



Unit 1 – OPTOELECTRONIC DEVICES

Class 7

Dr. Shilpa K.C
Assistant Professor
Dept. of Electronics and
Communication
Engineering
Dr. AIT



Dr. Ambedkar Institute of Technology



PHOTONS

Photon

Outline

- Light as Waves
- Light as Particles
 - . Photoelectric Effect - photon energy

PHOTONS

Packet of light is also a “particle”
called a **photon**

Energy of a
photon of
light

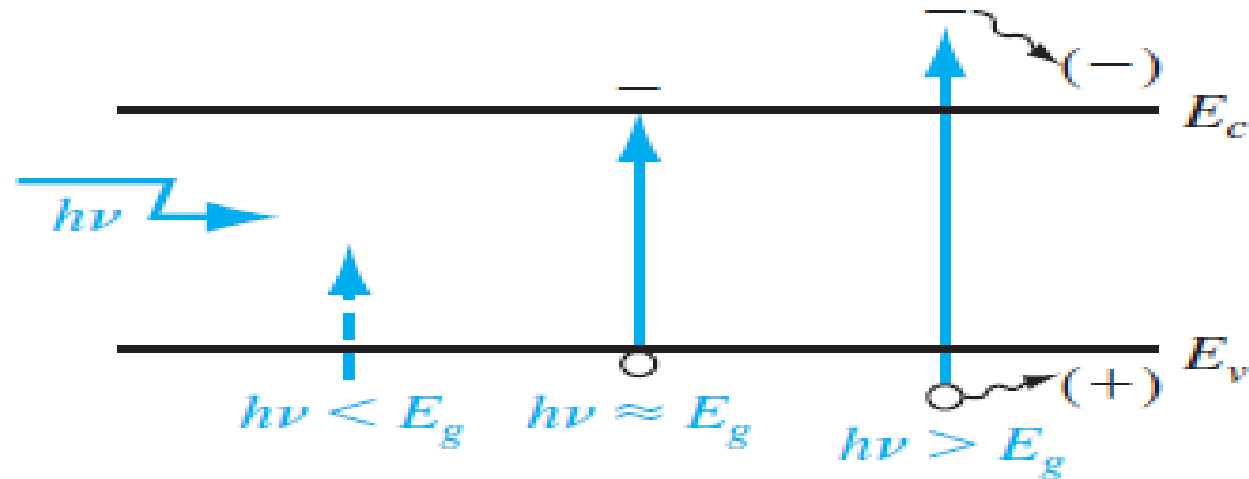
$$E = h\nu$$

OR

$$E = hc/\lambda$$

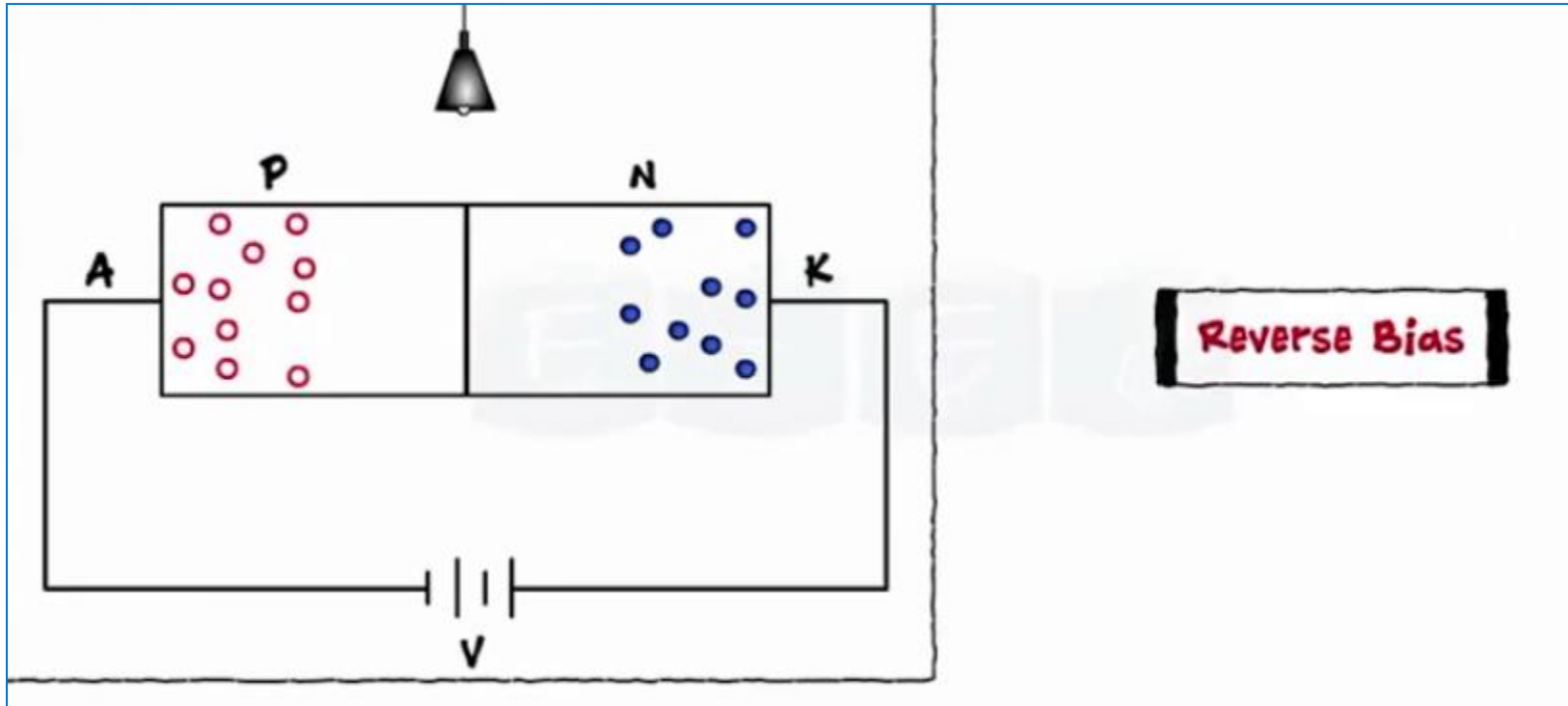
$h = 6.626 \times 10^{-34}$ J-s
Planck's constant

