SNS COLLEGE OF ENGINEERING
Coimbatore-35
An Autonomous Institution

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DEPARTMENT OF CSE (IoT)

23ECT102- ELECTRONIC DEVICES AND CIRCUITS

I YEAR/ II SEMESTER

UNIT 2 – **PN Junction Diode**

Review on PN junction diode

P type and N type semiconductors, taken separately are of very limited use.

If we join a piece of P type material to a piece of N type material such that the crystal structure remains continuous at the boundary.. ..... A **PN JUNCTION** is formed

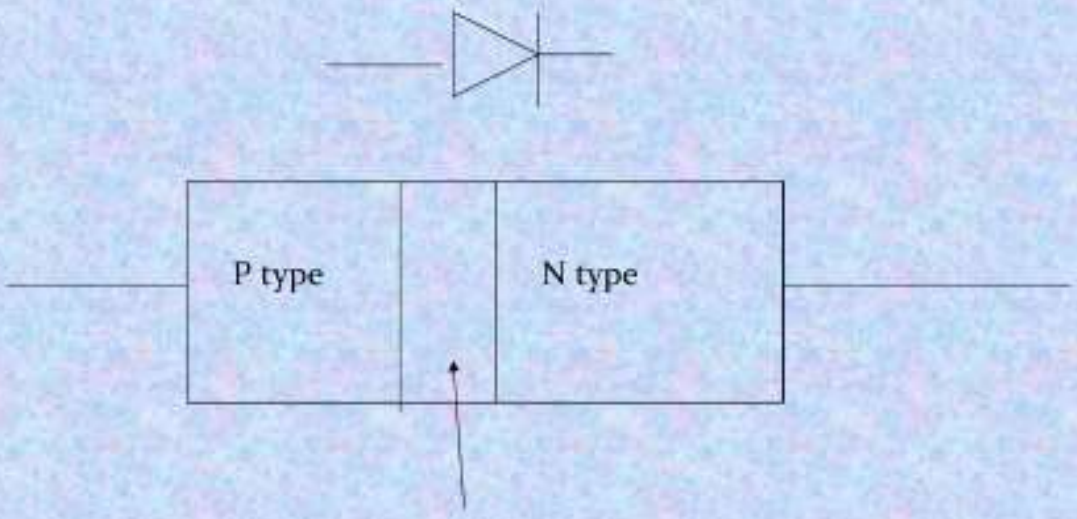
- It can function as ....

Rectifier ,
Amplifier ,
Switching
And other operations in electronic circuits.

What is a PN Junction?

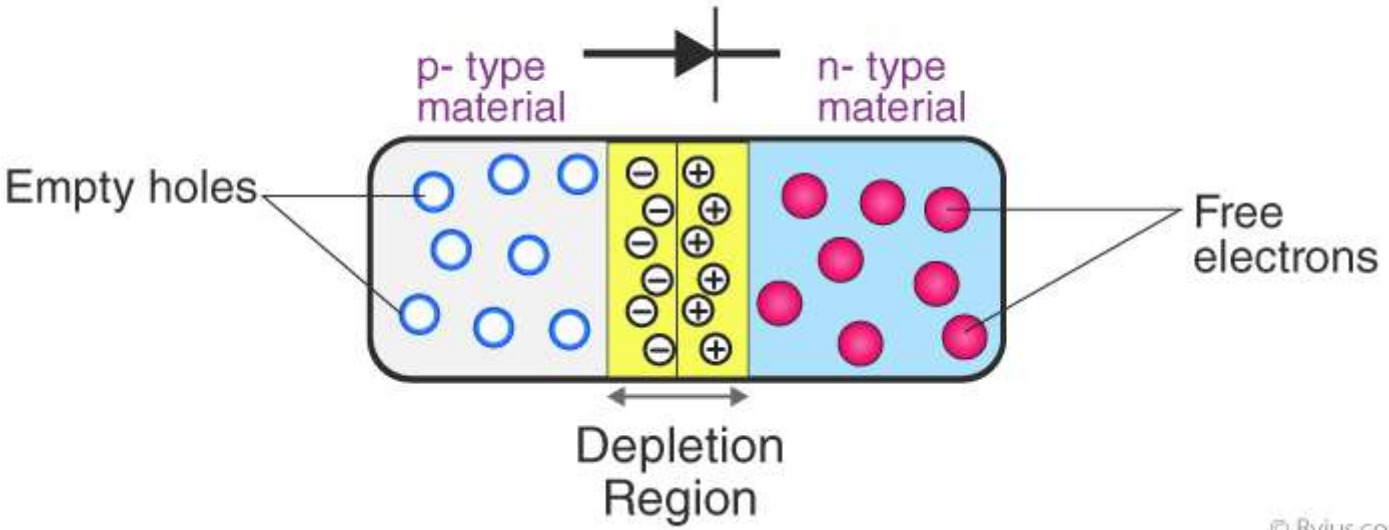
A PN junction is a device formed by joining p-type (doped with B, Al) with n-type (doped with P, As, Sb) semiconductors and separated by a thin junction is called PN Junction diode or junction diode.

