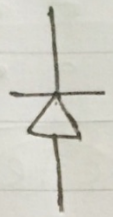
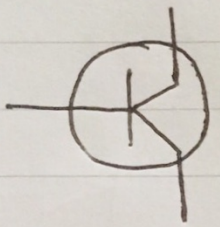
Date ...../...../.....

Diode

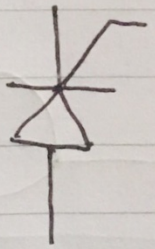
* N type meterial + P type meterial = Diode



* N type meterial + P type meterial + N type meterial = transistor

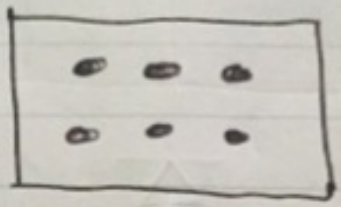


* N type meterial + P type meterial + N type " + P " "
= thyristor



Date ...../...../.....

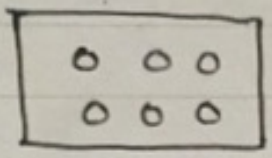
* N type material এর মধ্যে অনেক free ইলেকট্রন থাকে।



* P type material এর মধ্যে অনেক free hole থাকে।

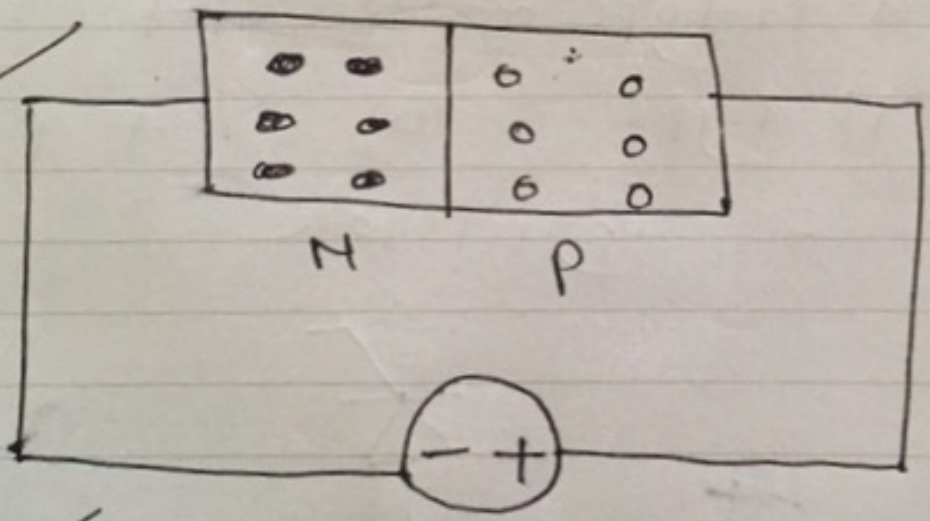
↓

নিকেল of electron

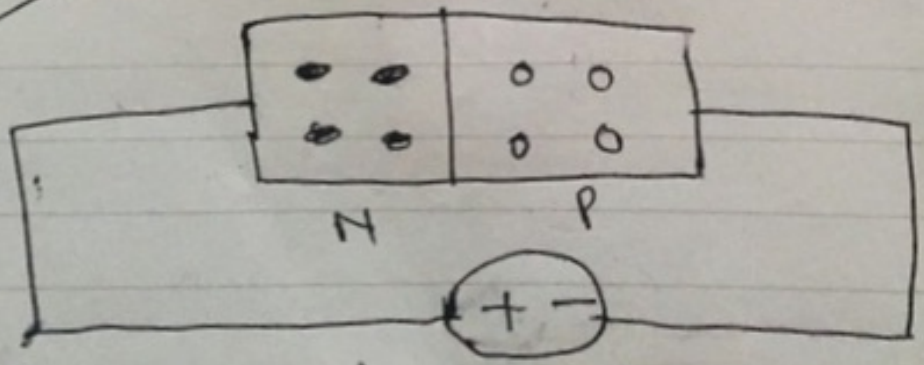


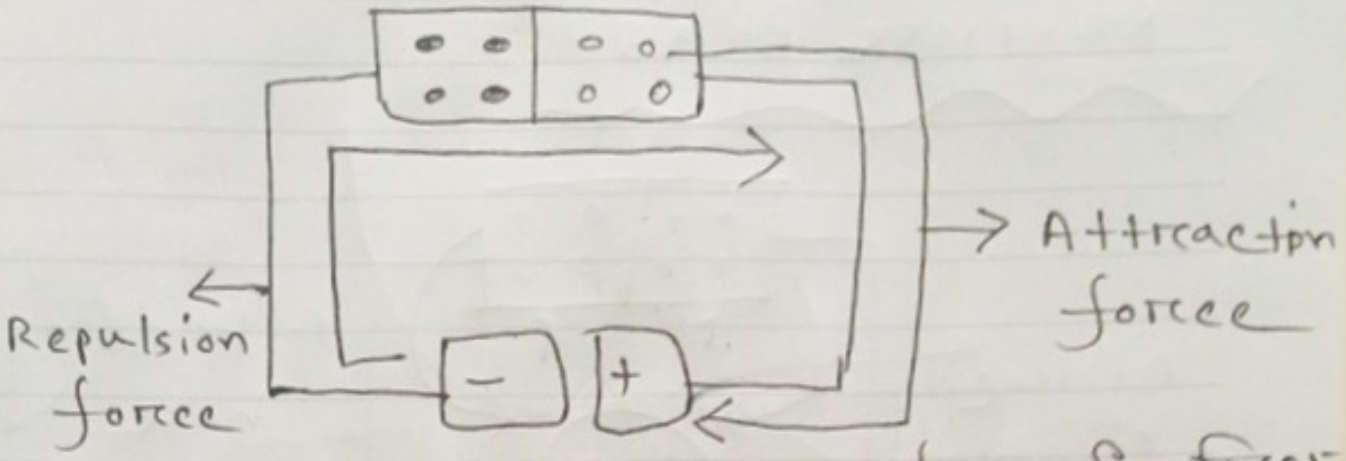
Connection

case-1



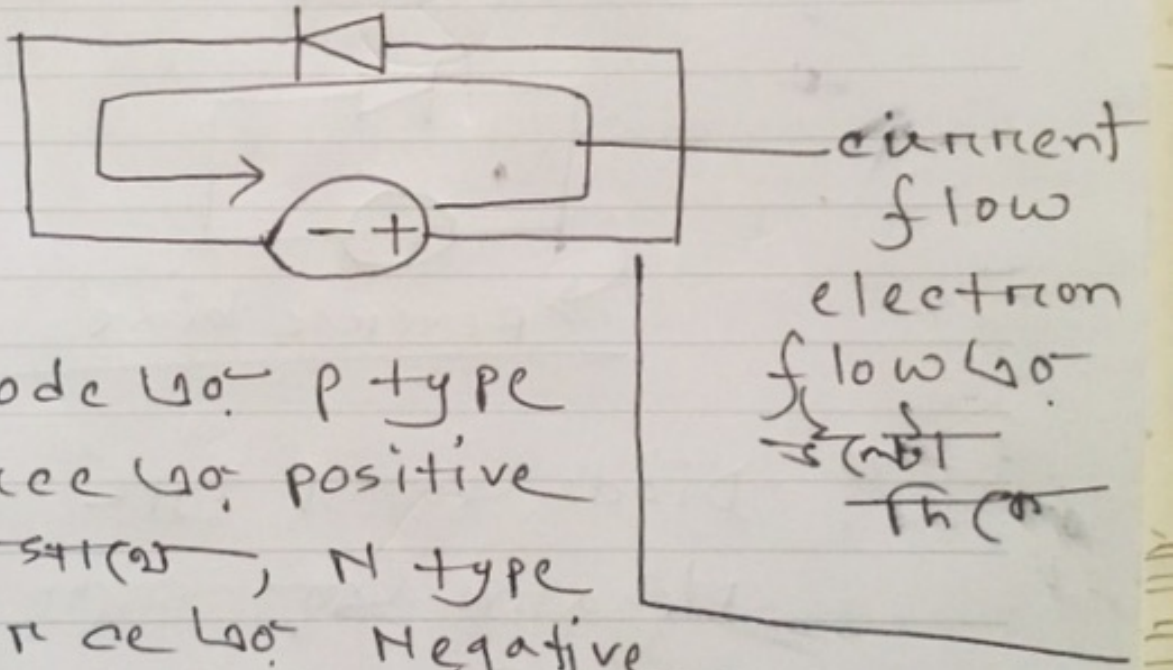
case-2





* source থেকে negative দিয়ে electron

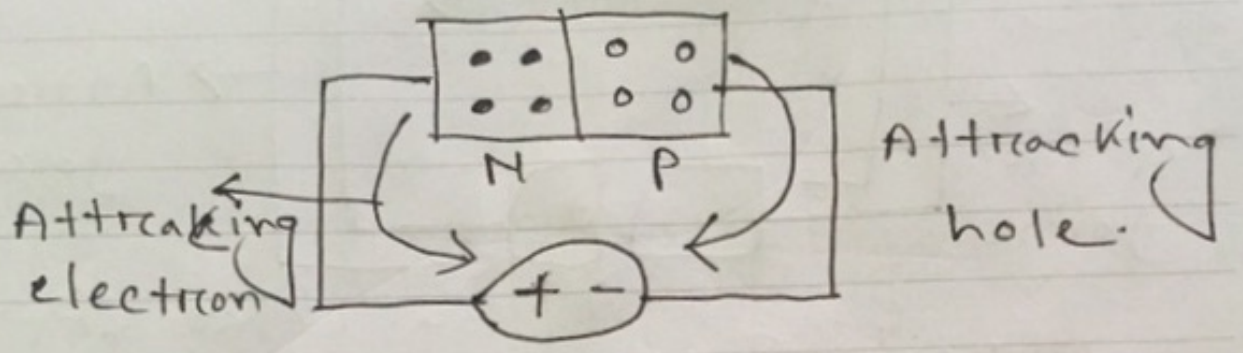
Diode circuit (forward Bias)



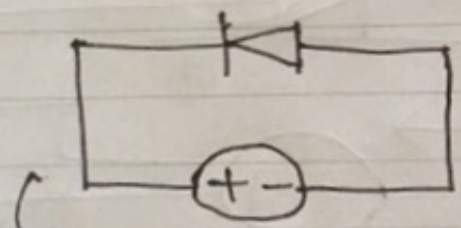
