Information for the Quiz on Ch. Q3 and Q4

Things You Must Know

(1) Superposition Principle
(2) Boundary conditions for standing waves
(3) Conditions for constructive and destructive interference
(4) Rayleigh criterion
(5) Photon model of light
(6) Wave nature of matter

Potential Useful Equations

$v = \lambda f$ $\qquad$ $f = 1/T$

path difference = $d \sin\theta$ $\qquad$ $a \sin\theta_{1d} = \begin{cases} \lambda & \text{single slit} \\ 1.22\lambda & \text{circular opening} \end{cases}$

$E = hf = \dfrac{hc}{\lambda}$ $\qquad$ $\lambda = \dfrac{h}{p}$

$p \approx mv$ $\qquad$ $K \approx p^2/2m$

Physical Constants

$c = 3 \times 10^8$ m/s $\qquad$ 1 eV = 1.602×10^{-19} J

$h = 6.63 \times 10^{-34}$ J·s $\qquad$ $hc = 1240$ eV·nm

$m_{\text{proton}} = 1.7 \times 10^{-27}$ kg $\qquad$ $m_{\text{proton}}c^2 = 938.27$ MeV

$m_{\text{electron}} = 9 \times 10^{-31}$ kg $\qquad$ $m_{\text{electron}}c^2 = 0.511$ MeV