CHEM106: Assessment 3

Postulates of Quantum Mechanics

1. According to one of the postulates of quantum mechanics, to every observable in classical mechanics there corresponds a linear, Hermitian operator in quantum mechanics. Write down the quantum mechanics operators for the following observables.

1. Total energy
2. Linear momentum in one dimension
3. Kinetic energy

2. Classify the following operators as linear or nonlinear:

1. 

B. 

3. Evaluate the commutator .

4. For a particle moving in a one-dimensional space with the potential energy function , write down the Schrödinger equation for the system.

5. For a one-dimensional system described by the wavefunction  (with ), set up the equation for calculating the expectation value for the kinetic energy of the particle.