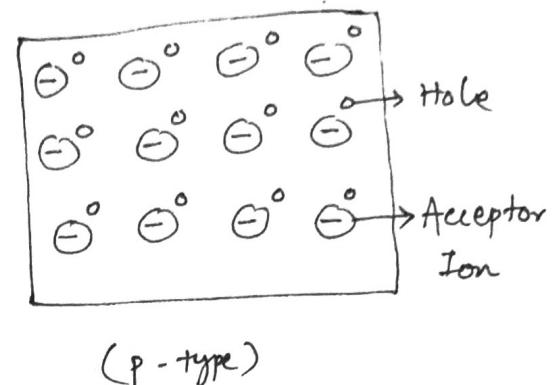
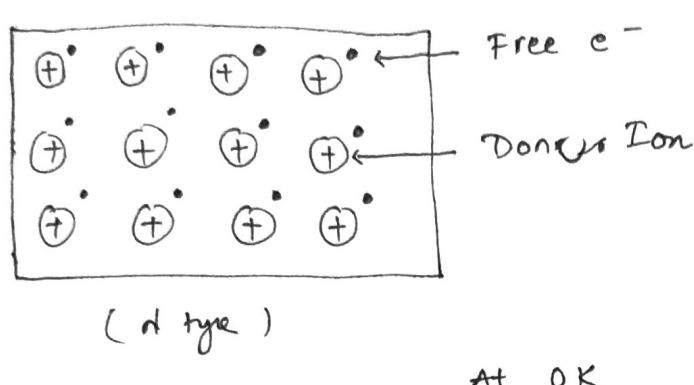


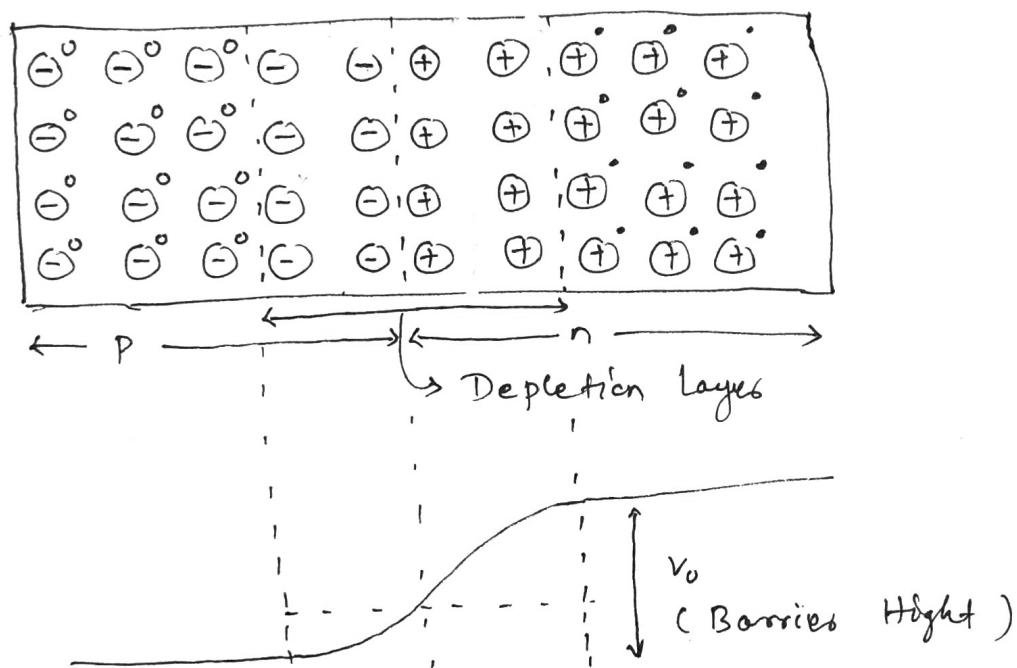
# CHAPTER - 1

## P-N Junction Diode

1.



