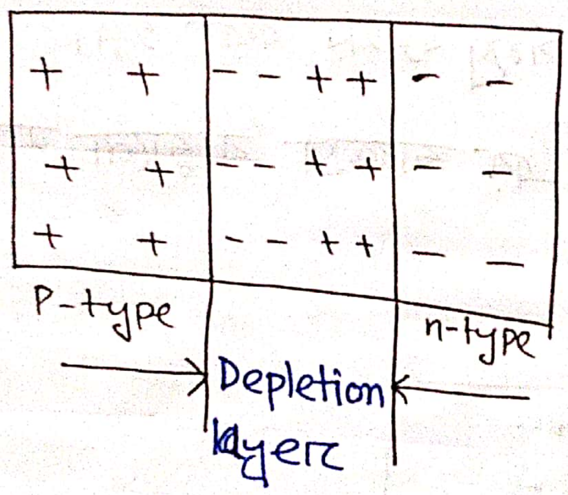
Majority charge carrier → e h

minority charge carrier

☐ connect করলে → (p + n) type

→ চলে আসবে এবং একত্রসময় layer তৈরি করবে

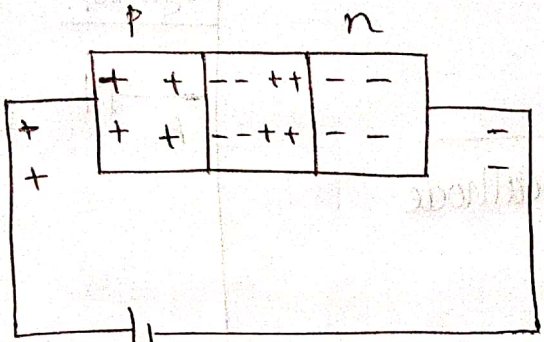




☐ Biasing : বাহির থেকে external dc voltage দেওয়ার process.

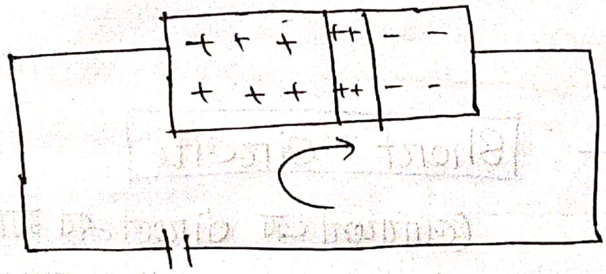
- Forward
- Reverse

Forward:



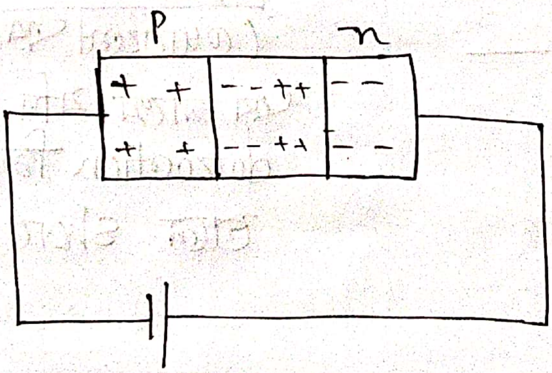
→ বিপরীত ধর্মী চার্জ পরস্পরকে আকর্ষণ করে depletion layer narrow হয়ে যাবে

→ current flow হয় সহজে,



Question: P-n type যখন add করা হয় তখন Forward এবং Reverse Biasing এর ক্ষেত্রে condition কেমন হবে??

Reverse:



* P-type এর (+) এর সাথে ব্যাটারির (−) প্রান্ত এবং n-type এর (−) এর সাথে ব্যাটারির (+) প্রান্ত যুক্ত হয়ে Reverse Biasing তৈরি হয়,

* resistivity বেড়ে যাবে current কম flow হবে (leakage current)

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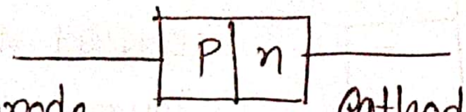
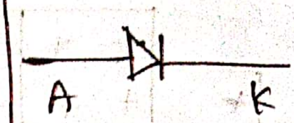
Diode:



Symbol:

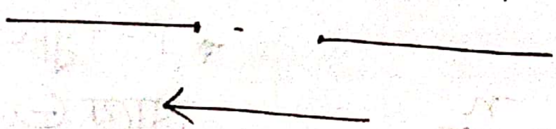


FB:

Short circite

(current এর direct এর সাথে diode এর derection মিলে গেলে তা short circite)

R.B:

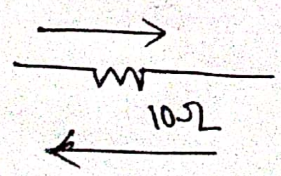


Open circite

(current এর derection এর সাথে যদি diode এর derection মিলে না তাহলে short circite)

