E_g → Si / Ge (1.1 eV, 0.7 eV).

- p-type: (Trivalent element).
  - charge carriers: holes, electrons
  - holes.

- n-type (Pentavalent material).
  - electrons.

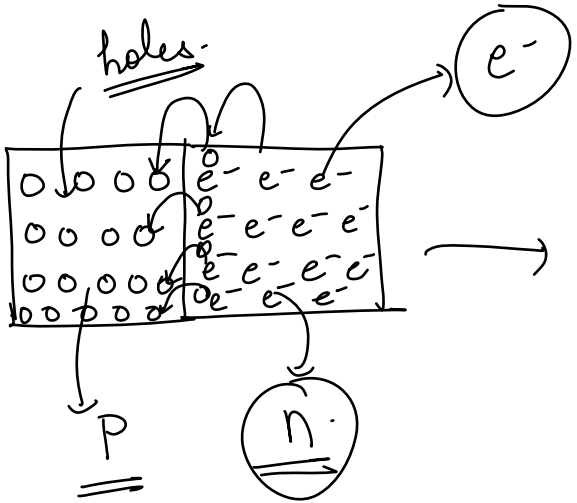
Fermi - level in p - type semiconductor.

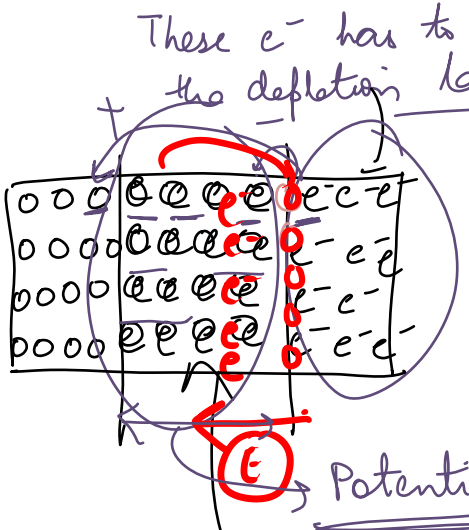
→ Valence Band.

n - type ⟶ E_c :

P-N Junction:

A P-N junction is an interface formed between two semiconductor materials (p-type & n-type).





Depletion layer will be formed.

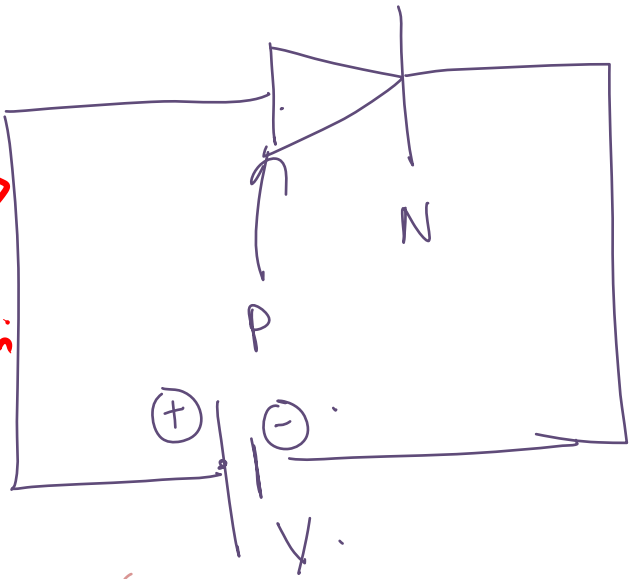
width = 400nm of depletion layer.

Electric field = 8×10^5 V/m.