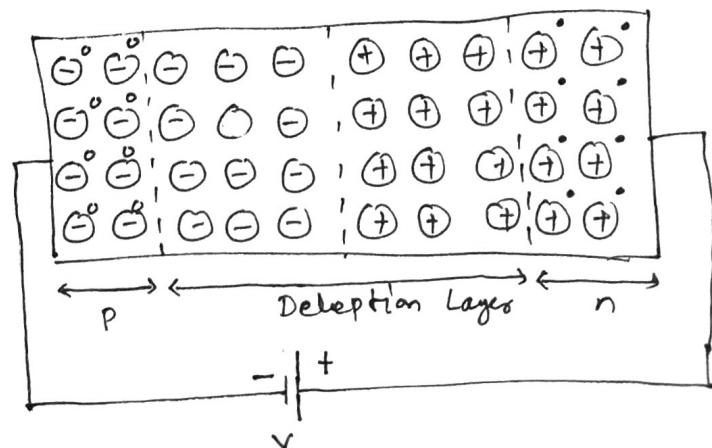
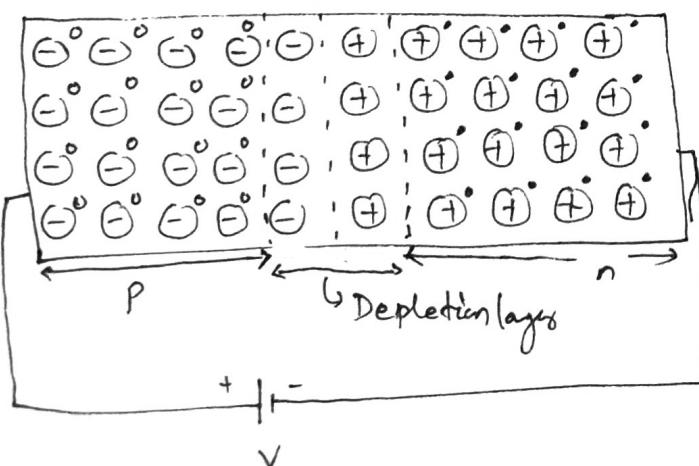
2.



3.

Forward Bias

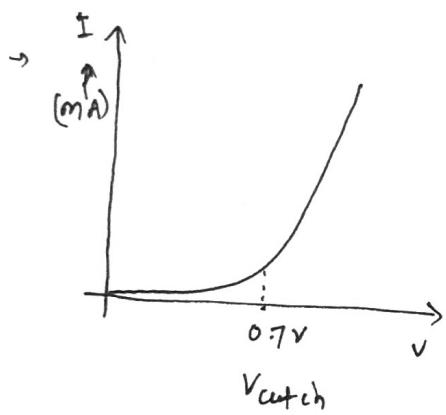
Reverse Bias



### Forward Bias

- $V_o \downarrow$
- width of Depletion layer  $\downarrow$
- $R_F \approx 100\Omega$
- forward current  $\approx 10^{-3} A$

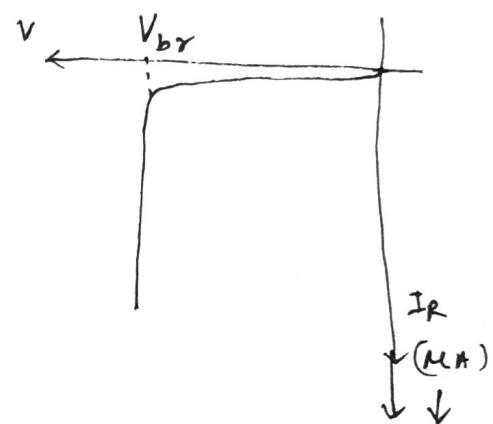
→ knee Voltage  
 "cut-in"  
 $0.3V \rightarrow Ge$   
 $0.7V \rightarrow Si$



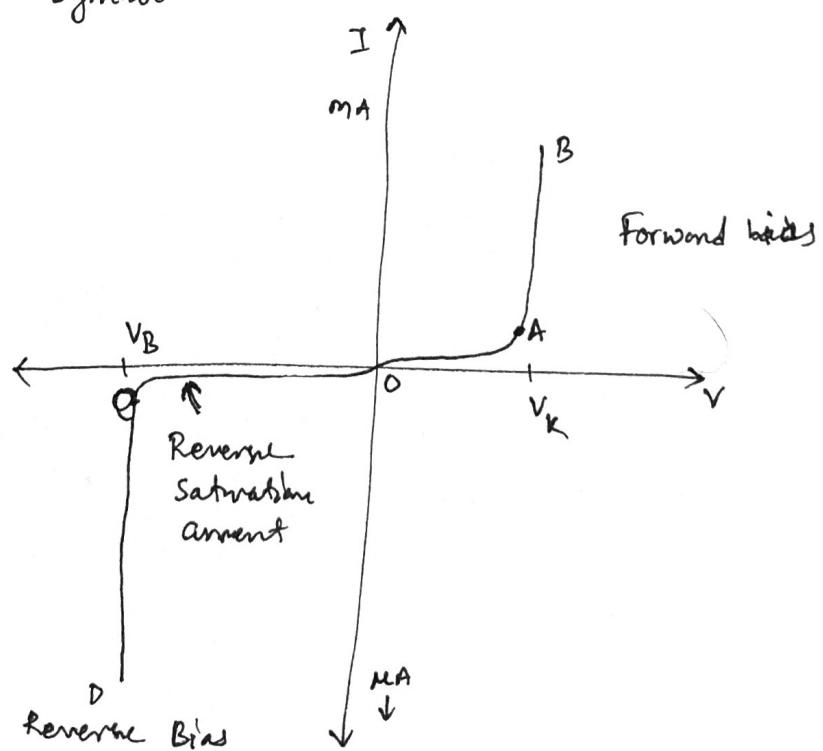
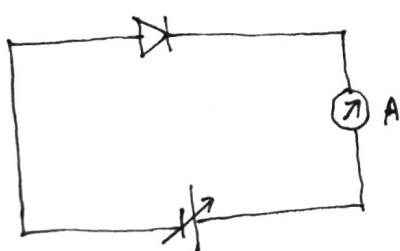
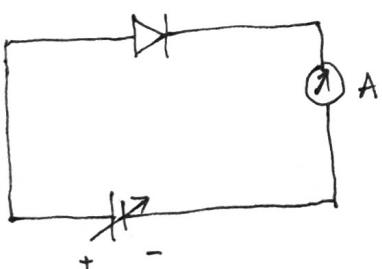
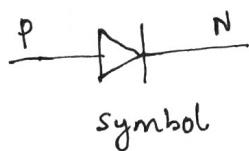
### Reverse Bias