Q. Defference Between unilateral element and Biolateral element??

- Unilateral element:
  - Diode resistance
- Bilateral element: → current যেদিকেই থাকনা কেন. এর element change হয় না।



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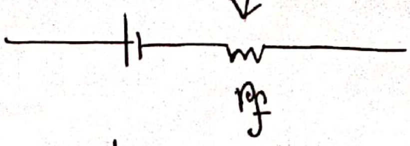
passive ~~ke~~ element:

we use	
Si	Ge
0.7V	0.3V

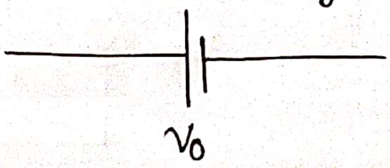
Diode এর model:

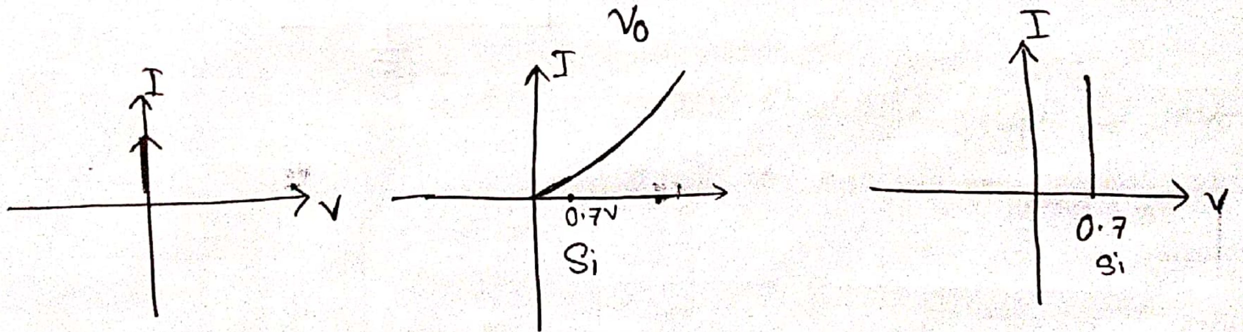
① Ideal model:

(ii) Approximate modal:



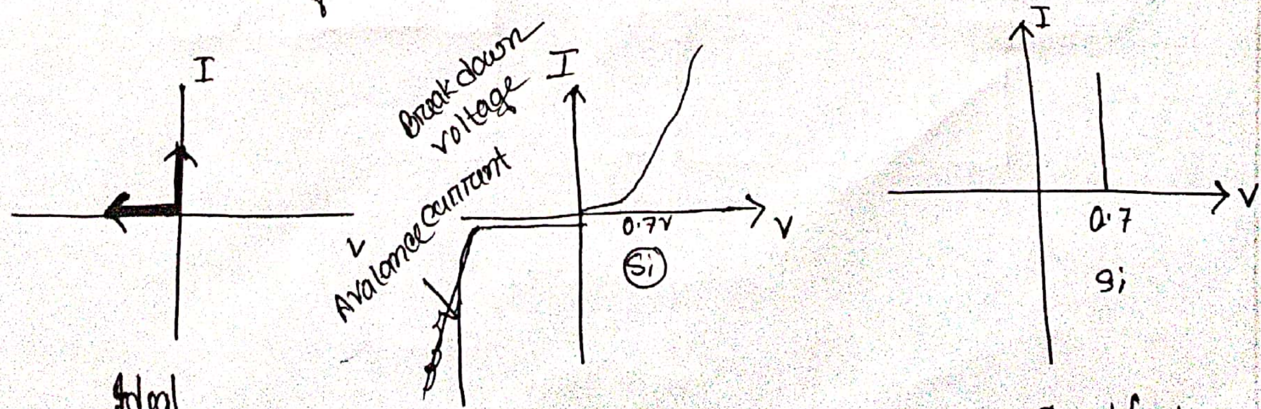
(iii) Simplified modal:





Ideal — approximate — Simplified

reverse Bioyes এর :



Ideal — approximate — Simplified

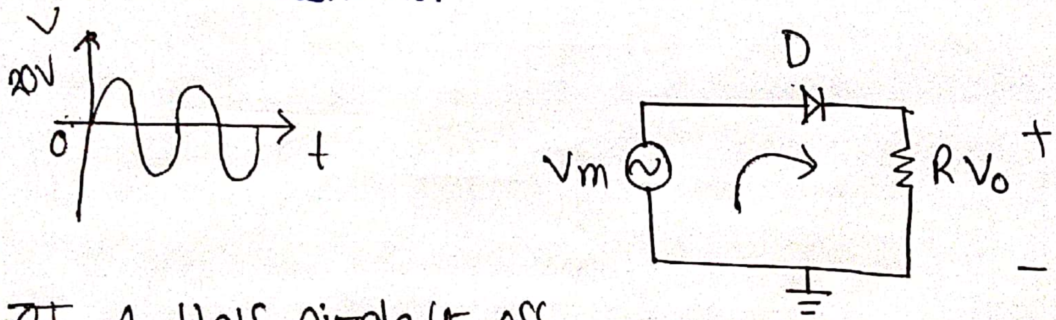
12th E Day
24-11-19

Rectifier: এমন Device যা AC → DC করে

2 types:

