

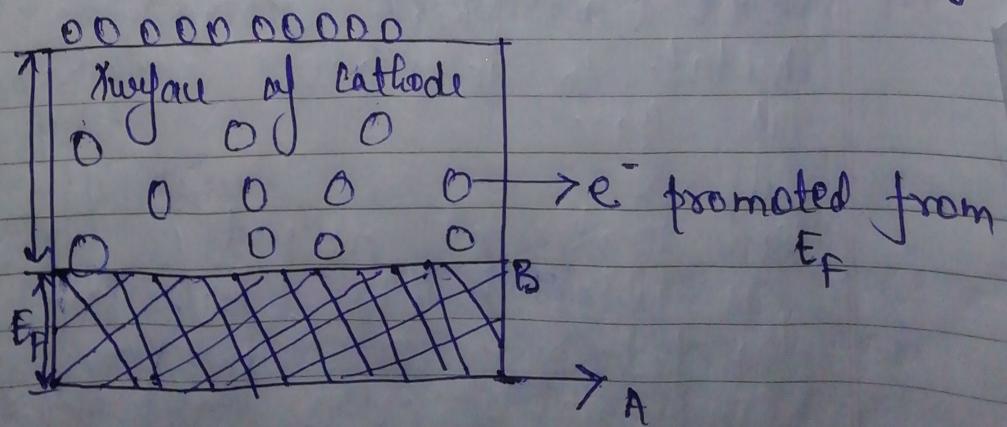
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Assignment → IV
R.E.R

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Ans-1 Working of Thermoionic Generator :-

- electrons within a metal can be treated as "electron gas" in which individual outermost electrons are capable of moving freely under influence of field
- This movement of e^- is responsible for function of electric circuit
- At the surface of metal, a potential barrier exists which prevents e^- from escaping unless certain conditions are met, this concept explained
- According to free e^- theory at 0°K all energy levels upto Fermi energy are completely filled & all the energy levels above E. are completely empty.



→ Energy level from Surface of metallic cathode to level of E_F is potential energy barrier

called Work function (ϕ).

- If any e^- wants to escape from surface of metallic cathode, they should cross this potential barrier.
- At 0°K all e^- are bounded within E_f level & cannot escape from surface of cathode (emitter)

ns → 3 Seebeck effect → this term refers to phenomenon by which either a temperature difference creates an electric potential or an electric potential creates a temperature difference. It is also known as thermoelectric effect.

Peltier effect → It is the presence of heating or cooling at an electrified junction of 2 different conductors when current is made to flow through a junction b/w 2 conductors A & B, heat may be generated at Junction

Thomson relation → In 1854 Lord Kelvin found relationship b/w 3 coefficients implying that Thomson, Peltier & Seebeck effects all thermodynamic effects are closely related to each other and relations b/w different coefficients are called Kelvin relations.

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4) work function → the minimum energy required to allow an e^- to be liberated from a material as it work function is different from material to material.

ns-2 Thermoelectric

1) It converts heat energy directly into electrical energy through semi conductor.

2) It has poor efficiency due to diffusive current flow.

3) It require low quality heat sources to produce electric power.

Thermionic

1) It converts heat into electrical energy using cathode & anode by changing ions.

2) It is based on ballistic current flow which is highly efficient.

3) It required high temp. to generate useful current.