* Diode এর p type source এর positive এর সাথে, N type source এর Negative এর সাথে connect করলে source থেকে Diode দিয়ে current pass হয়ে circuit এর মধ্য দিয়ে।

Date ...../...../.....

Reverse Bias



* Reverse Bias এ কোনো current flow হয় না।



* Diode এর P type কে Negative এর সাথে connect করলে, N type কে positive এর সাথে connect করলে এবং সঠিক ভিত্তে Diode current

flow হতে পারে না তাকে Reverse bias বলে।

Characteristics Curve

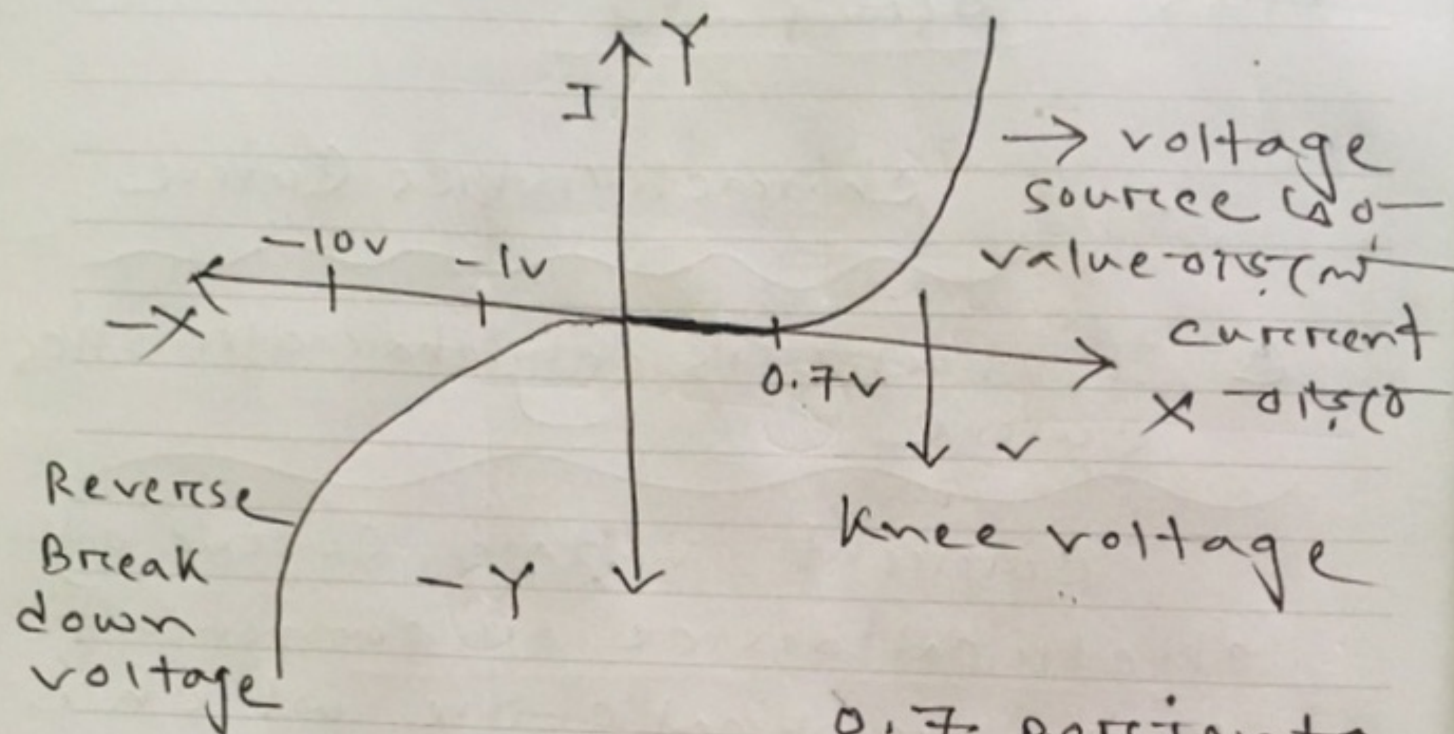
- If there is only characteristics curve