- **Electronic Symbol** .....the triangle shows indicated the direction of current



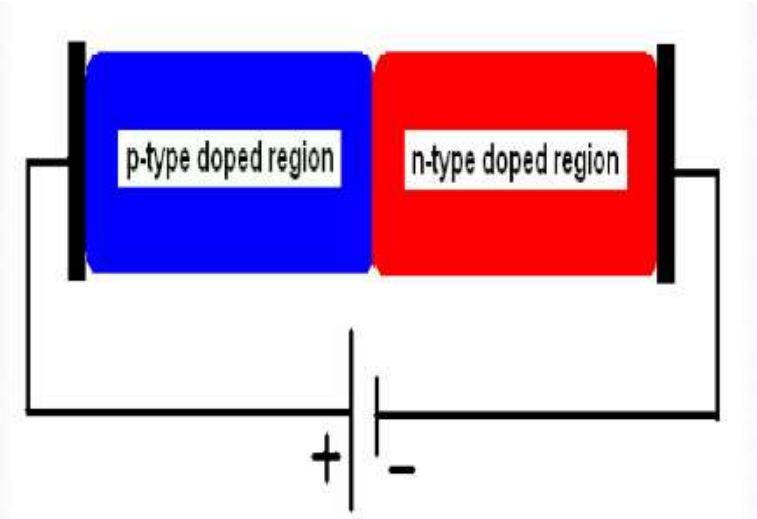
- In PN junction diode, N is at right and P is at left.
- Majority carriers
  - N region -- electrons
  - P region -- holes

UNBIASED P-N JUNCTION



POTENTIAL BARRIER

- The electrons in the N region have to climb the potential hill in order to reach the P region
- Electrons trying to cross from the N region to P region experience a retarding field of the battery and therefore repelled. Similarly for holes from P region.
- Potential thus produced are called ..**potential barrier**
- Ge..0.3 V Si ..0.7V



PN junction can basically work in two modes, (*A battery is connected to the diode*)

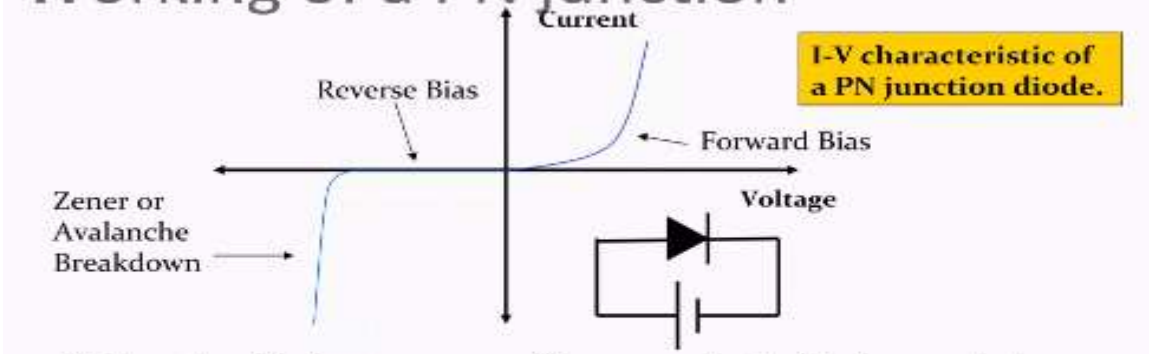
- **forward bias mode** (positive terminal connected to p-region and negative terminal connected to n region)

- ***reverse bias mode*** (negative terminal connected to p-region and positive terminal connected to n region)

VOLTAGE –CURRENT (V-I) CHARACTERISTICS OF PN JUNCTION DIODE

- The curve drawn between voltage across the junction along X axis and current through the circuits along the Y axis.
- They describe the d.c behavior of the diode.

Working of a PN junction



- PN junction diode acts as a *rectifier* as seen in the IV characteristic.
- Certain current flows in forward bias mode.
- Negligible current flows in reverse bias mode until zener or avalanche breakdown happens.

Automatic switch

- When the diode is forward bias ,the switch is CLOSED.
- When it is reverse biased , it is OPEN

ADVANTAGES:

- No filament is necessary
- Occupies lesser space
- Long life.

APPLICATIONS

- ....as rectifiers to convert AC into DC.
- As an switch in computer circuits.
- As detectors in radios to detect audio signals
- As LED to emit different colours.

THANK YOU