PHOTONS

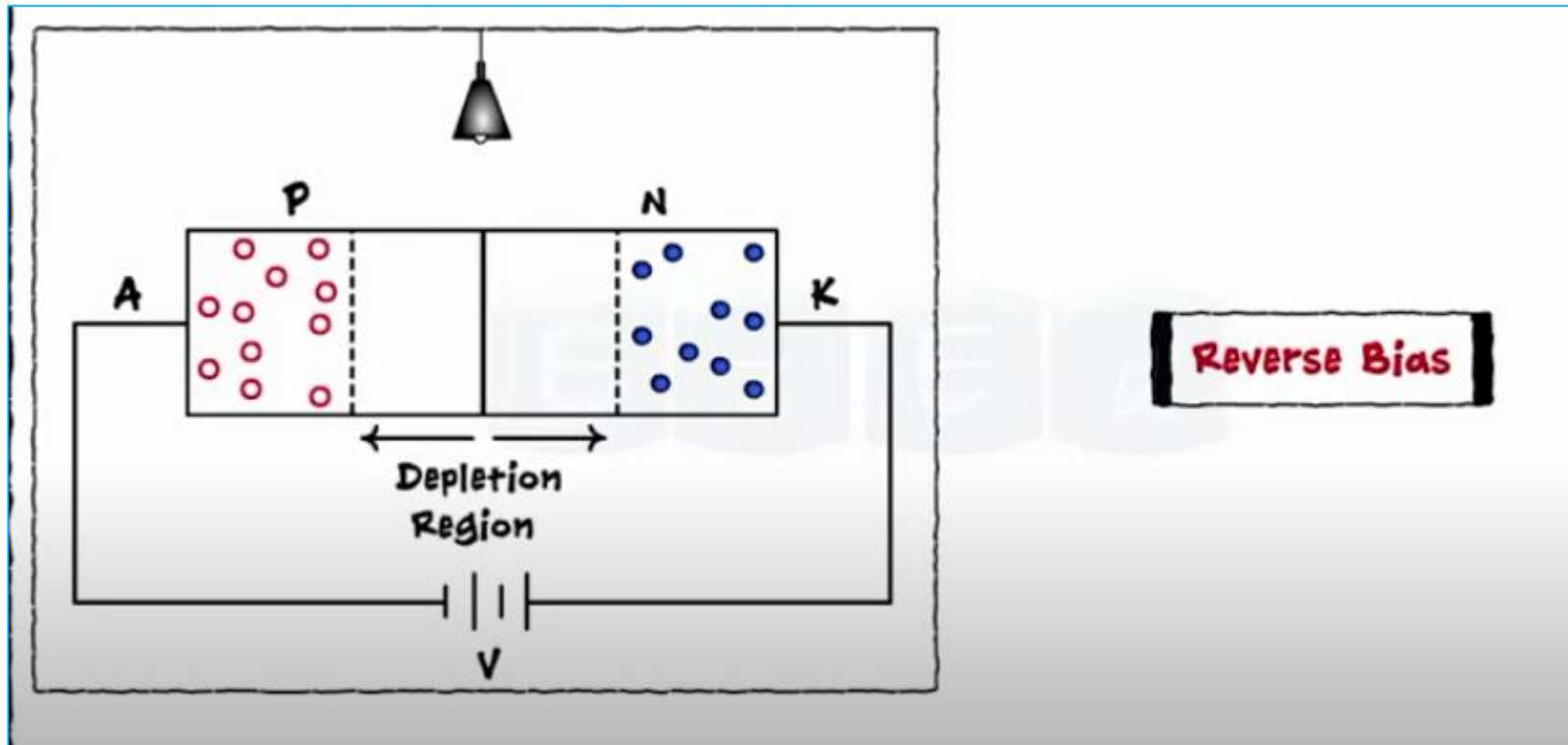


Optically generated electron-hole pair formation in a semiconductor.

