Quantum Calculations on a Ring IV

Consider the following normalized abstract quantum state on a ring:

$$|\Phi\rangle = \sqrt{\frac{2}{3}}|-3\rangle + \frac{1}{\sqrt{6}}|-1\rangle + \frac{i}{\sqrt{6}}|3\rangle$$

1. What is the expectation value of $\hat{L}_z$ as a function of time for this state?

2. What is the expectation value of the energy as a function of time for this state?