

Home work Solution

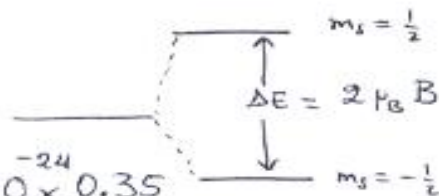
Chapter 8

Pb #1.

$$\Delta E = hf \Rightarrow f = \frac{\Delta E}{h}$$

$$f = \frac{2\mu_B B}{h} = \frac{2 \times 9.274 \times 10^{-24} \times 0.35}{6.63 \times 10^{-34}}$$

$$f = 9.8 \times 10^9 \text{ Hz}$$



Pb #6.

$$\Delta E = 2\mu_B B = 2 \times 9.274 \times 10^{-24} \times 0.5 = \boxed{9.274 \times 10^{-24} \text{ J}}$$

$$= \boxed{5.8 \times 10^{-5} \text{ eV}}$$

Pb #9.

particle, $s = \frac{3}{2}$ a) $S = \sqrt{s(s+1)} \hbar = 1.94 \hbar = 2.0 \times 10^{-34} \text{ J}\cdot\text{s}$

$$m_s = +\frac{3}{2}, \frac{1}{2}, \frac{1}{2}, \frac{3}{2}$$

$$\cos \theta = \frac{m_s \hbar}{\sqrt{s(s+1)} \hbar} = \frac{m_s}{\sqrt{s(s+1)}} = \frac{m_s}{1.94}$$

$$m_s = \frac{3}{2} \Rightarrow \cos \theta = 0.773 \Rightarrow \theta = 39.4^\circ$$

$$m_s = \frac{1}{2} \Rightarrow \cos \theta = 0.258 \Rightarrow \theta = 75.1^\circ$$

$$m_s = -\frac{1}{2} \Rightarrow \cos \theta = -0.258 \Rightarrow \theta = 104.9^\circ$$

$$m_s = -\frac{3}{2} \Rightarrow \cos \theta = -0.773 \Rightarrow \theta = 140.6^\circ$$