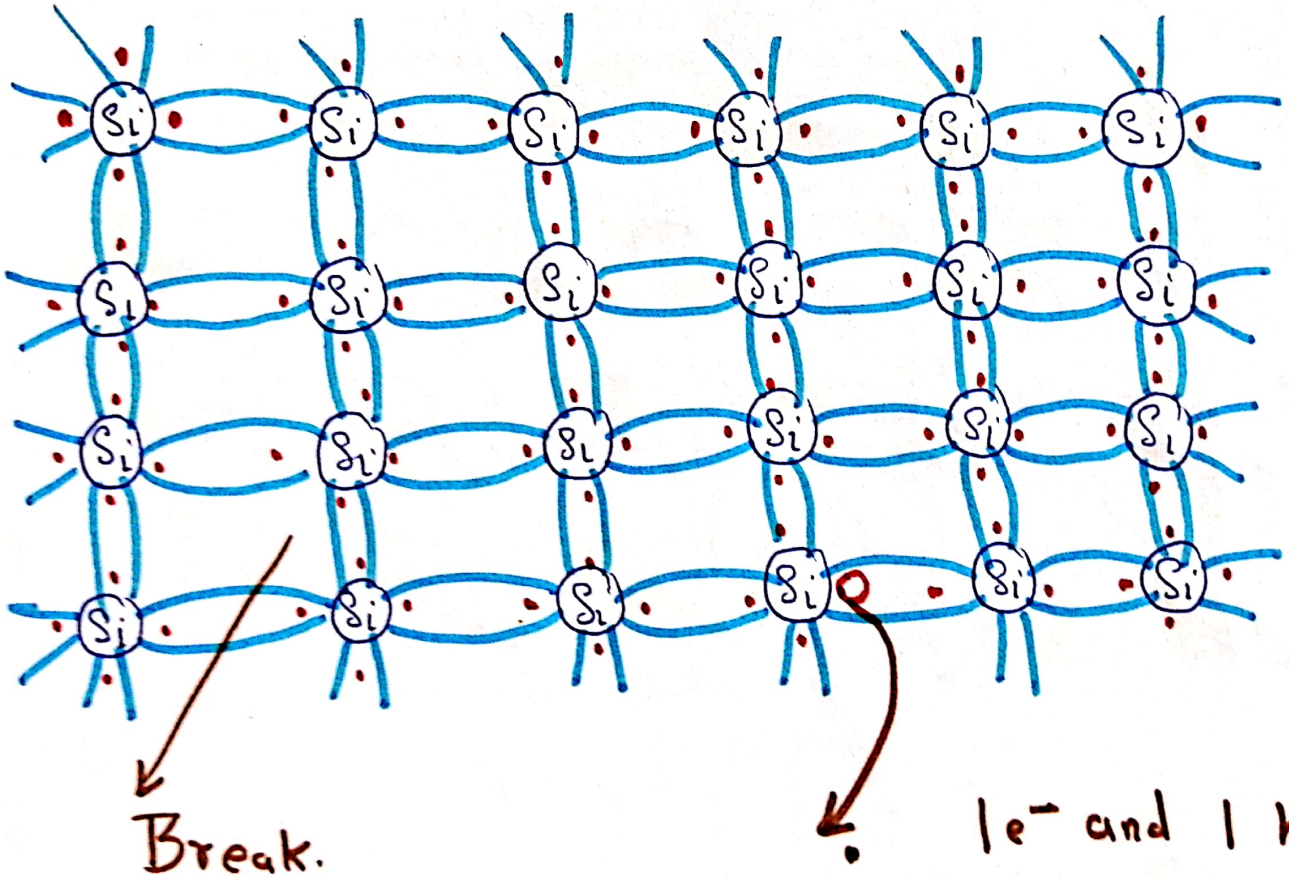
PURE SEMICONDUCTOR



n_i = intrinsic carrier concentration = 2 (if covelent bond break)

$n_i = 1$ (if $1e^-$ leaves its bond)