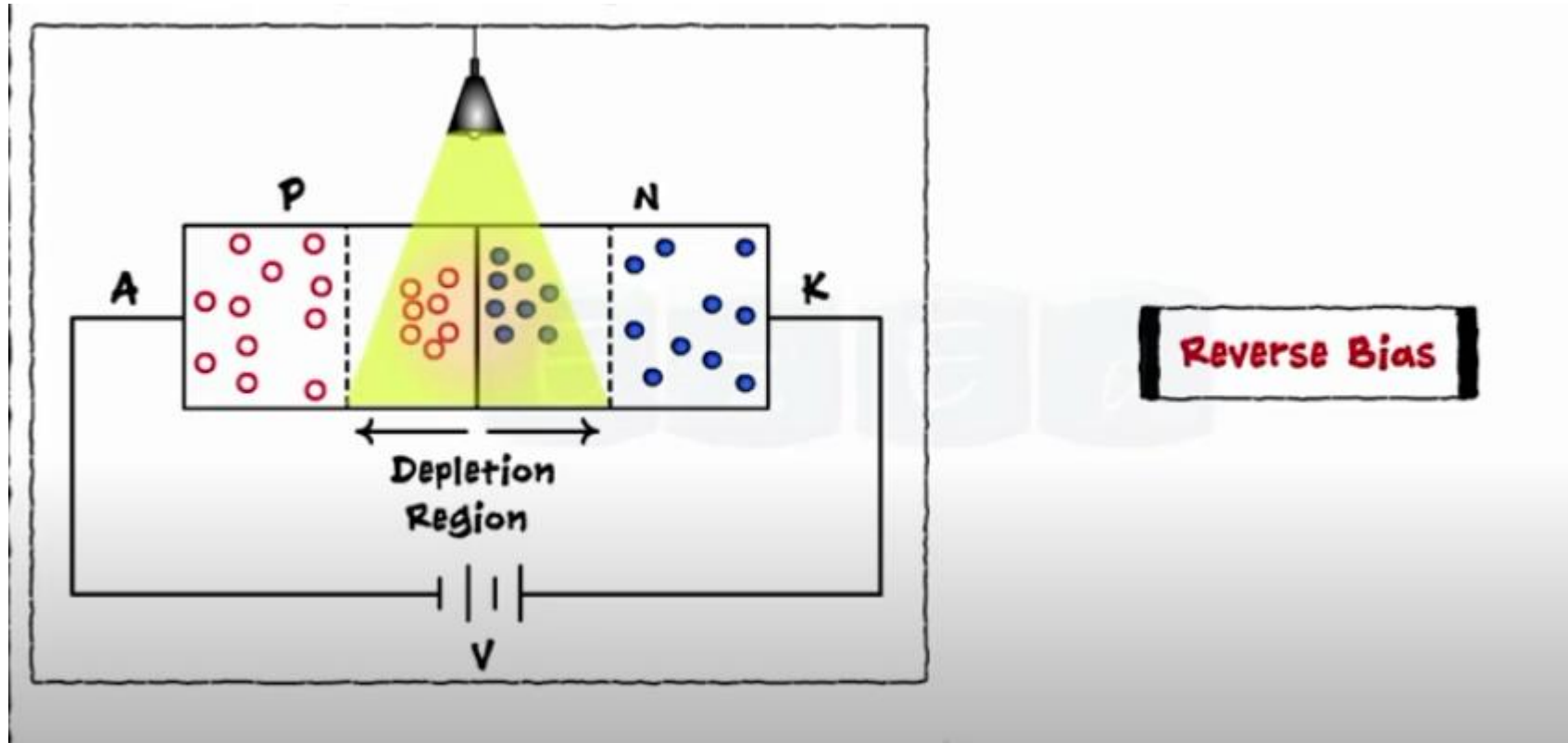
PHOTODIODE



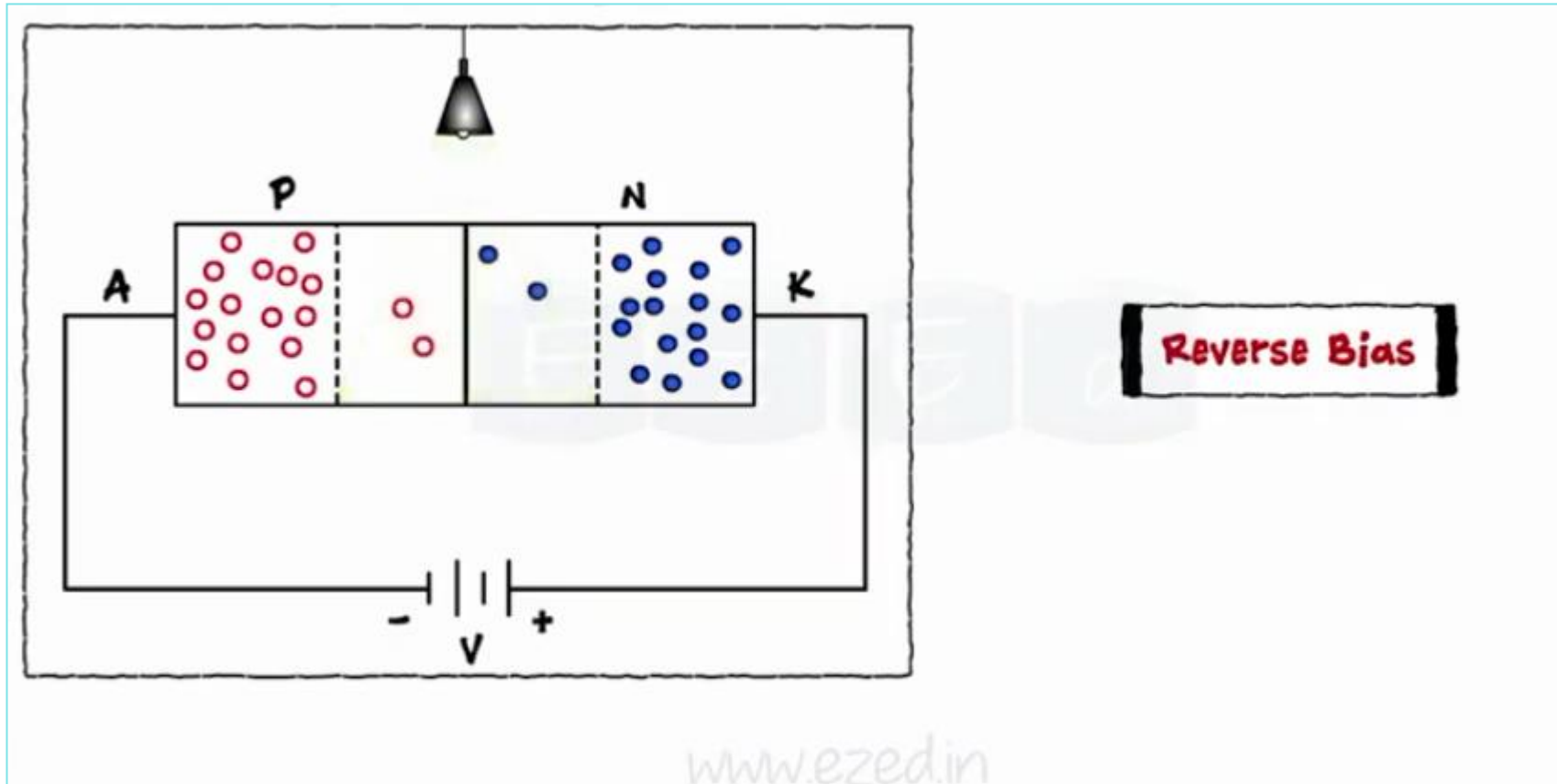
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PHOTODIODE



PHOTODIODE



