

NEET	Class - 12 <sup>th</sup>	Topic - Photoelectric
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### Photoelectric Effect

The photoelectric effect refers to the emission of electrons from a metal surface when light of sufficient frequency is incident on it.

### Einstein's Equation:

$$\text{K.E.} = h\nu - \phi$$

- $h$  = Planck's constant =  $6.63 \times 10^{-34}$  Js
- $\nu$  = frequency of incident light
- $\phi$  = work function = minimum energy needed to remove an electron from metal surface

**Threshold Frequency ( $\nu_0$ ):** Minimum frequency of light required to just emit electrons (K.E. = 0)

**Stopping Potential ( $V_0$ ):** The minimum potential that stops even the most energetic photoelectrons

### Graphs to remember:

- K.E. vs Frequency: Straight line (slope =  $h$ , x-intercept =  $\nu_0$ )
- Current vs Intensity: Linear
- Current vs Voltage: Saturates at high voltages

### Key Points:

- K.E.  $\propto$  frequency (not intensity)
- Current  $\propto$  intensity
- No time lag in emission
- Below  $\nu_0$ , no emission regardless of intensity

**Applications:** Solar cells, photodiodes, automatic doors, light sensors