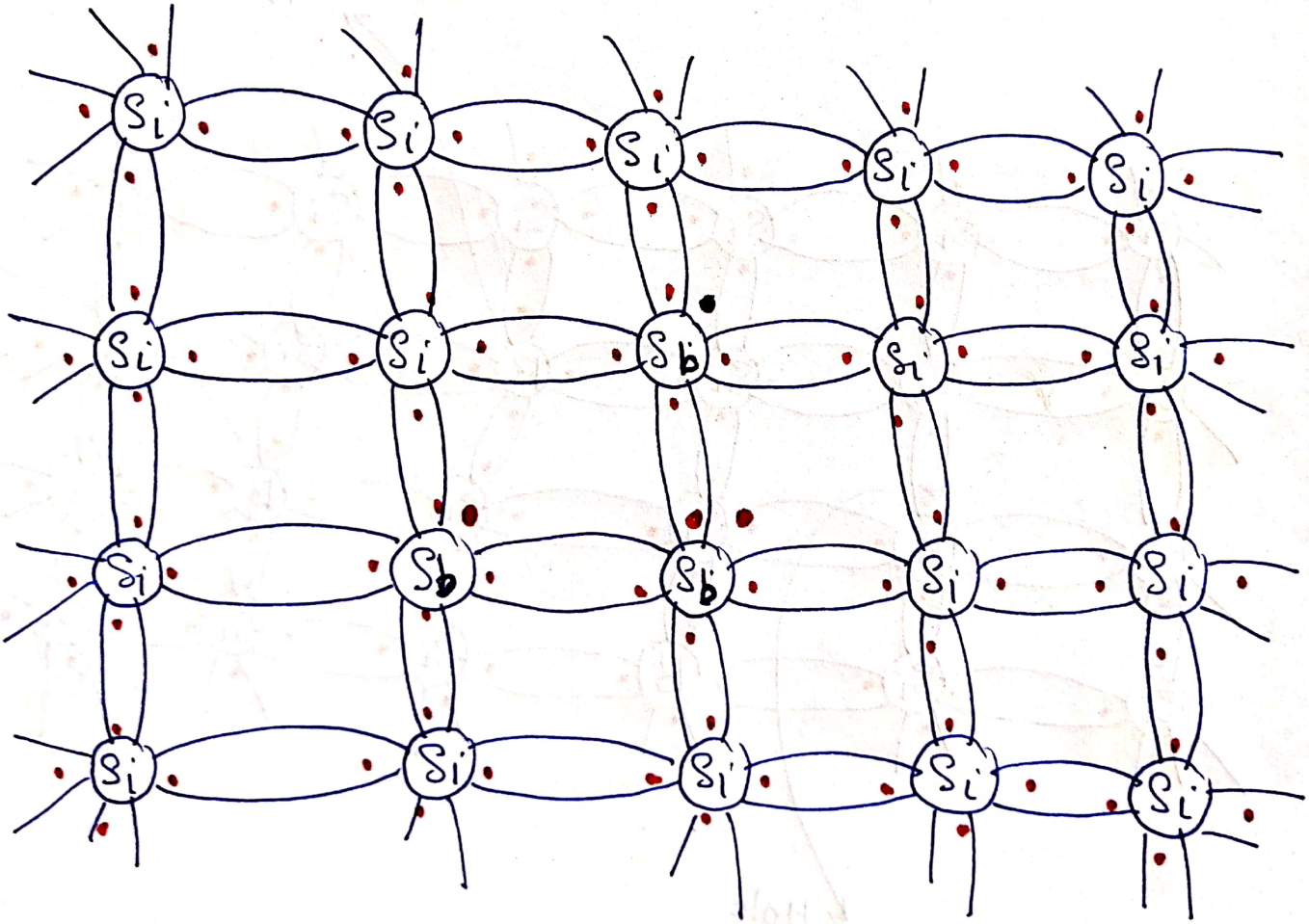
$n_i = \begin{cases} n = \text{no. of free } e^- = 2 \\ p = \text{no. of free holes} = 2 \end{cases}$ for covalent bond breaking

$n = n_i =$

$p = n_i \Rightarrow$ hence, $n = p = n_i$ for pure sc.

