

1. Define observables and operators in quantum mechanics. Why are observables represented by Hermitian operators?
2. Define expectation value. Give the expressions for expectation value of linear momentum and position.
3. Define Hamiltonian operator in quantum mechanics. Write down the eigenvalue equation for Hamiltonian operator explaining each term.
4. Find the expectation value of position for
 - a) $\psi(x) = Ne^{ikx}$ in the region $-a < x < a$
 - b) $\psi(x) = \sqrt{\lambda}e^{-\lambda|x|}e^{-i\omega t}$ in the region $-\infty < x < \infty$