14. (a) The value of l satisfies $\sqrt{l(l+1)}\hbar \approx \sqrt{l^2}\hbar = l\hbar = L$, so $l \simeq L/\hbar \simeq 3 \times 10^{74}$.

(b) The number is $2l + 1 \approx 2(3 \times 10^{74}) = 6 \times 10^{74}$.

(c) Since

$$\cos\theta_{\min} = \frac{m_{l\,\max}\hbar}{\sqrt{l(l+1)}\hbar} = \frac{l}{\sqrt{l(l+1)}} \approx 1 - \frac{1}{2l} = 1 - \frac{1}{2(3 \times 10^{74})}$$

or $\cos\theta_{\min} \simeq 1 - \theta_{\min}^2/2 \approx 1 - 10^{-74}/6$, we have $\theta_{\min} \simeq \sqrt{10^{-74}/3} = 6 \times 10^{-38}$ rad. The correspondence principle requires that all the quantum effects vanish as $\hbar \to 0$. In this case $\hbar/L$ is extremely small so the quantization effects are barely existent, with $\theta_{\min} \simeq 10^{-38}$ rad $\simeq 0$.