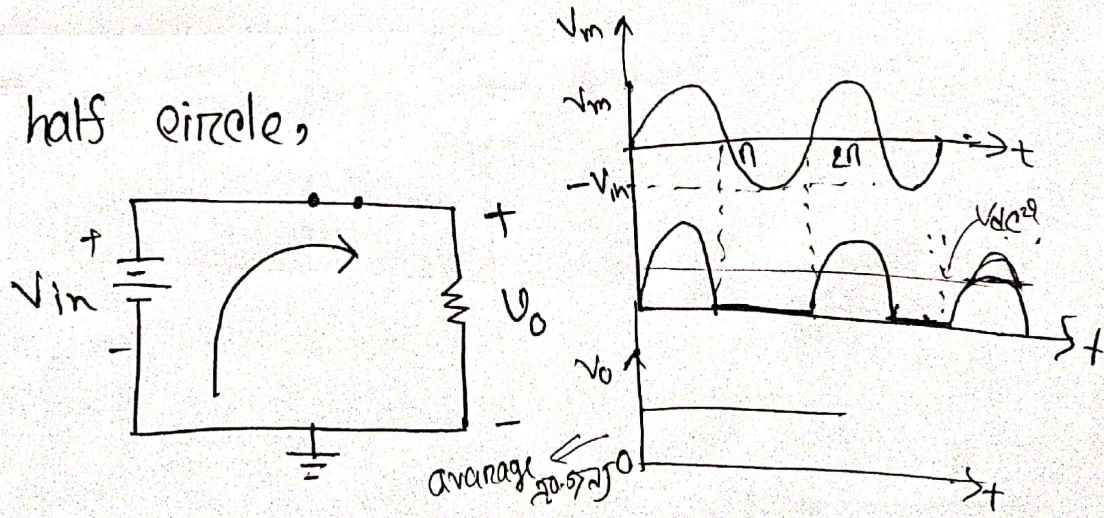
① Half wave rectifier
② full wave ,,
- → Full wave bridge rectifier
- → center tap full wave rectifier

Half wave rectifier:



যে 1 Half circle এ off
এবং পরের ,, ,, ,, On থাকে,

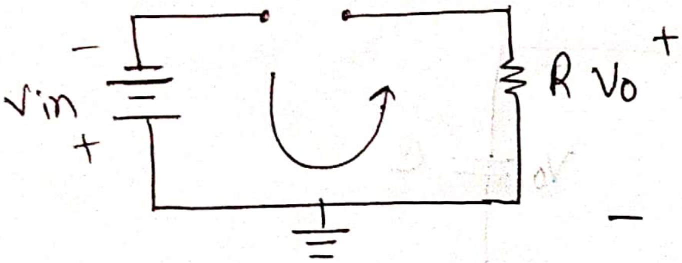
For half circle,



$$-V_m + V_0 = 0$$

$$\therefore V_m = V_{in}$$

For negative half circle



$V_0 = IR = 0 \times R = 0V$

Q. Explain the half wave rectifier?

⊞ Rippole: AC ও DC ২টার বৈশিষ্ট্য থাকে।

$$V_{dc} = \frac{1}{2\pi} \int_0^{\pi} V_m \sin t \, dt$$

$$= \frac{1}{2\pi} V_m \left[-\cos t\right]_0^{\pi}$$

$$= \frac{V_m}{2\pi} (-\cos\pi + \cos 0^\circ)$$

$$= \frac{V_m}{2\pi} 2 = \frac{V_m}{\pi} = 0.318 V_m$$

$V_{dc} = 0.318 V_m$ → Avarage value

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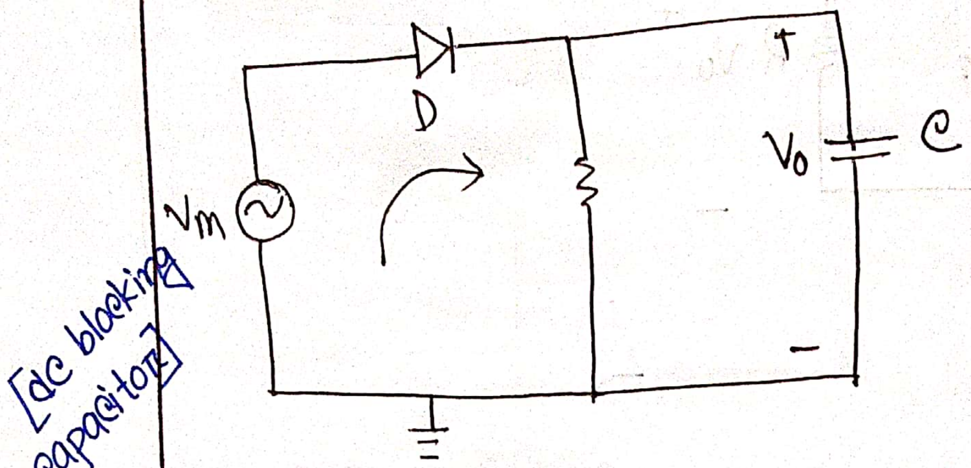
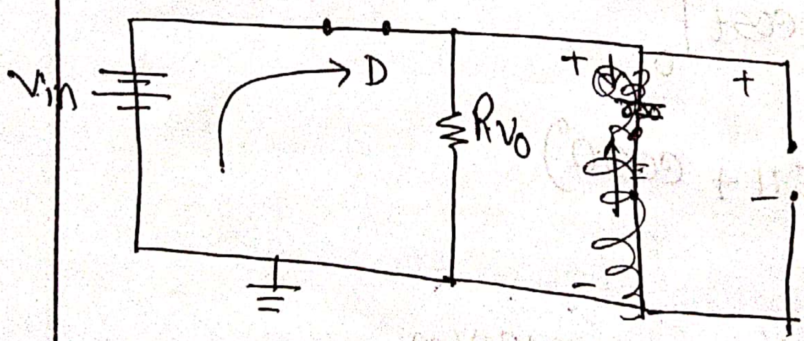
For pure dc :



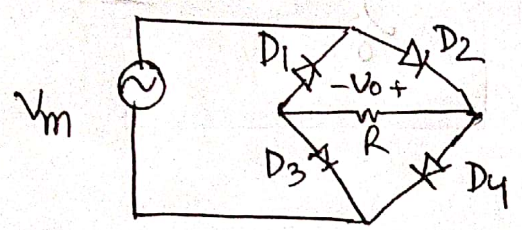
$$X_C = \frac{1}{2\pi f \, X_C}$$

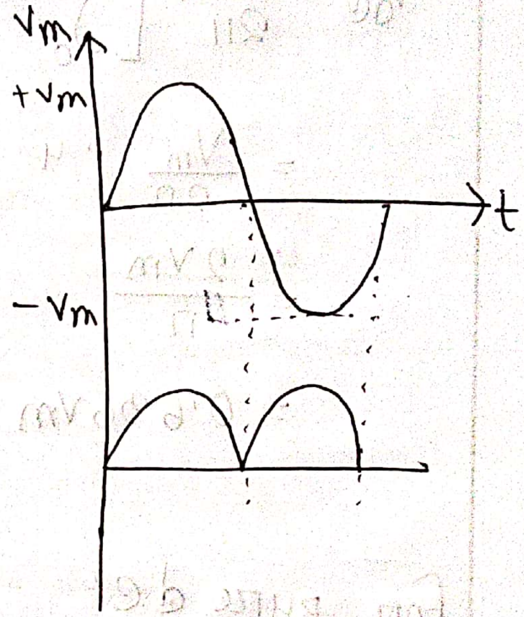
$f \to 0 \implies C \to \infty$

$f \to high \implies C \to 0$

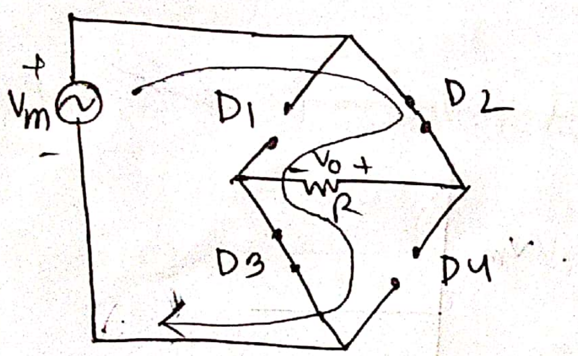


Full wave rectifiered.: Both half circle এ conduction করবে





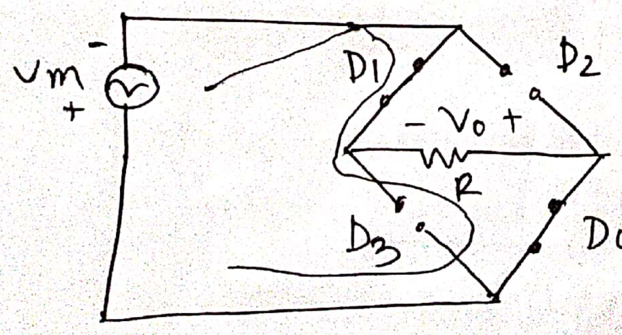
For positive half cycle,



$-V_{in} + V_0 = 0$

$\Rightarrow V_0 = V_{in}$

For negative half cycle;