Current - voltage curve of electrical device or component is a graphical curve which is used to define it's operation within eletrical circuit.

If there is more than one characteristics curve

Current - voltage curve of electrical device or component is a ~~geo~~ group of graphical curve which is used to define it's operation within electrical circuit.

Curve



0.7 porjonto
current 0 A

Date ...../...../.....

Linear Circuit

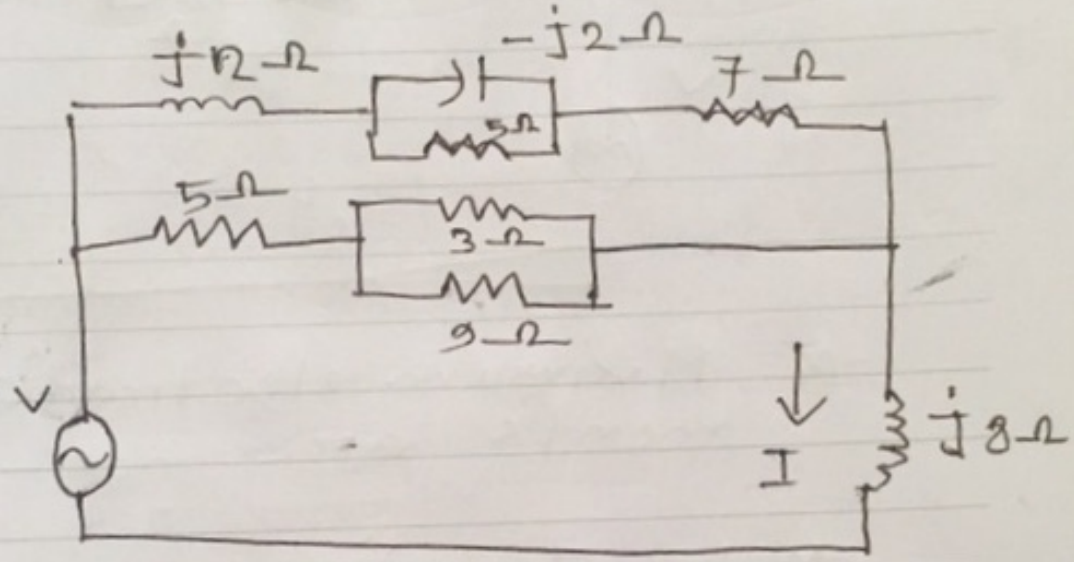
$y = ax$

x = input

y = output

a = Constant

$I = aV$, the circuit is linear

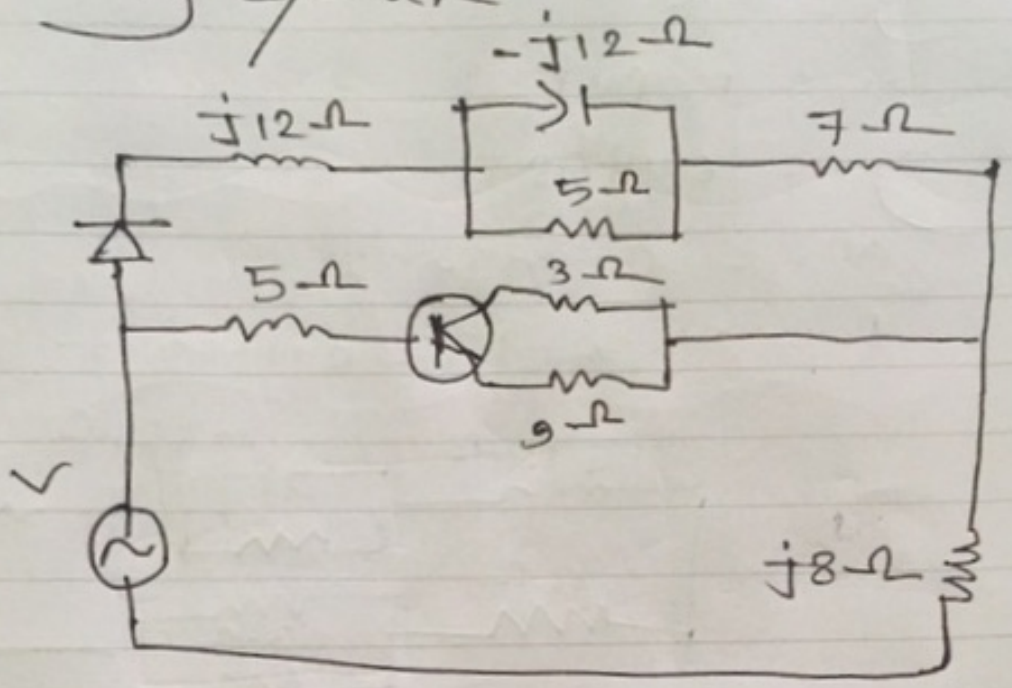


* Generally, basic electrical circuits are linear.

* In linear circuits, ohms law, Nodal analysis, Mesh analysis, superposition theorem etc are applicable

Non linear circuit

$y \neq ax$

