

Respostas da Lista 2

2. b) $0.6 \times 10^{-17} J$, c) $0.375 \times 10^{-8} m$ e $1.67 \times 10^{-9} m$

4. a) $V(x) = \frac{\hbar^2}{2m} \frac{x^2}{L^4}$, c) $\frac{\hbar^2}{2mL^2} \left(1 - \frac{x^2}{L^2}\right)$

5. $7.9 \times 10^{-10} m$

6. b) 0.04

8. $\langle E \rangle = \frac{\Delta p^2}{2m} + \frac{mw^2 \Delta x^2}{2}$

9. $\langle p^2 \rangle = \frac{\hbar^2}{4L^2}$

10. $\sigma_x = L \sqrt{\frac{1}{12} - \frac{1}{2\pi^2}}$, $\sigma_p = \frac{\hbar}{2L}$, $\sigma_x \sigma_p = \frac{\hbar}{2} \sqrt{\frac{1}{12} - \frac{1}{2\pi^2}}$,

14. a) $k_2 = \frac{k_1}{\sqrt{2}}$, b) $R = \frac{\frac{3}{2} - \sqrt{2}}{\frac{3}{2} + \sqrt{2}}$, c) $T = \frac{2\sqrt{2}}{\frac{3}{2} + \sqrt{2}}$, d) 97%

15. a) $k_2 = \sqrt{\frac{3}{2}} k_1$, b) $R = \frac{\frac{5}{2} - \sqrt{6}}{\frac{5}{2} + \sqrt{6}}$, c) $T = \frac{2\sqrt{6}}{\frac{5}{2} + \sqrt{6}}$, d) 99%

16. a) 4.2×10^{-5} , b) $3.6 V$ olt

18. a) $\left(\frac{1-\sqrt{\frac{2}{5}}}{1+\sqrt{\frac{2}{5}}}\right)^2$, b) $T = 1 - \left(\frac{1-\sqrt{\frac{2}{5}}}{1+\sqrt{\frac{2}{5}}}\right)^2$

20. a) $\psi_{n1,n2}(x, y) = \frac{2}{L} \sin\left(\frac{n_1\pi}{L}x\right) \sin\left(\frac{n_2\pi}{L}y\right)$, b) $E_{n1,n2} = \frac{\hbar^2 \pi^2}{2mL^2} (n_1^2 + n_2^2)$, c) $(n_1, n_2) = \{(1, 2), (2, 1)\}$

21. a) $l = 0, 1, 2, 3$, c) 32

22. a) 0.0107, b) 0.00587