$-V_{in} + V_0 = 0$

$\Rightarrow V_0 = V_{in}$

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Avarage value,

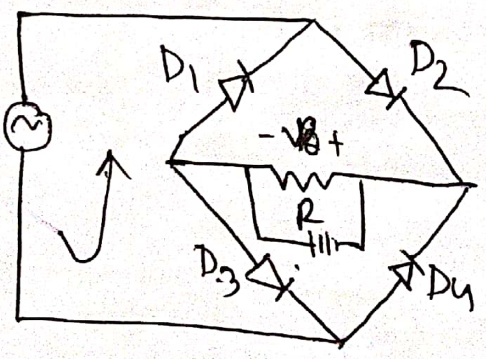
$$V_{dc} = \frac{1}{2\pi}\left[\int_0^{\pi} V_m \sin t\, dt + \int_0^{2\pi} V_m \sin t\, dt\right]$$

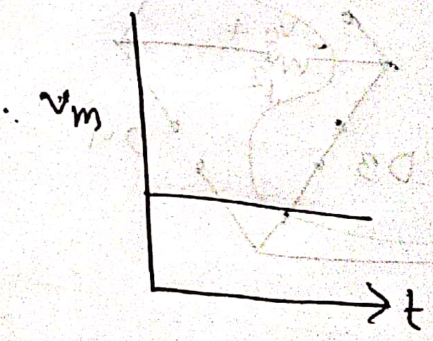
$$= \frac{V_m}{2\pi} \cdot 4$$

$$= \frac{2V_m}{\pi}$$

$$= 0.636 V_m$$

For pure dc:





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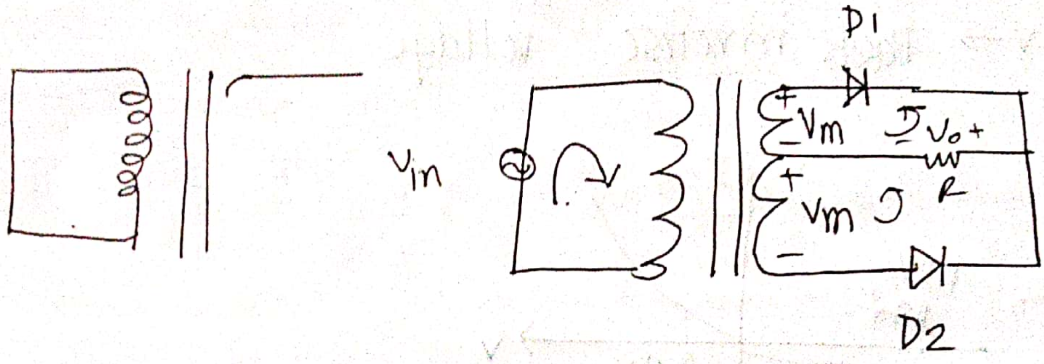
27-11-19
13-C-Day

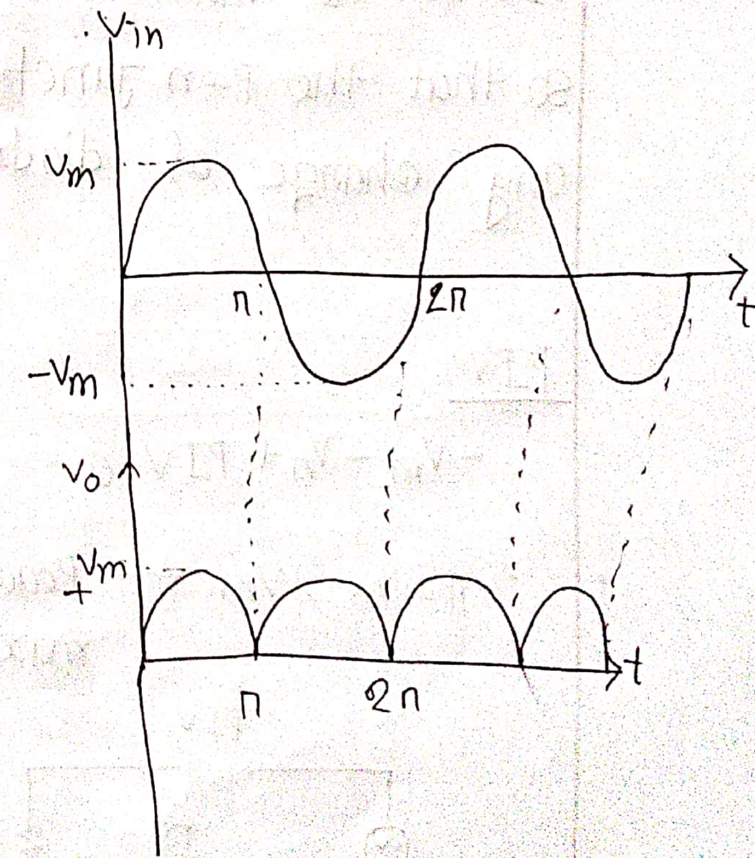
Full wave rectifier using center tap transformation:



Step down transformer use হয়

230/24 V

Input wave transformation



For positive half cycle:

