- Find the transmittance of solar pond for a depth of 0,6m.

Solution

$$\tau(x) = \sum_{i=1}^{4} \alpha_i e^{-b_i x}$$

Wavelength (μm)	α_i	$b_i (m^{-1})$
0.2 – 0.6	0.237	0.032
0.6 – 0.75	0.193	0.45
0.75 – 0.9	0.167	3.0
0.90 – 1.20	0.179	35.0

$$\tau(x) = \sum_{i=1}^{4} \alpha_i . b_i . x = 0237 * e^{-0.032 \times 0.6} + 0.193 * e^{-0.45 \times 0.6}$$

$$+ 0.167 * e^{-3 \times 0.6} + 0.179 * e^{-35 \times 0.6} = 0.407$$

- A beam of light with intensity of 3mW and a wavelength of 743nm is striking a solar cell. Estimate the number of photons incident on the cell.

Solution

$$c = 3 \times 10^8 \text{ m/s}$$

$$E_p = \frac{hc}{\lambda} = \frac{6.625 \times 10^{-34} . 3 \times 10^8}{743 \times 10^{-9}} = 2.675 \times 10^{-19} \text{ J}$$

For intensity of 3×10^{-3} W or 3×10^{-3} J/s

$$n_p = \frac{I_p}{E_p} = \frac{3 \times 10^{-3}}{2.675 \times 10^{-19}} = 1.12 \times 10^{16} \text{ photon/s}$$