- $V_o \uparrow$
- width of Depletion layer  $\uparrow$
- $R_R \approx 10^6\Omega$
- Reverse current  $\approx 10^{-6} A$   
 $10^{-9} A$

Breakdown Voltage  
 "Ge"  $\rightarrow 25V$   
 "Si"  $\rightarrow 35V$



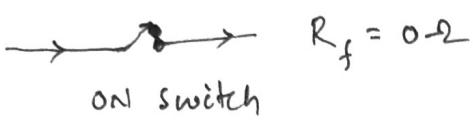
4.



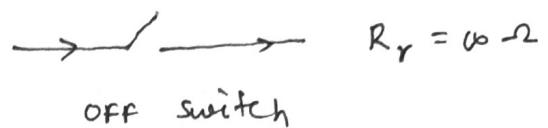
5.

## Ideal Diode :-

In forward Bias



In Reverse Bias



## Knee Voltage :-

→ It is the forward voltage at which the flow of current through the PN-Junction (~~Diode~~) of the diode increases rapidly.

$$\rightarrow V_K = 0.7V \text{ Si}$$

$$V_K = 0.3V \text{ Ge}$$

6.

## Zener Breakdown

- Occur due to very high Reverse Bias ( $< 6V$ )
- Covalent bonds of depletion layers break due to high Electric Field
- This phenomena takes place in
  - i) High doping PN Junction
  - ii) thin Depletion layers
- Not damage permanently
- use in Voltage stabilizers

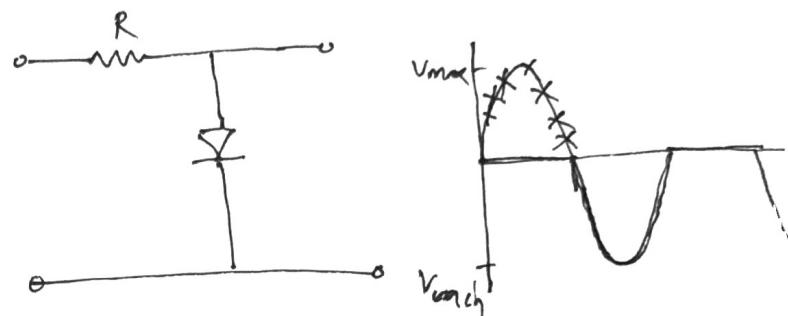
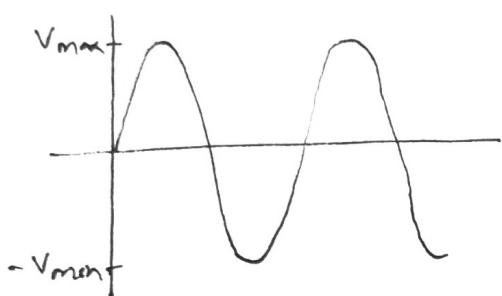
## Avalanche Breakdown

- occurs due to very - very high Reverse Bias ( $> 6V$ )
- Covalent bonds of depletion layers break due to collision of "Minorities"
- This phenomena takes place in
  - i) Low doping PN Junction
  - ii) thick Depletion layers
- Damage permanently
- No-use

