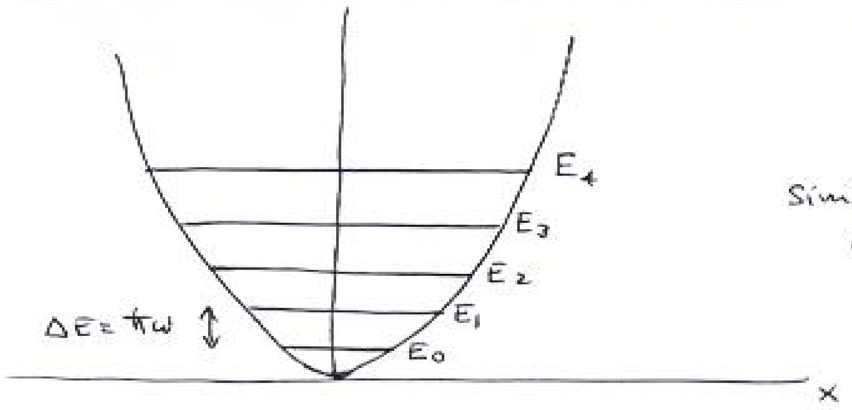

Similar to Planck oscillators or resonators!!

Probabity densities see Fig. 5.19

$$P_0 = 2\int_A^\infty |\psi_0|^2 dx$$

$$P_1 = 2\int_A^\infty |\psi_1|^2 dx$$

Note that as n increases, agreement between the classical and the quantum probabilities improves, as expected.

Ex 5.15

Classical vs. quantum

Classically

$m = 0.01\,kg$

$k = 0.1\ N/m$

$\omega = \sqrt{\frac{k}{m}} = 3.16\ rad/s$

$T = \frac{2\pi}{\omega} = 1.99\ sec$

$\Delta E = \hbar\omega = 2.08 \times 10^{-15}\ eV$

Too small to be detected or measured.

quantum (atomic level)

H_2 molecule

$m = 8.37 \times 10^{-28}\ kg$ (reduced mass)

$k = 510.5\ N/m$

$\omega = \sqrt{\frac{k}{m}} = 7.81 \times 10^{14}\ rad/s$

$\Delta E = \hbar\omega = 0.513\ eV$

Can be measured easily!