PHOTODIODE

Construction And Working of Photodiode

Reverse Bias

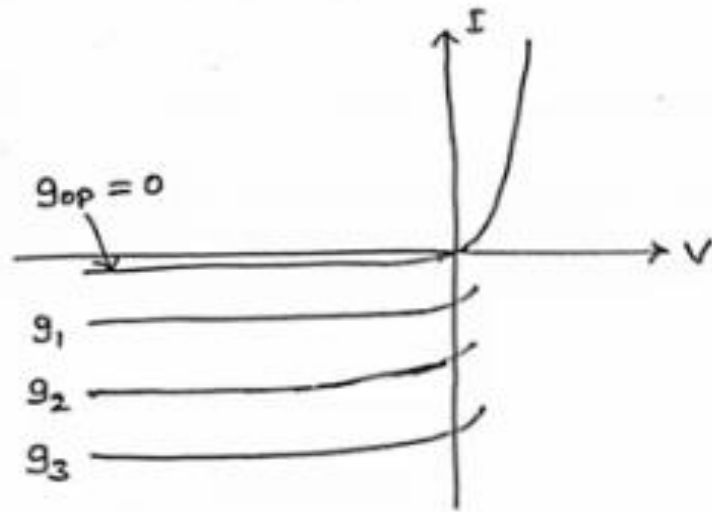
- Reverse Saturation Current (I_{Rsat}) Flows
- As Charge Carriers I_{Rsat} ↑ ↑