N- type. (group 15 element)

(P, As, Sb)



Majority Carrier (electron)

Minority Carrier (Hole)

Mass Action Law:- -ve and +ve Carrier Conc.

$$np = n_i^2$$

Phosphorous, Antimony, Arsenic. } 5 valence e^-

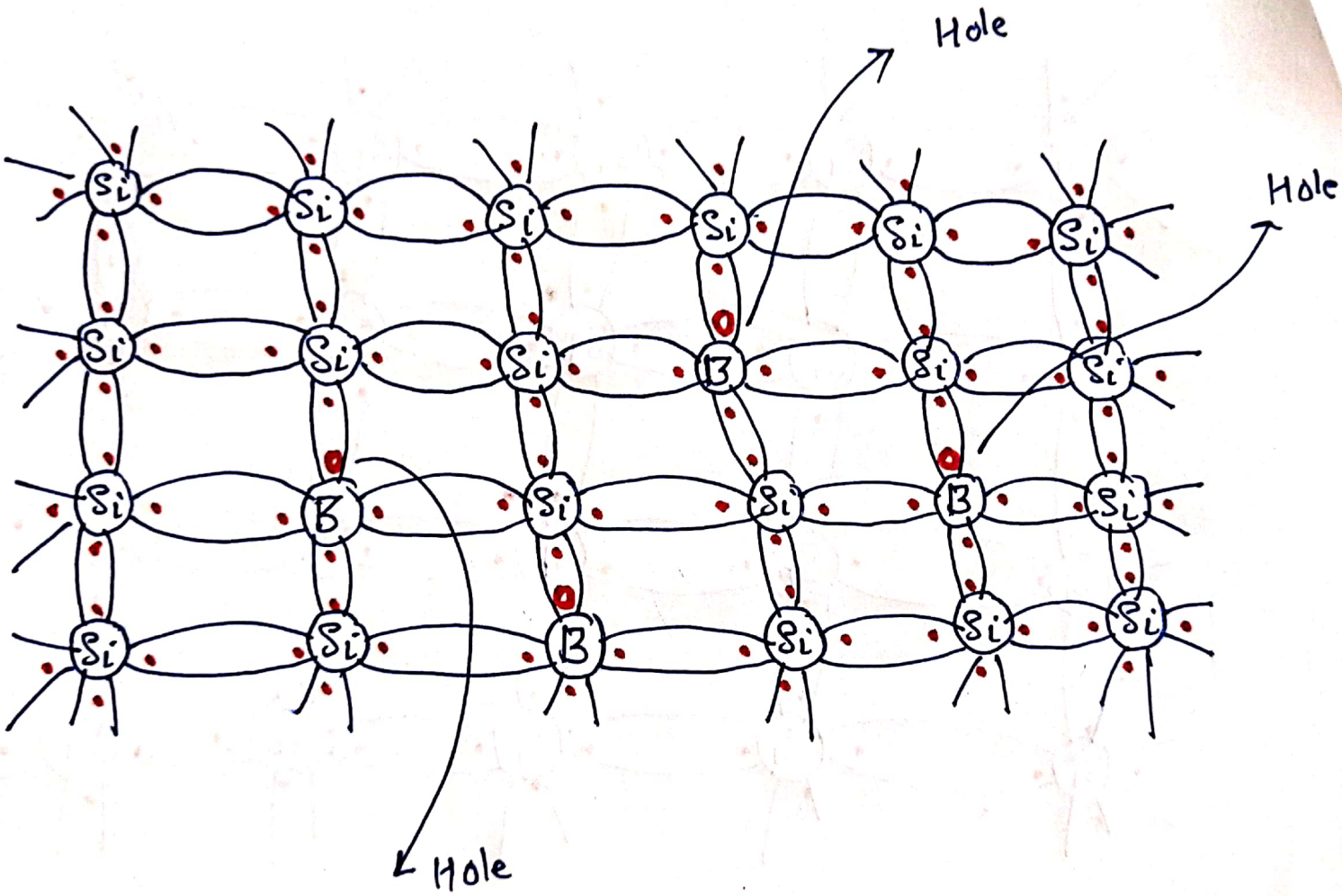
Donar atom = N_D

$N_D \sim n$

$$\text{Minority carrier}(p) = \frac{n_i^2}{N_D(\text{majority carrier})}$$

P- type Semiconductor

group - 13 element (B, Al, Ga --)



Majority Carrier (Hole)

Minority Carrier (electron)