

Key

- 1) What is the most commonly used semiconductor material?

Silicon or Si

- 2) What type of chemical bond does Si make with other Si atoms?

Covalent

- 3) What are the three solid forms that Si material makes?

Single crystal, polycrystalline, amorphous

- 4) What is n_i ?

Intrinsic Carrier Density

- 5) What does "intrinsic mean"?

Pure

- 6) The bandgap energy is what?

Minimum energy needed to break a covalent bond

- 7) What are the two types of charge carriers?

electrons and holes

- 8) This term relates electric field to charge carrier velocity:

mobility

- 9) What is a common donor impurity for Si?

P, As, or Sb

- 10) Does a donor impurity have more or less valence electrons than Si?

more

- 11) Does a donor impurity make Si n-type or p-type?

n-type

- 12) What is a common acceptor impurity for Si?

B or Al

- 13) Does an acceptor impurity have more or less valence electrons than Si?

less

- 14) Does an acceptor impurity make Si n-type or p-type?

p-type

- 15) N_A refers to:

Acceptor Impurity Concentration

16) N_D refers to:

Donor Impurity Concentration

17) Does intrinsic Si have high or low resistance at absolute zero?

High Resistance

18) What are the two types of current flow in an unbiased semiconductor material above absolute zero?

Drift Current

Diffusion Current

19) How does resistivity relate to resistance?

Resistivity is a material property.
Resistance is a function of resistivity and geometry

20) Charge carrier velocity saturation occurs because:

Electrons have mass and therefore cannot have infinite velocity, so there is a limit to increasing the applied electric field to increase the charge carrier velocity