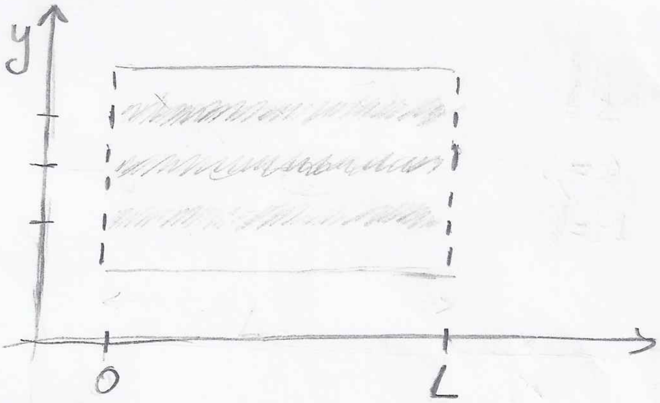
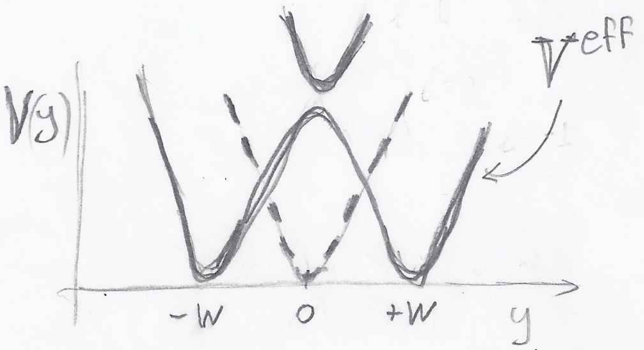
E 3710 (2004A #3) revised 2013B





$$\vec{B} = (0, 0, B(y))$$

$$B(y) = \begin{cases} +B_0 \\ -B_0 \end{cases}, \quad \omega_B = \frac{eB_0}{m}$$

(5) מצבים עצמיים חדשים

$$\psi^{\pm} \approx e^{-ieBWx} \cdot \frac{1}{\sqrt{2}}(\varphi^{+} \pm \varphi^{-})$$

$$\Delta = 2\omega_B \sqrt{g} \qquad (6)$$

$$g \approx e^{-2S}$$

$$S = 2 \cdot \int_0^W \sqrt{m^2 \omega_B^2 y^2}\, dy$$

Hence

$$\Delta = C e^{-A}$$

$$C = 2\omega_B$$

$$A = m\omega_B W^2 \sim \left(\frac{W}{r_B}\right)^2$$

(1) $$H = \frac{1}{2m}(p_x + eBy)^2 + \frac{1}{2m} p_y^2 + V(y)$$

$$p_x = -eB \cdot (\pm W)$$

(2) $$V^{\pm} = \frac{1}{2} m\omega_B^2 (y \mp W)^2 + V(y)$$

(3) $$\psi^{\pm} = \frac{1}{\sqrt{L}} e^{\mp ieBWx} \varphi_0(y \mp W)$$

$$\varphi_0(r) = \left(\frac{m\omega_B}{\pi}\right)^{1/4} e^{-\frac{1}{2}m\omega_B r^2}$$

Notations:

$$r_B = \frac{1}{\sqrt{m\omega_B}} = \frac{1}{\sqrt{eB}}$$

$$V_0 = \frac{1}{2} m\omega_B^2 W^2 \sim \left(\frac{W}{r_B}\right)^2 \omega_B$$

$$\Delta Y = \frac{2\pi}{eBL} \sim r_B^2/L$$

$$\varphi^{\pm}(r) = \varphi_0(r \mp W)$$