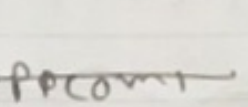


- Maximum electronic equipments are non-linear.
- In non-linear circuit, ohms law, Nodal analysis, Mesh analysis, Superposition theorem etc are not applicable.

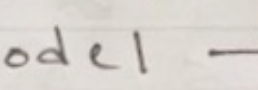
That's why we need Equivalent circuit.

Date ...../...../.....

3 types diode equivalent circuit

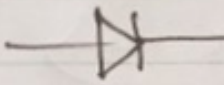
1) ~~Approxi~~  $r_d = \frac{\Delta V_d}{\Delta I_d}$

Approximate or piecewise Linear equivalent circuit

2) simplified equivalent circuit or constant voltage drop model  $r_d = 0 = \frac{1}{g_d}$

$g_d = \infty = 90°$

3) Ideal equivalent circuit.

 $V_d = 0$

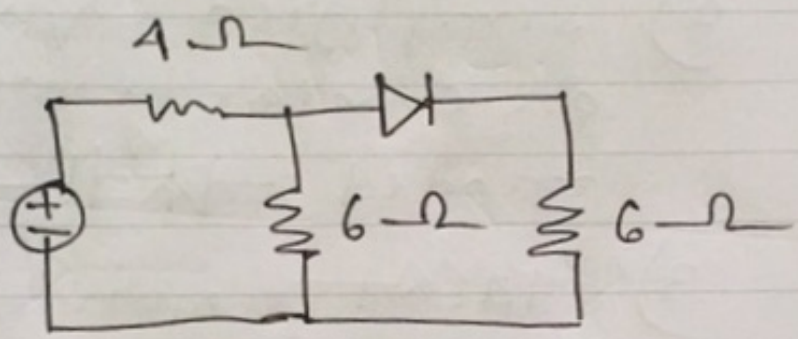
* Diode ලට P type ලට ~~fix~~ voltage Source ලට positive, N type ලට ~~fix~~ voltage Source ලට Negative.

