

b) What happens at the PN junction when an N-type and P-type semiconductor are joined (when no voltage is applied)? (check all that apply)

Electrons near the junction move from the P to the N-type.

✓ Electrons near the junction move from the N to the P-type.

Electrons near the junction do not move.

c) If some electrons re-adjust at the PN junction by moving from one to the other, why don't all electrons move? That is, what stops them all from moving? (Hint, think about the forces acting on the electrons)

As the electrons move to the p-type, there is a net negative charge accumulating which repels other electrons. The energy gained by moving to a lower energy band is compensated by having to work against this repulsion.

2. A) Since there are now electrons in the conduction band, the Fermi level moves up (closer to the conduction band).
- B) Since there are now empty levels at the top of the valence band, the Fermi level moves down.
- C) When there is enough thermal energy to create a considerable number of electron-hole pairs (greater than the number of impurities) the behavior becomes intrinsic.

