DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

COURSE NAME : 19EC602 – Microwave and Optical Engineering

III YEAR / VI SEMESTER

Unit IV – OPTICAL COMMUNICATION

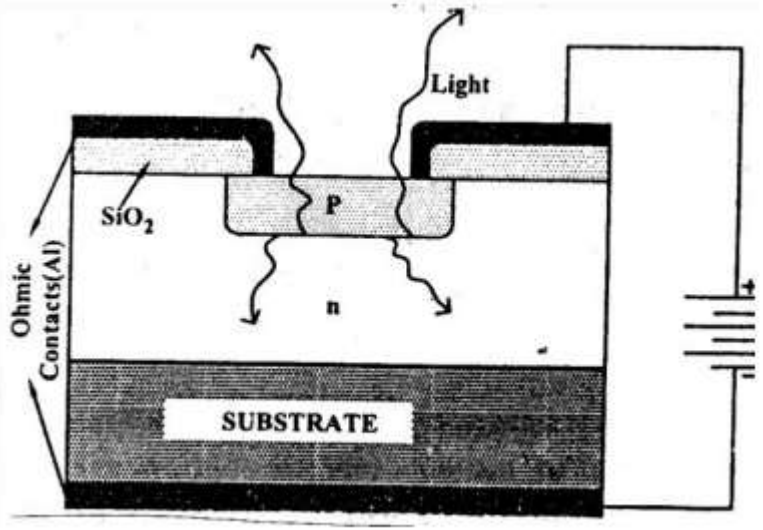
Topic: Optical Sources - LED

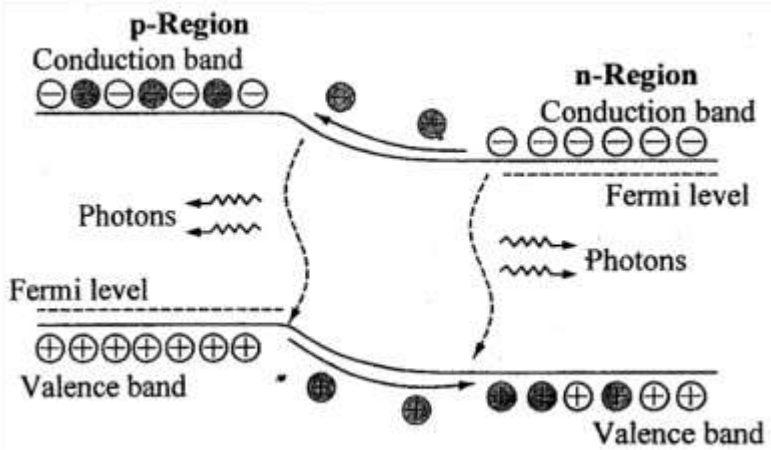
INTRODUCTION

Light Emitting Diode (LED) Principle:

- It’s a device used to convert the electrical energy into light energy.
- When it is forward biased, the majority charge carriers of electrons from n-type and holes from p-type are diffuse into each other.
- At the junction the electron hole recombination process takes place and energy is emitting in the form of visible light and IR region.

STRUCTURE OF OPTICAL SOURCE - LED





BLOCK DIAGRAM

Constructions :

- The light emitting diode is made by Gallium Arsenide semiconductors. First the PN Junction is formed by epitaxial growth technique. Si+Ga=n-type; Si+As=p-type.
- The thickness of the n-layer is always larger than the p-layer, because of increasing the radioactive recombination.
- Proper electric connection (forward bias) given to the semiconductor through aluminium contact.
- P-jn is slightly open for out coming light rays.

Working :

- When the p-n junction diode is forward biased, the barrier width is reduced, raising the potential energy on the n-side and lowering that on the p-side.
- The free electrons and holes have sufficient energy to move into the junction region. If a free electron meets a hole, it recombines and releases a photon.
- Thus, light radiation from the LED is caused by the recombination of holes and electrons that are injected into the junction by a forward bias voltage.

ADVANTAGES

1. Very small in size
2. Less cost and longlife time.
3. It needs less voltage for operate

DISADVANTAGES

1. It requires high power.
2. Its preparation cost is high

Any Query????

Thank you……