

b # 7.

$$\psi(x, y, z) = A \psi(x) \psi(y) \psi(z)$$

$$= A \sin\left(\frac{k_1 x}{L}\right) \sin(k_2 y) \sin(k_3 z)$$

$$\int_0^L \psi^2 dV \Rightarrow$$

$$A^2 \int_0^L \sin^2(k_1 x) dx \int_0^L \sin^2(k_2 y) dy \int_0^L \sin^2(k_3 z) dz = 1$$

$$A^2 \left(\frac{L}{2}\right) \left(\frac{L}{2}\right) \left(\frac{L}{2}\right) = 1$$

$$\boxed{A = \left(\frac{8}{L}\right)^{3/2}}$$

$$A^2 \int_0^{L_1} \sin^2(k_1 x) dx \int_0^{L_2} \sin^2(k_2 y) dy \int_0^{L_3} \sin^2(k_3 z) dz$$

$$A^2 \left(\frac{L_1}{2}\right) \left(\frac{L_2}{2}\right) \left(\frac{L_3}{2}\right) = 1$$

$$A = \sqrt{\frac{8}{L_1 L_2 L_3}} = \sqrt{\frac{8}{V}}$$

$$V = \text{volume} = L_1 L_2 L_3$$

b # 9.

$$L = 4.714 \times 10^{34} \text{ J.s} = \sqrt{l(l+1)} \hbar = \sqrt{l(l+1)} 1.05 \times 10^{34}$$

\Rightarrow

$$l(l+1) \approx 20$$

$$l^2 + l - 20 = 0 \quad l = \frac{-1 \pm \sqrt{1 + 80}}{2} = \boxed{4}$$