$V_{source} = V_b$ (b = built-in potential

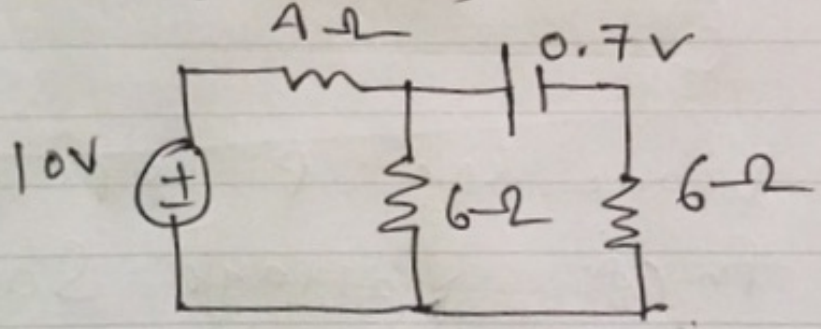
for Si ⊕, $V_b = 0.7\ v$

for a circuit having a diode

before →



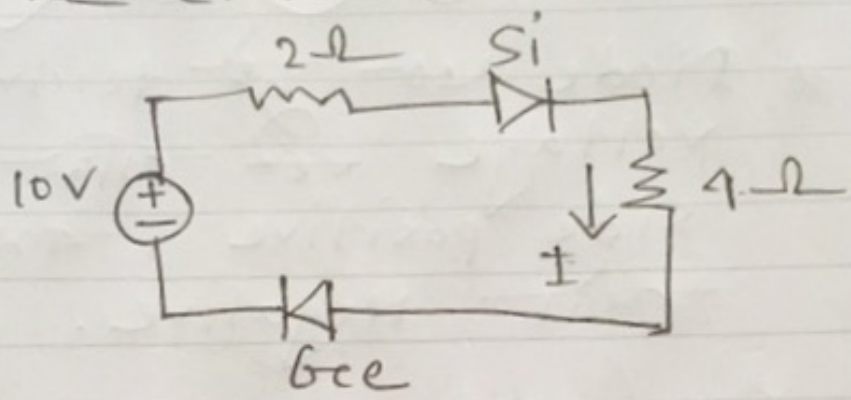
After →

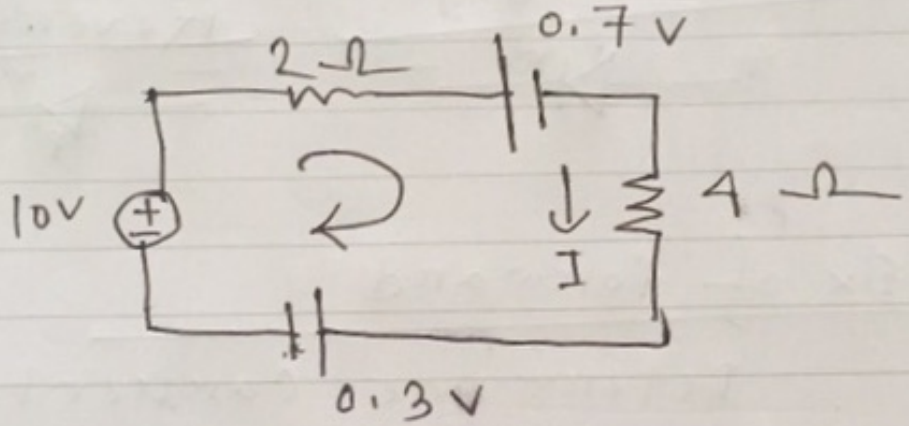


Date ...../...../.....

Example

Determine current I from the circuit —





$$-10 + 2I + 0.7 + 4I + 0.3 = 0$$

$$\Rightarrow 6I = 10 - 0.7 - 0.3$$

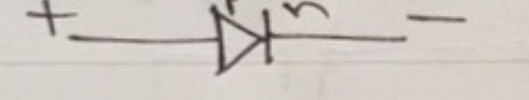
$$\Rightarrow I = \frac{9}{6} A$$

$$= 1.5 A$$

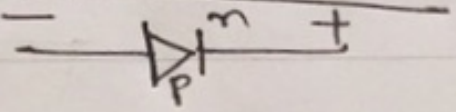
How to understand biased condition (Forward or Reverse)?

