

PH-105 Assignment Sheet - 2 (Quantum Mechanics)

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1. Light of wavelength 2000 \AA falls on a metal surface. If the work function of the metal is 4.2 eV , find the kinetic energy of the fastest and the slowest emitted photoelectrons. Also find the stopping potential and cutoff wavelength for the metal.

Solution :

Lets find the energy of photon

$$E = hc/\lambda$$

$$E = 12400/2000 \text{ eV} = 6.2 \text{ eV}$$

Now the energy of emitted electrons is ranged from 0 to E_{Max} .

$$\text{Here } E_{Max} = E_p - W$$

$$\text{So } E_{Max} = 6.2 - 4.2 = 2 \text{ eV}$$

$$\text{So stopping potential is } V = E/C = 2 \text{ V}$$

$$\text{For cutoff wavelength } E_p = W = 4.2 \text{ eV}$$

$$\text{So } \lambda = hc/E = 12400/4.2 = 10333 \text{ \AA}.$$