Photocurrent

- As Light Intensity ↑ ↑
- Photocurrent ↑

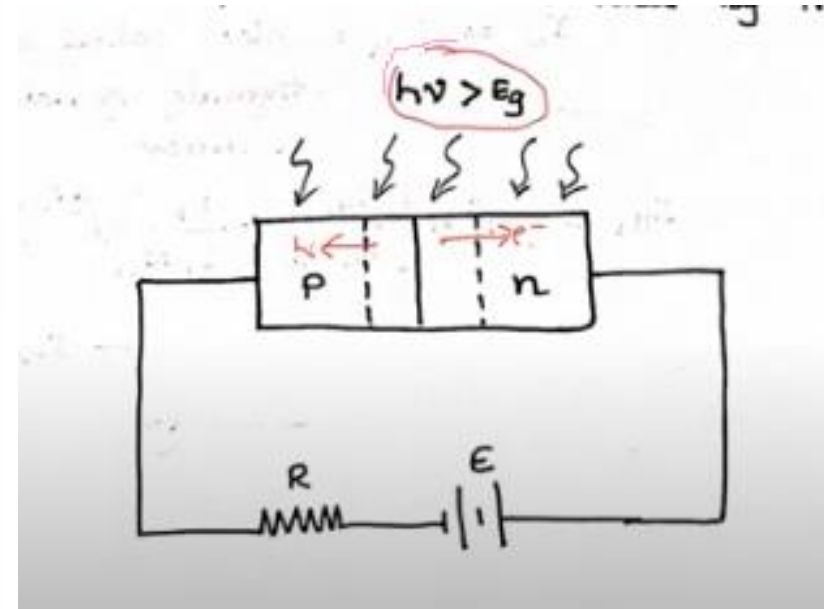
Photocurrent \propto Light Intensity

PHOTODIODE