D_1 on, D_2 off

$-V_{in} + V_o = 0$

$\therefore V_o = V_{in}$

For negative half cycle:

FB → D_2 On, D_1 off

$-V_{in} + V_o = 0$

$\therefore V_o = V_{in}$

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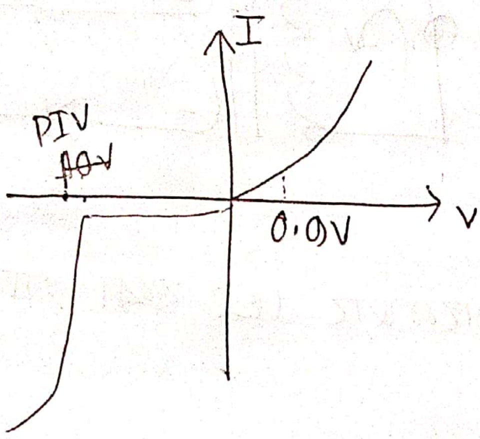
(lecture দিলাতে হবে)

PRV → Pack revarage voltage

/PIV → Pack inverse voltage

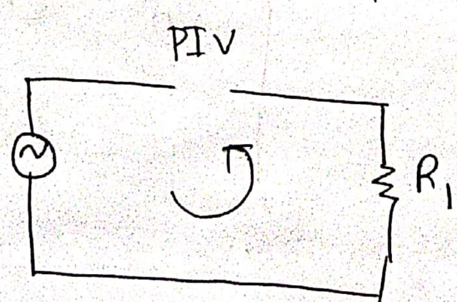


PIV is the maximum revarse ~~Biouse~~ Bias potentiol so that the p-n junction with stands without any change of diode.

PIV:

$$-V_m - V_n + PIV = 0$$

$\Rightarrow PIV = 2V_m$ ← Peack voltage এর 2 গুন দিয়ে maximum হবে।



$-V_m - 0 + PIV = 0$

$\Rightarrow$ $PIV \geq V_m$

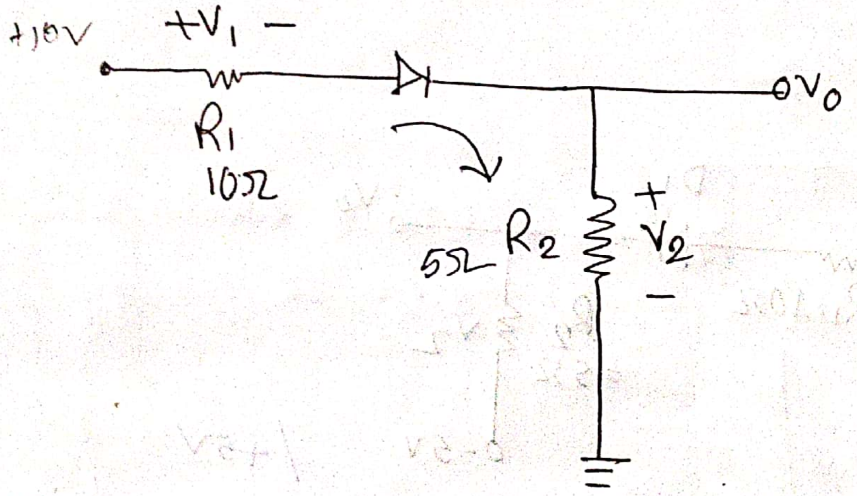
Half ~~brige~~ wave

brige.

(i) PIV 2 গুণন করতে হচ্ছে
(ii) Center define করা কষ্ট কর } Half wave

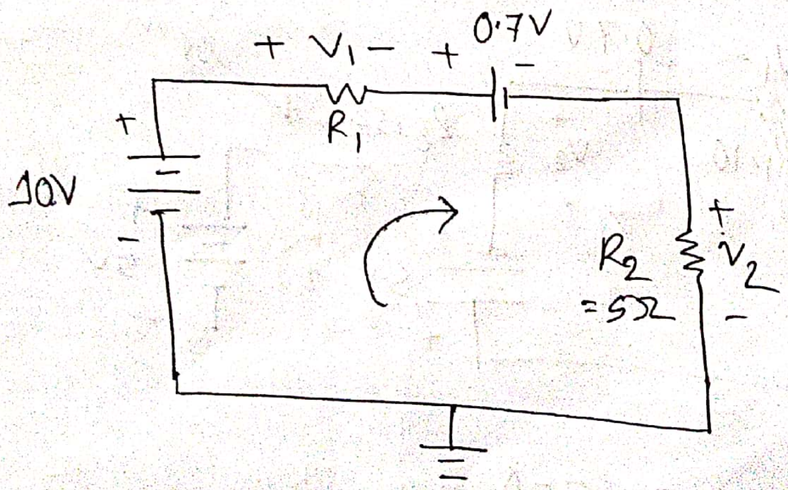
তাই Half wave avoid করে Full wave use করা হয়।

Math:



V_1, V_2, V_o, I = ??

