Fundamentals of Electronics Devices

Unit-2 Lecture-1

Excess carriers in Semiconductors

- Optical absorption.
- Luminescence.
- Carrier life time.
- Photo conductivity.
- Diffusion of carriers.

Introduction

- Most semiconductor devices operate by the creation of charge carriers in excess of the thermal equilibrium values.
- These excess carriers can be created by optical excitation or electron bombardment, or as we shall see, they can be injected across a forward-biased p-n junction.

- However, the excess carriers arise, they can dominate the conduction process in the semiconductor material.
- In this unit we shall investigate the creation of excess carriers by optical absorption and the resulting properties of photo luminescence and photoconductivity.

- We shall study more closely the mechanism of electron-hole pair recombination and the effect of carrier trapping.
- Finally we shall discuss the diffusion of excess carrier due to a carrier gradient, which serves as a basic mechanism of current conduction along with the mechanism of drift in an electric field.