(1) A particle is confined to one corner of a cubic box of sides L in quantum state

$$|\psi\rangle \leftrightarrow \begin{cases} A \sin\dfrac{2\pi x}{L} \sin\dfrac{2\pi y}{L} \sin\dfrac{2\pi z}{L}, & |x, y, z| < L/2, \\ 0, & |x, y, z| \geq L/2. \end{cases}$$

(a) Find the normalization constant A.

(b) If you measured the energy of the particle, what values could you measure, and with what probabilities?

(c) Describe as best you can the time evolution of this state.