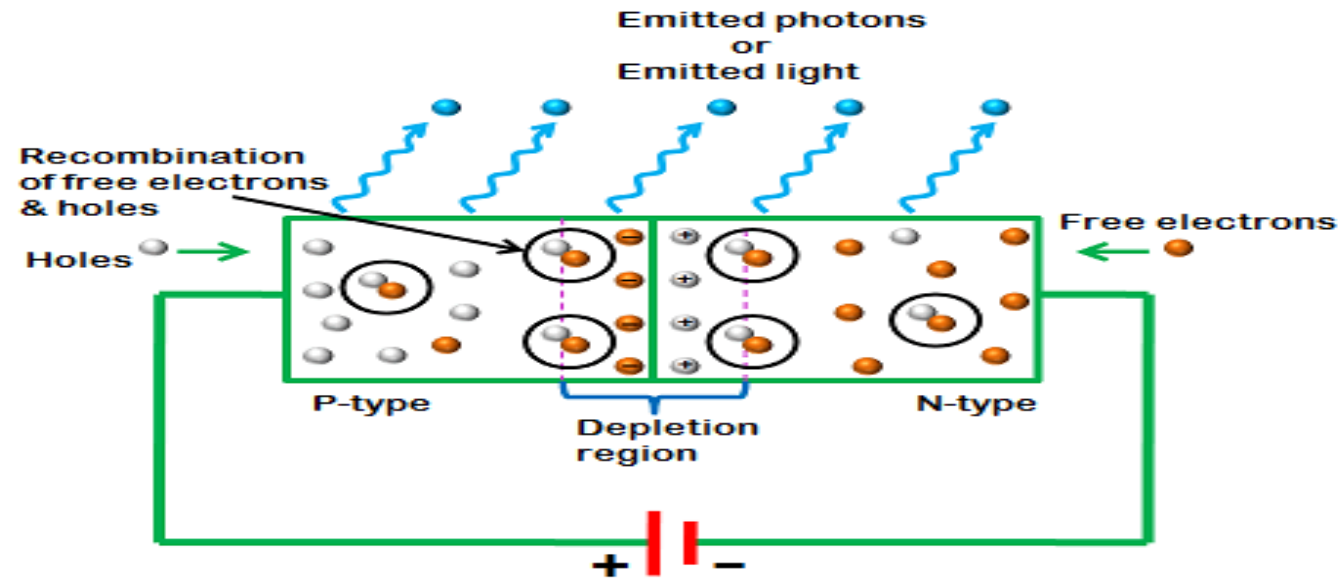


$$g_3 > g_2 > g_1$$

I-V characteristics
of an illuminated
junction

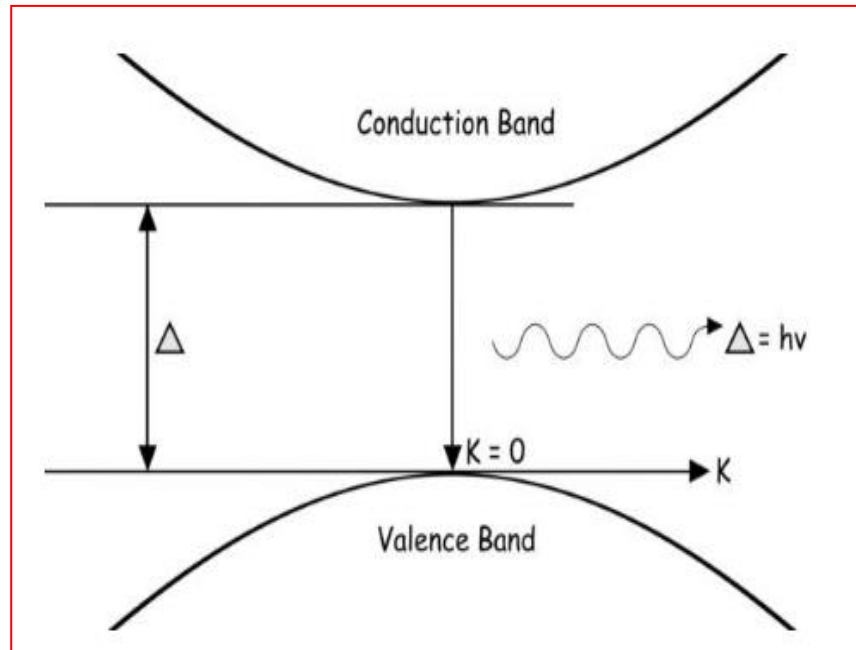


LIGHT EMITTING DIODE (LED)