* Diode এর দুই terminal এর voltage কোন side positive, আর কোন side Negative.

Forward

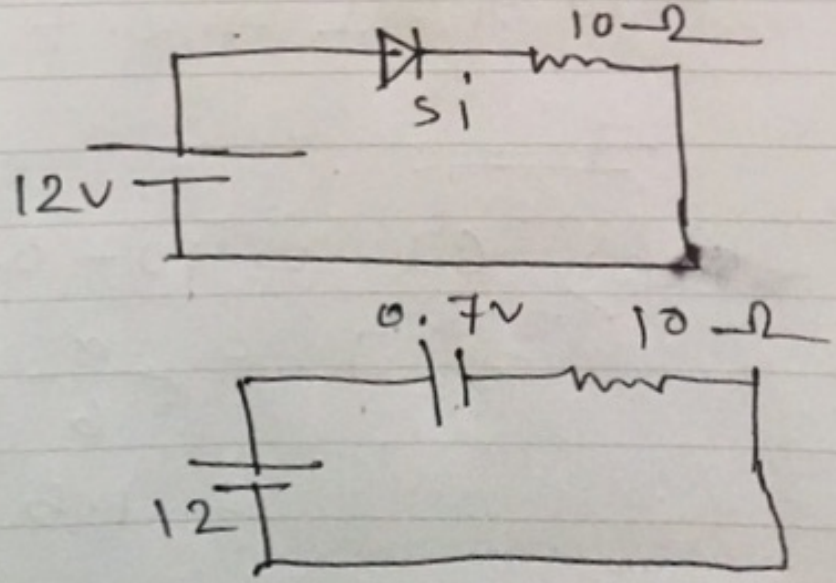


Reverse



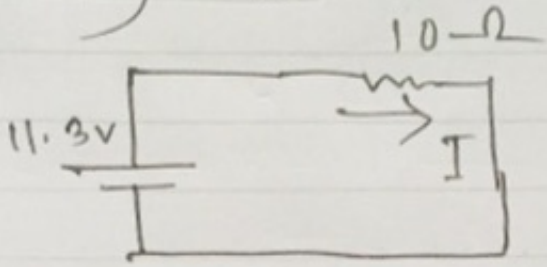
Ex of forward

Determine current through 10 ohm resistor.



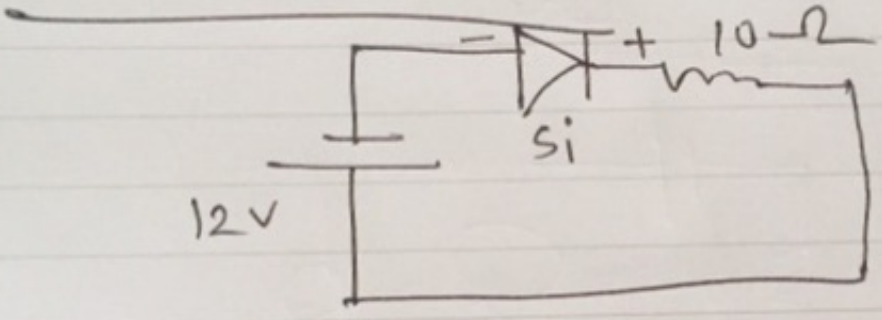
Date ...../...../.....

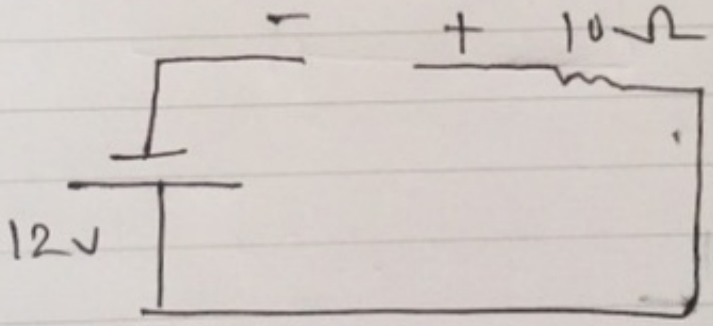
$(12 - 0.7) = 11.3\ V$



$$I = \frac{11.3}{10} = 1.13\ A$$

For Reverse





$I = 0$ (bez of the verse bi)