Forward Bias:

Applied voltage > V

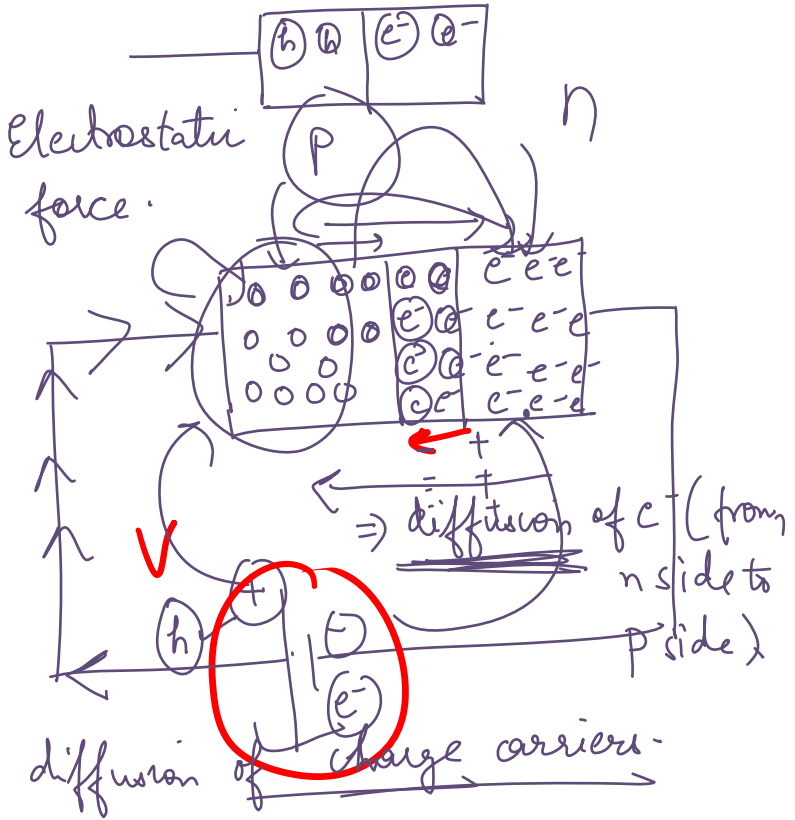
depletion layer.



Current flow from 'p' to 'n' side

holes → e^-

p side - n side -



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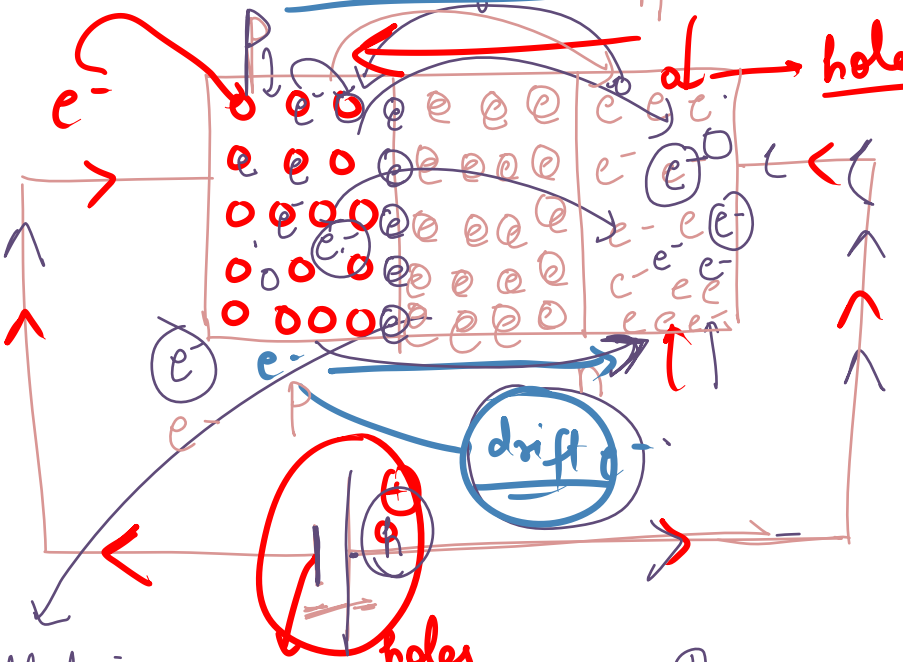
Reverse Bias:

(Flow of minority carrier) ↓ drift.



Width of depletion layer also increases.

Drift Current

Majority carriers on both the sides are not flowing.

$I_{reverse} \simeq 0$.

↳ Drift of minority carriers