Some quantum heat engines as real application of thermodynamic quantum have been modeled. These engines are constructed from a single particle on a one dimensional infinite potential well which are analogued from classical system containing a ideal monoatomic gas that expands an pushes piston in a cylinder. Here, temperature of gas is analogued as the expectation value of particle energy, cylinder volume is analogued as well wide, and piston pressure is analogued as mechanical force of well wall. From these analoguing, quantum thermodynamic processes can be explained. These processes construct Carnot, Otto, Brayton, and Diesel cycles which each of their efficiencies can be determined based on first thermodynamic law. The main conclusion is that generally the efficiencies of quantum heat engines are greater than the efficiencies of each classical engines.

**Key word**: quantum heat engine, potential well, efficiency
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