Домашняя работа № 3

№ 6.86

Дано

$0 < X < \dfrac{a}{3}$

$p - ?$

Решение:

$$p = \int \psi \psi^* \, dx$$
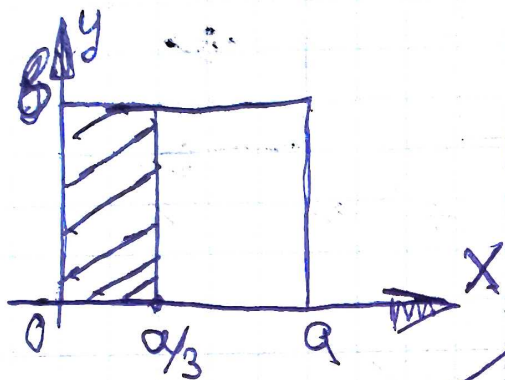
$$\frac{\partial^2 \psi}{\partial x^2} + \frac{\partial^2 \psi}{\partial y^2} + \frac{2m}{\hbar}(E - \underset{0}{U})\psi = 0$$

$$\psi = A \sin k_1 x \sin k_2 y, \text{ где}$$

$k_1 = \dfrac{2m}{\hbar} E_1, \quad k_2 = \dfrac{2m}{\hbar} E_2$

$$\begin{cases} \psi = 0 \\ (x=a) \end{cases}, \quad k_1 = \dfrac{\pi n_1}{a}$$

$$\begin{cases} \psi = 0 \\ (y=b) \end{cases}, \quad k_2 = \dfrac{\pi n_2}{b} \quad \Rightarrow$$

$$\Rightarrow A = \sqrt{\frac{4}{ab}} \quad , \quad \psi = \sqrt{\frac{4}{ab}} \sin \frac{\pi x}{a} \sin \frac{\pi y}{b}$$

$$P = \int\limits_0^{a/3} \int\limits_0^{b} \left(\frac{ab}{4}\right)^{-1} \sin^2 \frac{\pi x}{a} \sin^2 \frac{\pi y}{b} \, dx d = \ldots =$$
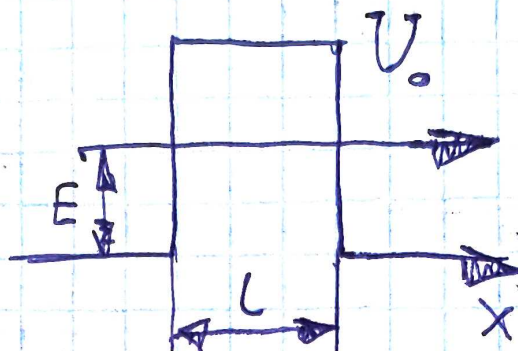
$$= \frac{1}{3} - \frac{\sqrt{3}}{4\pi} \approx 19\% \qquad +$$

Дано:

$E, \not{B}, L, U_0$

Найти:

D

Решение:

$$D \approx e^{-\frac{2}{\hbar}\int_{x_1}^{x_2}\sqrt{2m(U-E)}\,dx}$$

$$V(x_2) = V(x_1) = E \quad \text{и} \quad V(x) > E \quad \text{в}$$
$$x_2 > x > x_1$$

$$\Downarrow$$

Отв: $D \approx \exp\left(-\frac{2L}{\hbar}\sqrt{2m(U_0-E)}\right) +$