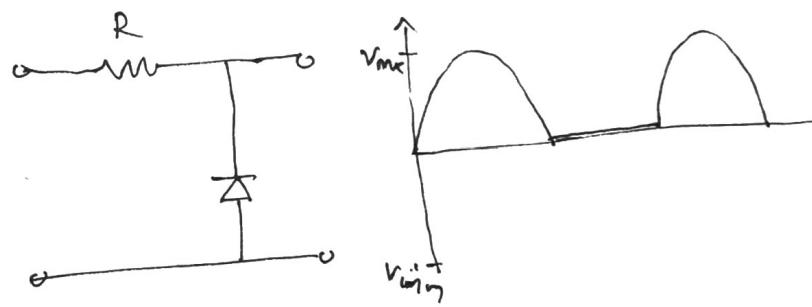
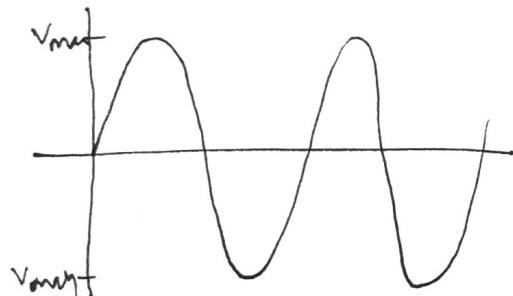
## 7. Clipping circuit

- Positive clipper & Negative clipper
- Biased Positive clipper & Biased -ve clipper
- combination clippers

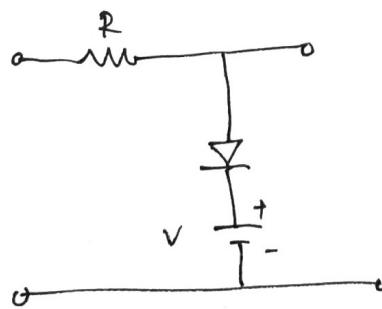
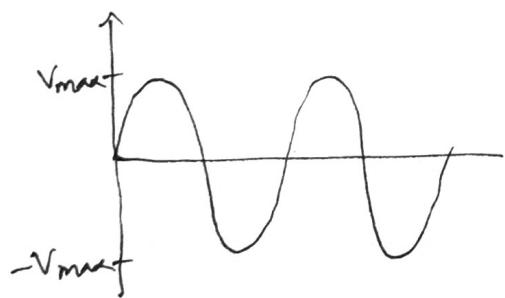
### A. Positive clipper



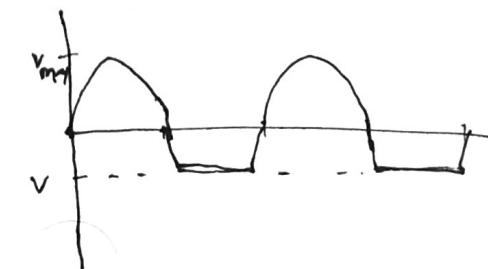
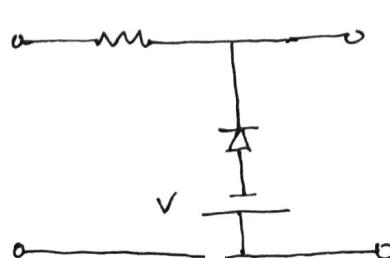
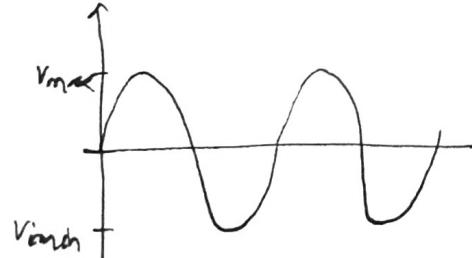
### B. Negative clipper



### C. Biased Positive clipper



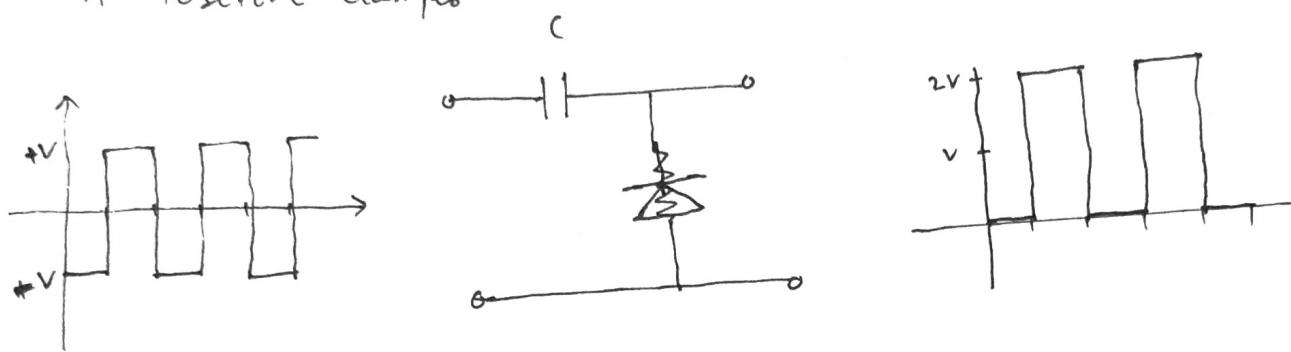
### D. Biased -ve clipper



## 8. clapper Circuit

- Positive clapper
- Negative clapper

A. Positive clapper



B.

