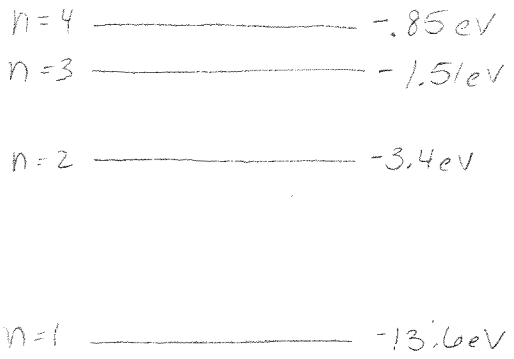
P #J

Ch 28 - Worksheet

Find energy levels for hydrogen:

$E = \frac{-13.6\,eV}{n^2}$ for $n = 1, 2, 3 \ldots$

$E_1 = -13.6\,eV$
$E_2 = -3.4\,eV$
$E_3 = -1.51\,eV$
$E_4 = -.85\,eV$



For all series, longest λ corresponds to smallest ΔE

a) For Balmer series, e^- falls to $n=2$

Smallest ΔE = E_3 to E_2 = $(-3.4eV) - (-1.51eV)$

$\Delta E = 1.89\,eV$

$E = \frac{h \cdot c}{\lambda}$ $\quad 1.89eV = \frac{1240\,eV \cdot nm}{\lambda}$

$\boxed{\lambda = 656\,nm}$

b) For Lyman series, e^- falls to $n=1$

Smallest ΔE = E_2 to E_1 = $(-13.6eV) - (-3.4eV)$

$\Delta E = 10.2\,eV$

$E = \frac{h \cdot c}{\lambda}$ $\quad 10.2eV = \frac{1240\,eV \cdot nm}{\lambda}$

$\boxed{\lambda = 122\,nm}$