8-14

(a)

Since wave function of a system consisting with two identical spin half must be anti-symmetric, and Spacial part $\psi(x_1, x_2)$ is symmetric thus spin part must be anti-symmetric and then $\chi(\vec{S}_1, \vec{S}_2)$ must be Unique.

(b)

Wave function given is correspond to situation in which one of the particles is in $n = 2$ and the other in $n = 5$ surface by knowing that $\varepsilon_n = \frac{n^2\pi^2\hbar^2}{2ma^2}$:

$$E = \varepsilon_2 + \varepsilon_5 = 4\varepsilon_1 + 25\varepsilon_1 = 29\varepsilon_1 = \frac{29\pi^2\hbar^2}{2ma^2}$$

Reader must know that wave function of a trapped particle in a box with width "a" is

$$\psi_n(x) = \sqrt{\frac{2}{a}} sin\left(\frac{n\pi x}{a}\right)$$

Mohammad Behtaj

Adel Sepehri

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