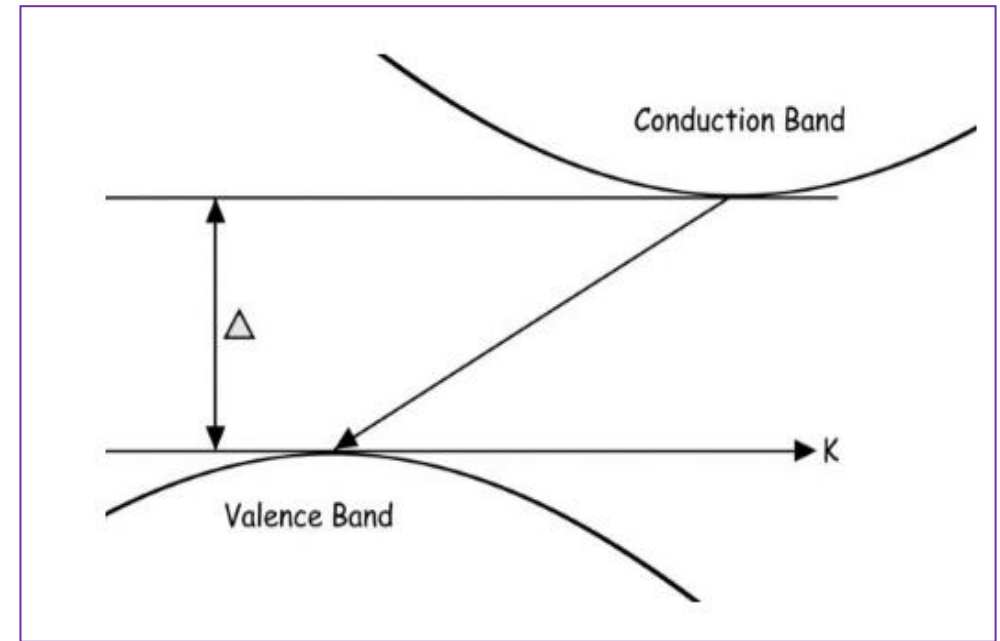


Light Emitting Diode (LED)

LIGHT EMITTING DIODE (LED)

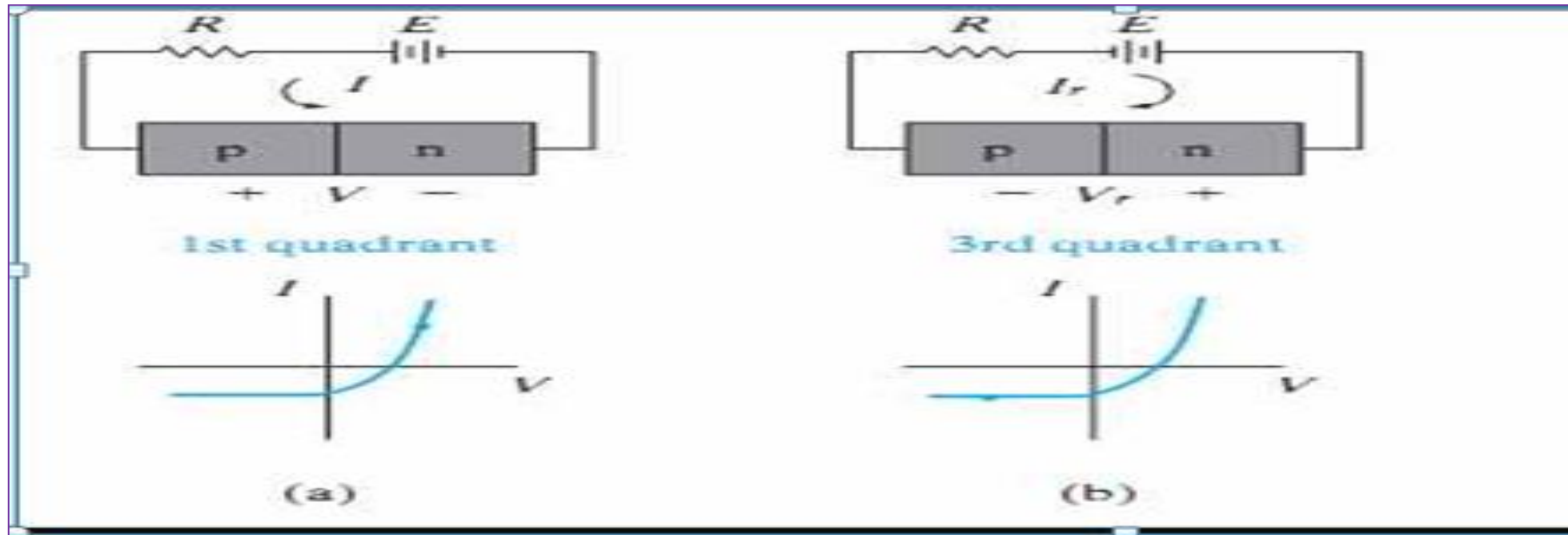


Direct Band Gap



In-Direct Band Gap

PHOTONS





Thank You

HAVE A NICE DAY