Ans:



Applying KVL

$$-10 + I\times10 + 0.7 + 5I = 0$$

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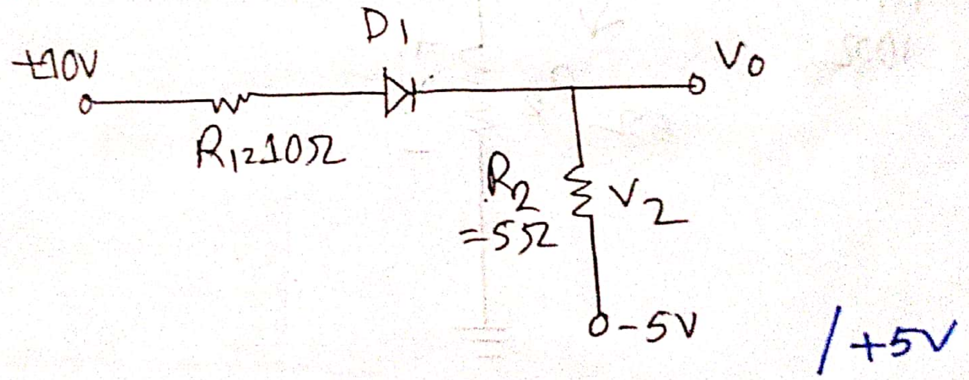
$\therefore I = \dfrac{10-0.67}{10+5}$

$V_1 = I \times 10 = \square\ V$

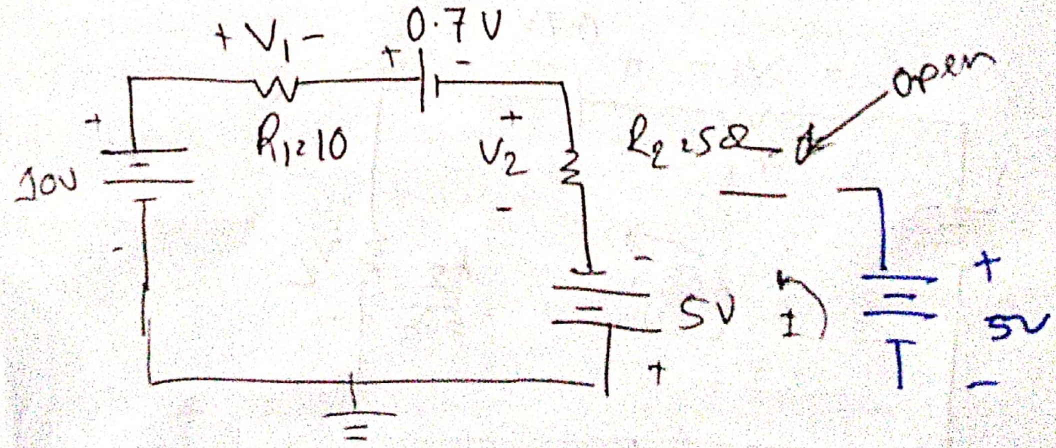
$V_2 = I \times 5 = \square\ V$

$V_0 = V_2$

OR:



$V_1, V_2, V_0 \Rightarrow I = ?$



$-10 + 10I + 0.7 + 5I - 5 = 0$

$\Rightarrow I = ?$

$-V_0 + V_2 - 5 = 0$

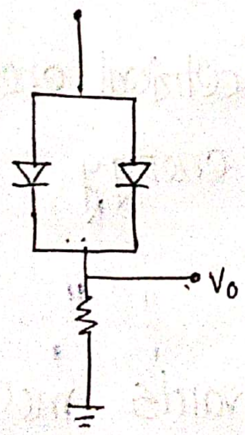
$\Rightarrow V_0 = V_2 - 5$

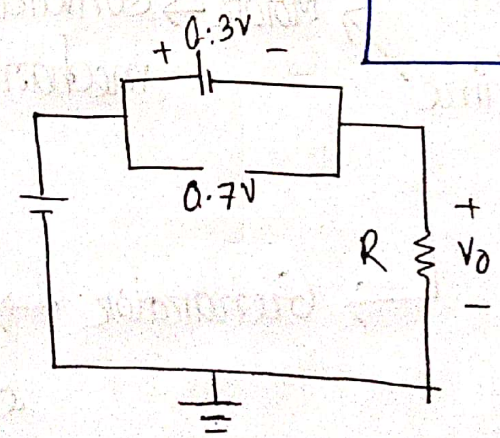
$\Rightarrow V_0 = \square$

Assessment → for CT 4

Problem no:

Ex: 2.5, 2.7, 2.6, 2.7, 2.9, 2.10, 2.12, 2.14, 2.17





V = দেয়া

I = n

4টি বাল্ব একসাথে connect করলে @ (series)এ কত I প্রবাহিত হবে ?

