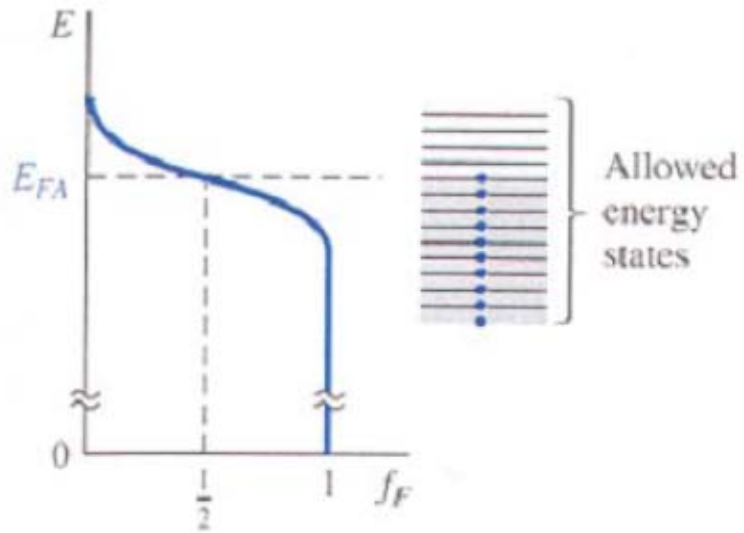
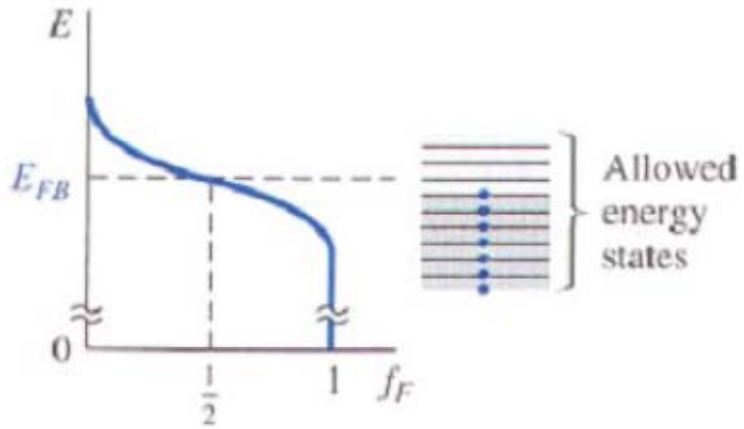
EF must be equal when different systems are in contact and in thermodynamic equilibrium



(a)



(b)

Consider a material A, with Fermi level E_{FA}. Bands below E_{FA} are full and above are empty.

material B with Fermi level E_{FB}.

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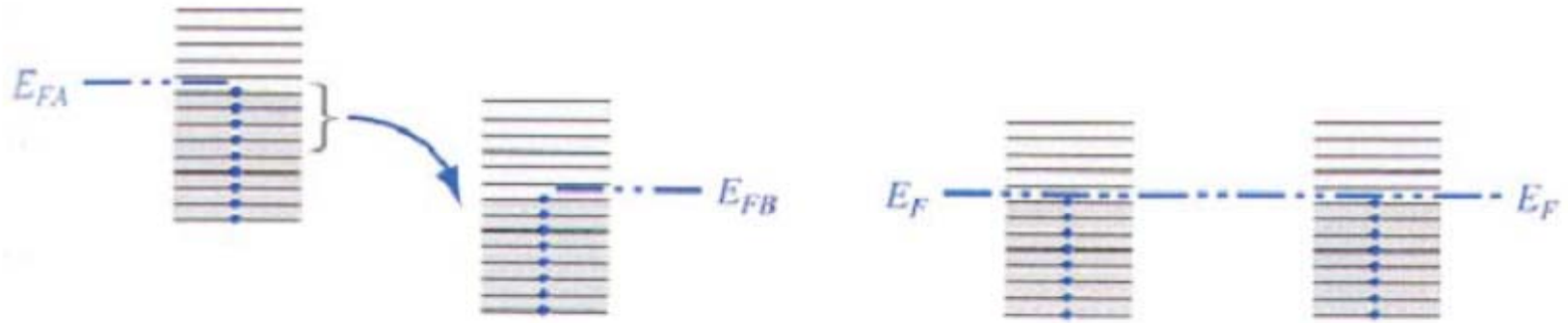

- When A and B are brought in contact, electrons will flow from A into lower energy states of B, until thermal equilibrium is reached.

- Thermal equilibrium → E_F same in A & B