02-12-19
13-D-Day

New cheapter

Machine

Machine → Electrical energy কে machanical energy তে convart করবে

2types:
→ Motor
→ Genarator

Machine → Motor → converts electrical energy into mechanical energy.
Machine → Genarator → converts mechanical energy into electrical energy.

Electrical energy ⇒ Motor ⇒ Mechanical energy
↓
Example
(power point)

input হিসাবে electrical energy থাকলে motor
" " mechanical " " Genarator

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☐ DC Genarator হতে হলে ৩টি condition maintain করতে হয়।

☐ DC Genarator: → ৩টি condition:

i) Magnatic field

ii) A group of conductor

iii) Motion of that conductor (moving | vibration | গতিশীলতা condition থাকতে হবে)

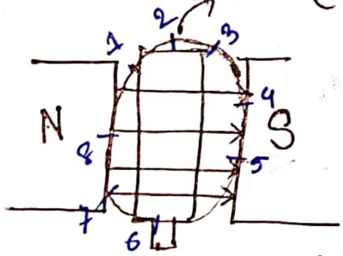
↓ খুব Important

conductor / single conductor / cu wire (which is moving)

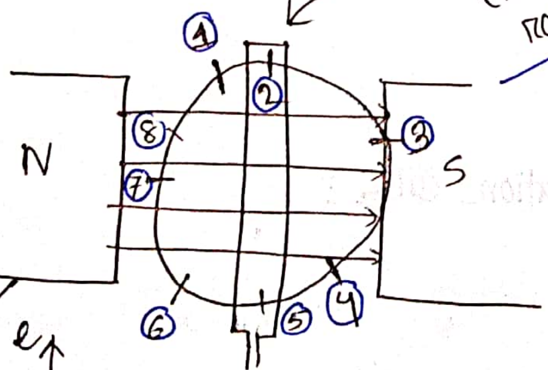
কোনো magnate এ conductor দিলে ঐ conductor এর, Motion এর কারনে electric flux কাজ করবে এবং যে পরিমান flux কাজ করবে ঐ পরিমান voltage কাজ করবে

→ ফ্যারাডের Law (electric magnatic law)

☐

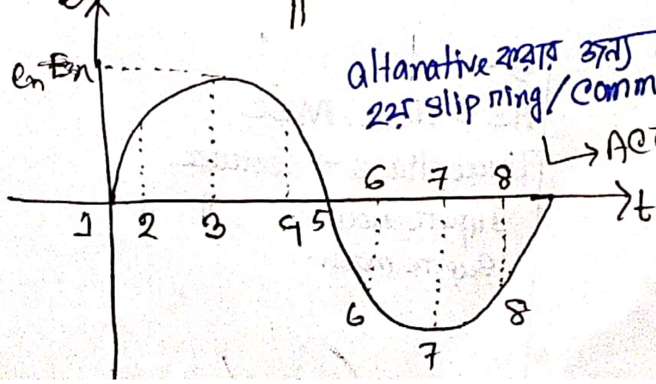


Arratary → Rotor (DC Genarator এ rotate করে) Rotor



Field System ← Stator

Induce voltage এর পরিমান altanative voltage



altanative করার জন্য use করা হয় slip ring / commutator

↳ AC কে DC করে

Q. DC Generator এর princepal?

conductor parallal এ move করলে Induce voltage 0

R angle করলে Induce voltage বাড়বে

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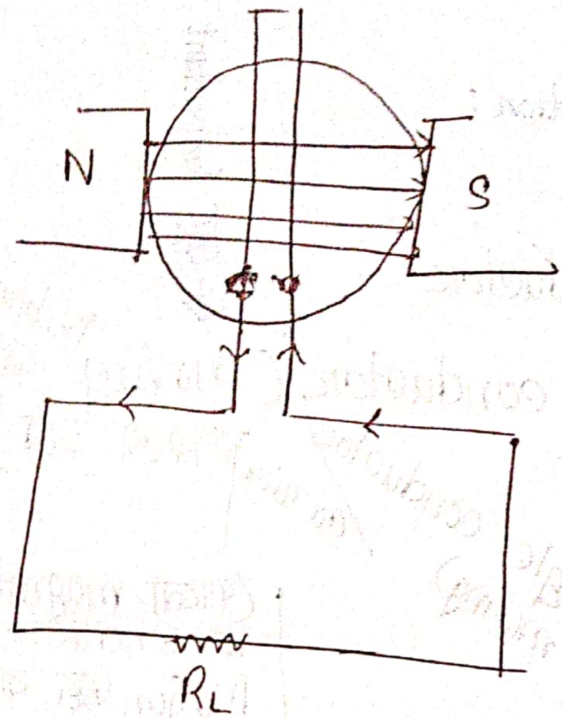
Generator:



Altaratory:

Filed station হবে stator
Arvatary হবে rotar

Q. Generator ও Motor এর Application লেখ?

Q →
AC → Node, Mase
Threephase → lecture
Super node
Super mash.

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